Noncommunity Source Water Assessment Report

For

West Milford Twp

Passaic, County

Richard J. Codey
Acting Governor
State of New Jersey

Bradley M. Campbell, Commissioner
Department of Environmental Protection

Lisa Jackson, Assistant Commissioner
Land Use Management

Michele Mateo Putnam, Director
Division of Water Supply

Barker Hamill, Acting Assistant Director
Water Supply Operations
401 E. State Street
PO Box 426
Trenton, New Jersey 08625-0426
(609) 292-5550

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HOW TO USE THIS SOURCE WATER ASSESSMENT REPORT

The following outlines the source water assessment report and directs you to general and/or noncommunity water system specific information.

Source Water Assessment Executive Summary
A summary of the Source Water Assessment Program and the susceptibility results statewide for noncommunity water systems. This summary also provides the susceptibility ratings for the noncommunity water systems' source(s) within the municipality.

The first three sections of the report contain general information; the last section is specific for the individual noncommunity water system(s) within the municipality.

Section I: Background Information on Drinking Water Systems page 1
General information on types of public drinking water systems (community and noncommunity) and sources of drinking water. The number of public water systems, wells, and surface water intakes in New Jersey is provided.

Section II: Source Water Assessment Program Overview page 7
An introduction to the Source Water Assessment Program and its goals.

Section III: Source Water Assessment Program Steps page 10
A description of the steps the Department of Environmental Protection (DEP) conducted to assess drinking water source(s) susceptibility to potential contamination. The contaminant categories of concern and the potential contaminant sources found to be significant in determining susceptibility (reffered to as explanatory variables) for the Source Water Assessment Program are included in this section. Table 5 provides the percentage of public noncommunity water system sources in New Jersey that rated high, medium, and low for each of the contaminant categories.

Section IV: Noncommunity Public Water System Individual Source Water Assessment Reports (arranged by PWID) page 25
The DEP developed a separate report for each noncommunity water system. This section of the report contains all of the noncommunity water system source water assessment reports that are within West Milford Twp. The individual noncommunity source water assessment reports contain general information regarding the program (similar to the information in Section I through III), susceptibility ratings for the system's source(s), an inventory of the potential contaminant sources used to determine the sources' susceptibility, and a map illustrating the source water assessment areas. The map is municipality based; therefore the map is not specific to the system. If a noncommunity water system is interested in obtaining a map specific to its source water assessment area, contact the Bureau of Safe Drinking Water at 609-292-5550.

Appendix A contains additional specific information for the noncommunity water systems. Appendix A consists of tables and information relating to the susceptibility rating determination for the system's sources. These items include:

Contaminant Category Scoring System - Attachment 1
A series of tables illustrating how the rating score is determined for a source. This document is divided into surface water and ground water sections and provides a table(s) for each of the contaminant categories. Using these rating score tables and the Individual Explanatory Variable Inventory, the numerical susceptibility rating score can be determined. This rating score was then converted into a high, medium, or low susceptibility rating. (The susceptibility rating score conversions are also provided.)

Source Water Assessment Area Map - Attachment 2
A map illustrating the source water assessment areas for the Noncommunity water system's sources (wells and surface water intakes) within the municipality. If a noncommunity water system is interested in obtaining a map specific to its source water assessment area, it may contact the Bureau of Safe Drinking Water at 609-292-5550

Appendix B contains documents that further explain the procedures taken to determine susceptibility of public drinking water sources. These documents contain information addressing the three steps of a source water assessment: develop a source water assessment area, inventory the potential contaminant sources, and determine susceptibility to potential contaminant sources.

Appendix C contains materials to assist in understanding the source water assessment report and contact information for further questions.

SOURCE WATER ASSESSMENT

Executive Summary

As a requirement of the 1996 Amendments to the Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination.

Approximately 85 to 90 percent of New Jersey's population receive their drinking water from public water systems. These public water systems are highly regulated and perform routine monitoring for the presence of contaminants. In 2003, 606 public community water systems consisting of 2237 wells and 64 surface water sources served approximately 7.5 million New Jersey residents. In addition, the public was served by 3685 public noncommunity water systems through establishments such as: schools, hospitals, restaurants, office buildings, and rest stops that have their own drinking water source.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water sources' susceptibility.

- Identified the area that supplies water to a public drinking water system well or surface water intake (known as the source water assessment area). For ground water sources, this area is also known as the well head protection area.
- Inventoried the significant potential sources of contamination within the source water assessment area.
- Determined how susceptible each drinking water source is to contamination.

Susceptibility to the following categories of contamination was determined:

- Pathogens
- Nutrients (nitrates)
- Pesticides
- Volatile Organic Compounds (VOCs)
- Inorganics
- Radionuclides
- Radon
- Disinfection Byproduct Precursors (DBPs)

To determine susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

The first category consists of *sensitivity factors*, which includes items related to the construction of a well (such as whether the well is in a confined or unconfined aquifer) and naturally occurring factors (such as the geology of the unit in which a well is drawing water from or over which water flows to the surface water intake).

Significant Sensitivity Factors

- Confinement status: For ground water, the confinement status of the well was by far the most frequently occurring sensitivity factor in predicting susceptibility to contamination and in fact was a factor in all the models. Confined wells are protected from activities at the land surface by relatively thick, laterally extensive units of low permeability (clay layers) and are a sufficient distance from the outcrop area of the geologic unit so that the source water is less likely to be affected by contamination at the land surface. Confined wells were determined to be of low susceptibility to contamination occurring at the land surface. Some confined wells, however, are susceptible to contaminants of natural subsurface origin. In 2003, there were no confined noncommunity water system wells.
- Depth to the top of the open interval: For unconfined wells, depth to the top of the open interval of the well was the most common sensitivity factor to affect the potential for contamination of a well. Depth to top of open interval was found to be a factor in the following five models: pathogens, nutrients, pesticides, inorganics, and radon. The shorter the distance to the land surface, the more likely for the well to be affected by contamination originating at the surface from point sources and certain land uses.
- Percent soil organic matter: For surface water and ground water, percent soil organic matter was found to be a frequently occurring sensitivity factor. Percent soil organic matter was a factor in the VOC, inorganic, and disinfectant byproduct precursor models for both the surface water and ground water susceptibility models.

The second category of factors affecting a source's potential to become contaminated consists of *intensity of use factors*. This category addresses the susceptibility to contamination resulting from human activities at the land surface. Intensity of use factors include those coming from a specific point source, such as a landfill or leaking underground storage tank, and nonpoint sources of contamination grouped by land-use characteristics, such as agriculture or urban land use.

Significant Intensity of Use Factors

Nonpoint Sources

Overall, the results of the modeling performed by USGS show that of the nonpoint sources, factors related to urban land use and agricultural land use, were most often linked to susceptibility of drinking water sources to contamination.

- Surface water: factors related to urban land use from the 1995 coverage (including percentage of commercial/industrial land use, percentage of developed land, percentage of residential land) were important in predicting a source's susceptibility for four contaminant groups, specifically nutrients, pesticides, VOCs, and inorganics. Agricultural land use was found to be a significant factor in three of the surface water models - nutrients, pesticides, and inorganics.
- Ground water: factors related to urban land use from both 1970 and 1995 were important in predicting the susceptibility of source water for five of the models - nutrients, pesticides, VOCs, inorganics and radionuclides. Agricultural land use in 1970 and 1995 coverages

were factors in six of the ground water models: pathogens, nutrients, pesticides, radionuclides, radon, and inorganics.

Point Sources

- Surface water: factors related to New Jersey Pollutant Discharge Elimination System /Discharge to Surface Water (NJPDES/DSW) permits and sewage treatment plant density were found most often to be important factors, specifically for the nutrients, VOCs, and inorganics susceptibility models. NJPDES stormwater permitted locations, compost facilities, sites on DEP's Known Contaminated Site List (KCSL) and solid waste landfills were found to be factors in two of the models: VOCs and inorganics.
- Ground water: point sources were found to be significant only in the models for VOC, inorganics, and disinfection byproduct precursors. No point sources were found to be important in the models for pathogens, nutrients, pesticides, radionuclides, and radon.

The specific sensitivity and intensity of use factors for each drinking water source are provided in this Source Water Assessment Report in Tables 2, 3, and 4.

Using the susceptibility factors, the statistical models provided numerical ratings for each source of drinking water for each contaminant category, which were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating was given to drinking water sources where the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL. For the list of New Jersey primary and secondary drinking water standards, containing the MCLs, please refer to http://www.state.nj.us/dep/watersupply/standard.htm.

In some cases, insufficient data for particular supplies were available for all variables used in susceptibility models. In such cases, a default value for missing data was assumed. Use of default values could result in a different susceptibility rating than that which would result if the source-specific data were available.

Statewide Summary

Table E1 illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the contaminant categories. The table is separated by source type: ground water and surface water.

Table E1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent %)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	DBPs
Ground Water 3480 Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Intakes								
High	100[1]	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100[1]	100[1]	0

[1]All surface water intakes received high susceptibility ratings for pathogens and low susceptibility rating for radionuclides and radon

For the purpose of the source water assessments, the drinking water derived from all surface water intakes was assumed to be highly susceptible to contamination by pathogens. Therefore, all surface water intakes received a high rating for pathogens (100 percent). Surface water sources are subject to various sources of microbial contamination runoff containing fecal matter. Secondly, radionuclide and radon models for surface water were not developed. Radionuclides are primarily a concern of ground water, therefore, all surface water intakes received a low susceptibility rating for radionuclides and radon (0 percent).

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens). In fact, a high percentage of community water system surface water intakes were found to be highly susceptible to the same contaminant categories. Eighty-one percent of community water system surface water intakes were found to be highly susceptible to inorganics and 98% were found to be highly susceptible to disinfection byproduct precursors.

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%). When reviewing the results of the medium susceptibility ratings for noncommunity water system wells, the three contaminant categories

in which a high percentage of the wells rated medium are disinfection byproduct precursors (97%), radon (72%), pesticides and nutrients (both 66%).

Summary of Noncommunity Water Systems' Sources within West Milford Twp

West Milford Twp consists of 92 noncommunity water systems, consisting of 95 wells, and 0 surface water intake(s). **(The water system data used for the development of the original drinking water source inventory was compiled in the summer of 2003.)**

Table E2 provides a summary of the susceptibility ratings for the noncommunity water systems within West Milford Twp. The first column provides the public water system's identification number (PWID) and the second column provides the name of the system and its source(s) (when available). The remaining columns provide the susceptibility ratings to each contaminant category for the source(s). A total of each of these ratings (overall susceptibility ratings) is provided at the bottom of the table.

Table E2: Summary of Susceptibility Ratings for Noncommunity Drinking Water Source(s) within West Milford Twp

PWID	System Name / Source Name	Pathogens			Nutrients			Pesticides			VOCs			Inorganics			Radionuclides			Radon			DBPs		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
1615302	Camp Vacamas Asscoiation of New Jersey	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615305	Danata Dangelo Strip Stores	0	1	0	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615306	Lakeland Plaza	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615307	Mcdonalds Restaurant	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615308	Belcher Run Shopping Center	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	1	0	0	0	1	0	0	1	0
1615310	Pizza Place	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615312	Upper Greenwood Lake School	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615314	Shell Oil Company VMPW	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615316	United Methodist Church	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0
1615317	Village Square Inn	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615319	Big Johns Pub	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615320	Dairy Queen	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615321	Greenwoo Lake Beach Supply	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615323	Our Lady Queen of Peace	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615324	Maple Road School	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615325	Macopin School	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0

PWID	System Name / Source Name	Pathogens			Nutrients			Pesticides			VOCs			Inorganics			Radionuclides			Radon			DBPs		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
1615326	West Milford High School	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615327	Westbrook School	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615328	West Milford Board of Education - Transportation	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615329	Marshall Hill School	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615330	Paradise Knoll School	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615333	St Josephs School	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615334	Oakridge Presbyterian Church/My School Day Care	0	0	1	0	0	1	0	0	1	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0
1615335	Strenghten Our Sisters Outreach/Omni School	0	1	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0
1615337	Grace Fellowship Church	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615338	Christian Life Day Care Center	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615339	Hillcrest Community Center	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615340	Milford Manor	0	2	0	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	2	0	0	2	0
1615341	Hewitt Plaza Professional Condominium	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615342	Rockport Shopping Park	0	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615344	West Milford Town Hall	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615345	West Milford Road Department	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615347	Geod Corporation	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0

PWID	System Name / Source Name	Pathogens			Nutrients			Pesticides			VOCs			Inorganics			Radionuclides			Radon			DBPs		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
1615353	Esco Products	0	0	1	0	0	1	0	0	1	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0
1615354	Lakeland Plaza	0	1	0	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615355	Our Lady Queen of Peace	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615356	Storms Island Association	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615357	Camp Hope (Main Well)	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	1	0	0	0	1	0	0	1	0
1615358	Camp Hope (Caretaker Well)	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615359	Camp Hope (Dining Hall)	0	0	1	0	1	0	0	1	0	0	0	1	0	0	1	1	0	0	0	1	0	0	1	0
1615360	Camp Hope (Pool Well)	0	0	1	0	1	0	0	1	0	0	0	1	0	0	1	1	0	0	0	1	0	0	1	0
1615362	Eastern Propane Corporation	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615363	Town Tavern Country Inn (Well 1)	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615364	Valley View Pub	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615367	Mckeage's Tavern	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615368	Pizza Station	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615369	The Philadelphia Church Ministry	0	0	1	0	0	1	0	0	1	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0
1615370	The Philadelphia Church Ministry	0	0	1	0	0	1	0	0	1	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0
1615371	Town Tavern Country Inn	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615372	Hot Diggity's Inc.	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615373	West Milford Elks Lodge	0	1	0	0	0	1	0	0	1	1	0	0	0	0	1	0	0	1	0	1	0	0	1	0

PWID	System Name / Source Name	Pathogens			Nutrients			Pesticides			VOCs			Inorganics			Radionuclides			Radon			DBPs		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
1615374	Paul's Place	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615377	Masons Mountainside Inn	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615378	Lakeland Bank	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615379	Mountain Restaurant	0	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615380	Newfoundland Deli	0	1	0	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615381	Country Roads Deli & Catering	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615382	Fenners Deli West Milford Bar	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615383	N & S Towne Centre Deli	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615384	Bethel Ranch Boarding	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615385	Countryside Mobile	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615386	Strength In Our Sisters	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615387	Momento	0	1	1	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	2	0	0	2	0
1615388	Exxon USA 3-5472	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615389	Mountain Jug Dairy Deli	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615390	Pickles Pub	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615391	West Milford Realty Shoprite	0	1	1	0	2	0	0	2	0	1	0	1	0	0	2	1	1	0	0	2	0	0	2	0
1615393	A.N.N Gas Mart	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615395	The Towne Commons	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615397	1-A RANCH	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615398	Cafe Amore	0	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0

PWID	System Name / Source Name	Pathogens			Nutrients			Pesticides			VOCs			Inorganics			Radionuclides			Radon			DBPs		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
1615399	Lakeside Market & Pizzeria Inc.	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615400	Lakeview Pub & Liquors	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615402	Oakridge Crossing Shopping Center	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615405	Newfoundland Amoco	0	1	0	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615411	Macopin Pizza	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615412	Connie's Cafe	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615415	Dairy Queen	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615416	Oak Ridge Pub & Liquors	0	1	0	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615417	West Milford Shopping Center	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	1	0	0	0	1	0	0	1	0
1615418	Montclair YMCA Day Camp	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615419	Montclair YMCA Day Camp (Lower)	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615420	Montclair YMCA Day Camp (Upper)	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615423	Quality Time Preschool	0	1	0	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615424	Holy Faith Lutheran Church	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615425	Apple Montessori School	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615426	Island of Spirits	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615427	Selling Precision Inc.	0	0	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0
1615428	Dunkin Donuts	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0

PWID	System Name / Source Name	Pathogens			Nutrients			Pesticides			VOCs			Inorganics			Radionuclides			Radon			DBPs		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
1615430	West Milford Township Police Athletic League	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0
1615431	Higgins Optical Building	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0
1615433	Evergreen Farms	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	1	0	0	0	1	0	0	1	0
Total for West Milford Twp		0	35	60	0	45	50	0	45	50	54	0	41	0	6	89	7	71	17	1	94	0	0	95	0

If a drinking water source's susceptibility is high, it does not necessarily mean the drinking water is contaminated. The rating reflects the potential for contamination of source water, not the existence of contamination.

Under the State's Safe Drinking Water Regulations, all public noncommunity water systems must routinely monitor for contamination. If MCLs (drinking water standards) are exceeded, the noncommunity water system must immediately post a notice of failure in a place conspicuous to consumers until the system is compliant.

The Source Water Assessment Program was designed to encourage protection of drinking water sources by providing information to state and local regulatory agencies and the public to assist in watershed assessment and planning and to enhance the public's role as "water stewards." The results provide information to allow state and local agencies to determine if increased regulatory controls, including local land use ordinances, are warranted. In addition, the basic data gathered through the Source Water Assessment Program, including the locations of the public water system wells and surface water sources, will be available for DEP program use in efforts to improve environment regulatory actions, such as cleanup decisions in the hazardous and solid waste programs. For more information on DEP's Source Water Protection efforts please see the Statewide Summary Document available at www.state.nj/us/dep/swap.

For further information please refer to the detailed information in this Source Water Assessment Report or go to www.state.nj/us/dep/swap.

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Division of Water Supply
Edward Apalinski
Patricia Bono
Karen Fell
Barker Hamill
Sandra Krietzman
Myongsun Kong
Mike Matthews
Diane Pupa
Michele Putnam
Linda Walsh
Kristin Zams

New Jersey Geological Survey
Steve Johnson
Bill Mennel
Ted Pallis
Steve Spayd

Division of Science, Research and Technology
Gail Carter
Branden Johnson
Judy Louis

Watershed Management
Robert Kecskes
Tom McKee

Policy and Planning
Elizabeth Semple

United States Geological Survey
Debra Buxton
Jessica Hopple
Robert Nicholson
Steven Nieswand
Donald Storck
Eric Vowinkel

Source Water Assessment Advisory Committee
Tom Atherholt, NJDEP, DSRT
Jim Blando, NJ Department of Health and Senior Services
Paul Britt, NJ Water Association
Dave Brogle, Middlesex Water Company
Perry Cohn, NJ Department of Health and Senior Services
Ray Cywinski, United Water
Joe Deckelmick, NJ Environmental Federation
Kevin Dixon, NJ American Water Company
Ron Farr, North Jersey District Water Supply Commission
Amy Goldsmith, NJ Environmental Federation
Robert Hordon, Rutgers University
Rick Howlett, NJ Water Association
William Hutchinson, Southeast Morris County MUA
Mark Impomeni, Bergen County Health
Lendel Jones, NJ American Water Company
Robert Karl, Brick Township MUA
Haig Kasabach, Hamilton Township
Geoff Knapp, Morris County
Anne Kruger, Passaic River Coalition
Leo Kruger, Passaic River Coalition
Louisa Lubiak, Passaic River Coalition
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SECTION I – BACKGROUND INFORMATION ON DRINKING WATER SYSTEMS

SECTION I – BACKGROUND INFORMATION ON DRINKING WATER SYSTEMS

This background information is provided to describe how public drinking water systems are regulated and the relationship of these water systems with the Source Water Assessment Program. The following section describes sources of drinking water (groundwater and surface water), types of drinking water systems according to the Department of Environmental Protection (DEP) and Environmental Protection Agency (EPA) definitions, and drinking water treatment.

Sources of Drinking Water

1. Ground Water
Ground water infiltrates the ground and is stored in aquifers, soil and rock below the surface. Aquifers typically consist of gravel, sandstone, sand, or fractured rock. An aquifer can be confined or unconfined. A confined aquifer is ground water bounded between impermeable layers, such as clay. An unconfined aquifer is not bounded by impermeable layers and is more directly linked to surface activities and resources.

Ground water is obtained from a spring or by pumping water from an aquifer through a well. A well is a hole or excavation that is drilled, bored, core driven, jetted, dug, driven or otherwise constructed for the purpose of removal of water from the subsurface for potable water supply. Public wells in New Jersey range from 15 to 1,984 feet deep (in 2002).

2. Surface Water
Surface water, is the water at or above the land's surface, which is neither ground water nor contained within the unsaturated zone, including, but not limited to, the ocean and its tributaries, all springs, streams, rivers, lakes, ponds, wetlands, and artificial waterbodies.

An important link exists between ground water and surface water. Surface water can infiltrate the ground and recharge aquifers. Conversely, ground water slowly moves to the surface and discharges into lakes, rivers, or streams and is known as baseflow. New Jersey's natural stream flow, especially during periods of low precipitation, is largely baseflow from ground water.

Figure 1 illustrates the water cycle, ground water and surface water, and potential sources of contamination to drinking water sources.

Figure 1: Hydrologic Cycle and Sources of Drinking Water

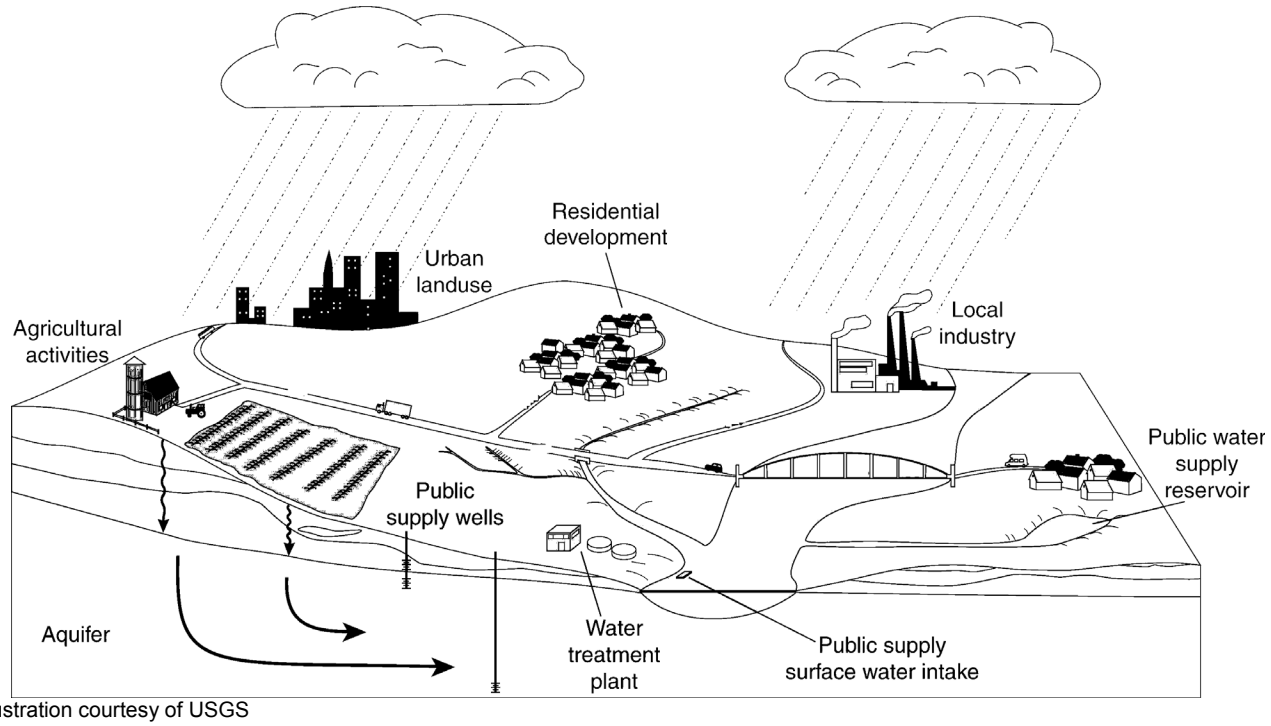


Illustration courtesy of USGS

Types of Public Water Systems

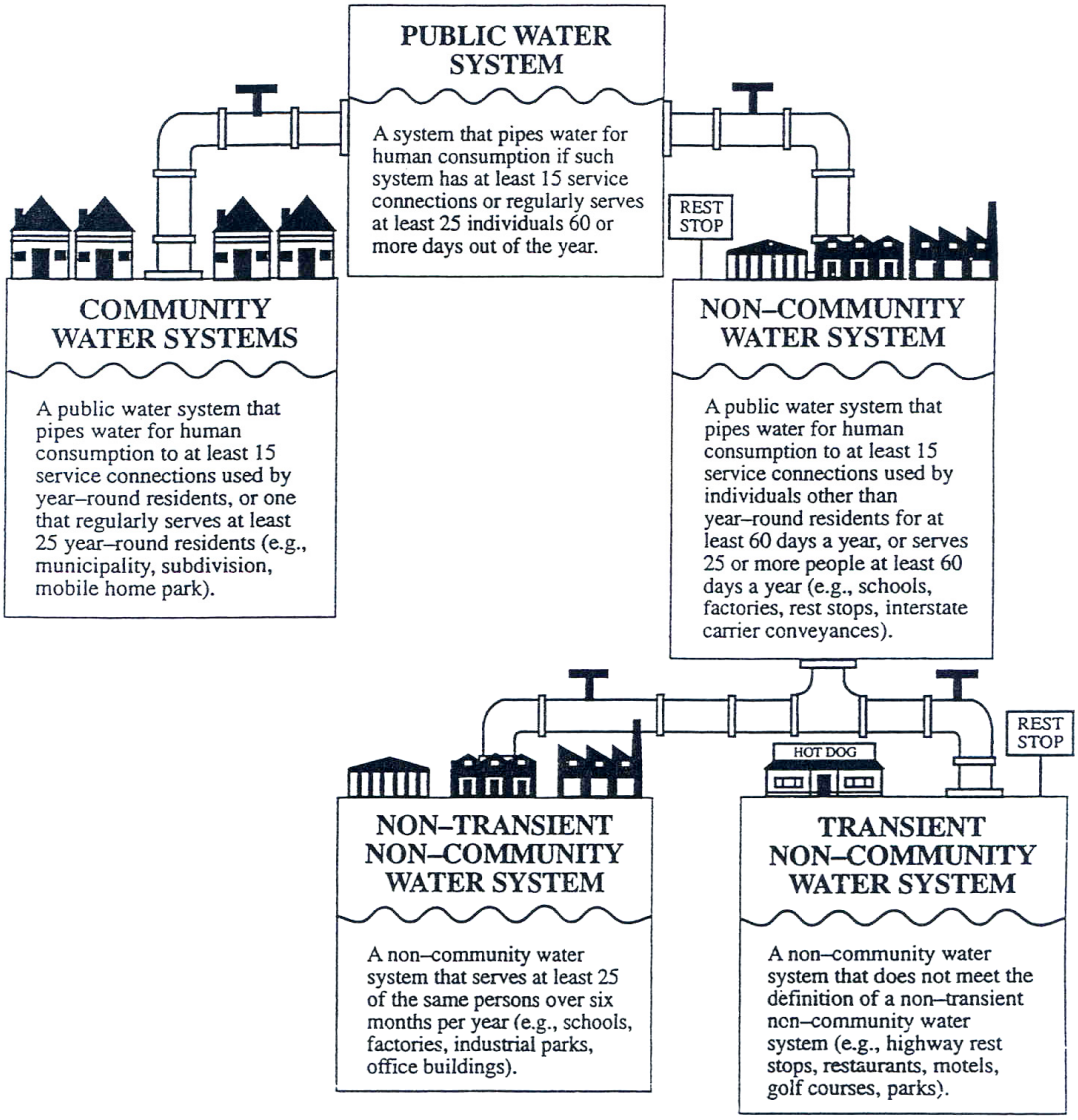
A public water system is defined as a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves at least 25 individuals. Ground water and/or surface water sources can be used for public water systems.

1. **Community Water System**: has at least 15 service connections used by year round residents, or regularly serves at least 25 year round residents. Examples of a community water system are mobile home communities, municipally owned water systems and privately owned water systems that have their own well(s) or surface water intake(s).

2. **Noncommunity Water System**: used by individuals other than year round residents for at least 60 days of the year. A noncommunity water system can be either transient or nontransient. A nontransient noncommunity water system serves at least 25 of the same persons over six months per year, such as schools, factories, and office buildings which have their own well(s) or surface water intake(s). Transient noncommunity water systems are systems that do not fall within the definition of a nontransient water system. Transient noncommunity water systems include rest stop areas, restaurants, and motels that have their own well(s).

A flow chart describing these definitions appears in Figure 2.

Figure 2: Types of Public Water Systems



From: Public Notification Handbook for Public Water Systems, USEPA Office of Water, USEPA Publication 570/9–89–002 September 1989

Approximately 85 to 90 percent of New Jersey's population is served by public water systems. Table 1 summarizes the number of public water systems, wells, and surface water sources in the State of New Jersey in 2003.

Table 1: Public Water Systems in New Jersey in 2003

Type of Public Water System	# of Public Water Systems*	# of Ground Water Sources	# of Surface Water Sources
Community	606	2237	64
Nontransient Noncommunity	876	1083	3
Transient Noncommunity	2654	2779	0
Total	4136	6099	67

* DEP, Bureau of Safe Drinking Water, NJ Public Water System Database.

The remaining New Jersey population is served by private wells (i.e. wells serving individual homes, small businesses, etc.) Private wells are not included in the SWAP. For more information on private wells please visit the Division of Water Supply web site at www.state.nj.us/dep/watersupply or refer to the EPA web site at www.epa.gov/safewater/pwells1.html.

Drinking Water Treatment

A public water system consists of interconnected pipes that lead from the source of drinking water to the consumer. Almost all community water system sources and some noncommunity water system sources are treated to remove microorganisms or dissolved chemicals or minerals. An entry point to the distribution system (EPTDS) is a location in the public water system where treated water from a treatment plant enters into the water distribution system. A public water system may contain one or more EPTDS. If the water is not treated, as some ground water systems are not, then the place where the untreated water source enters the network of pipes is the EPTDS.

Figure 3 illustrates general treatment schemes for both a surface water system and a ground water system. The means of acquiring water (well or surface water intake), the treatment process, and storage are shown. An individual water system may contain only part or even none (do not treat) of these pieces. Individual water treatment may vary according to source water quality.

Figure 3: Example of Drinking Water Treatment

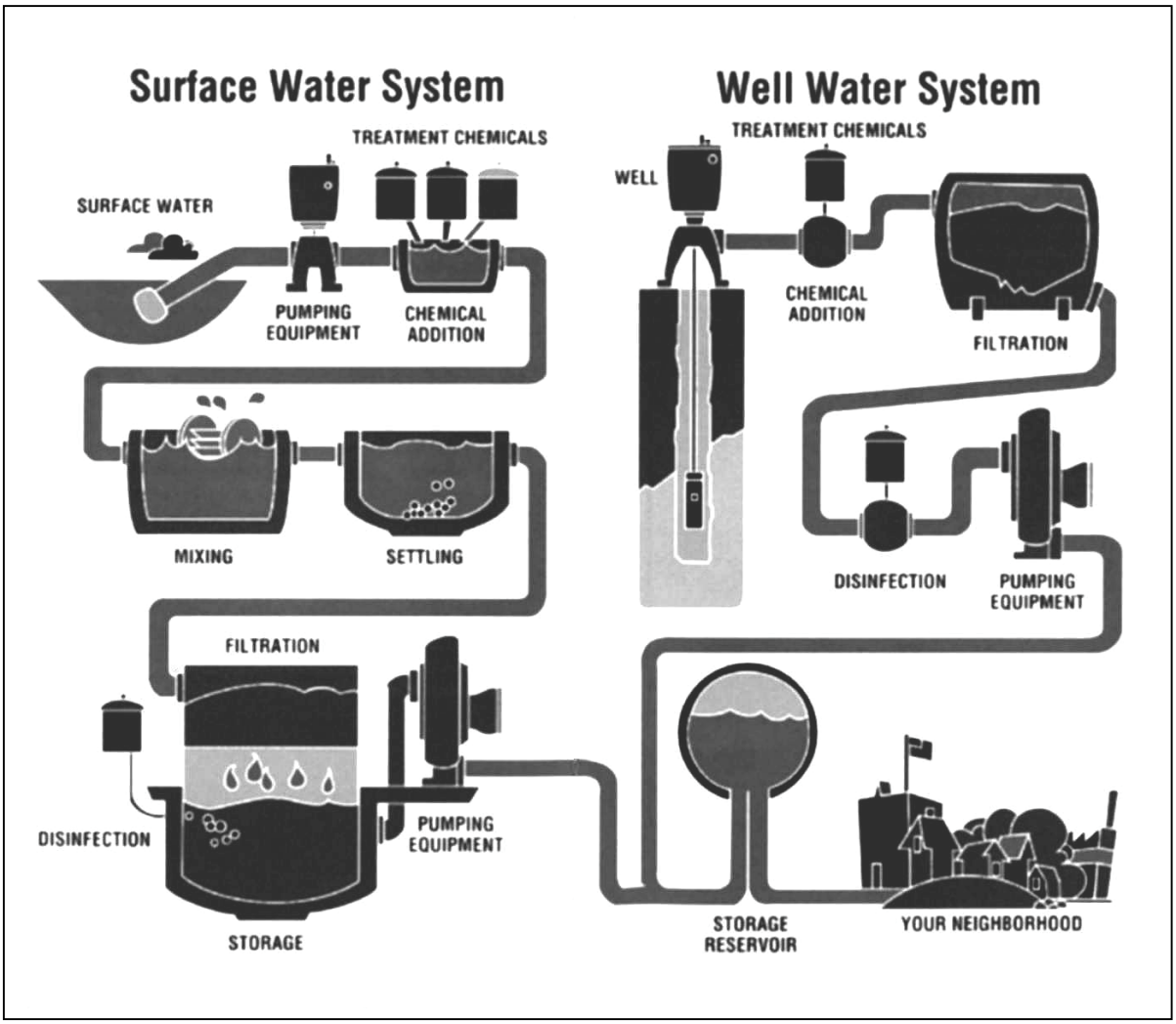


Illustration from “Safeguarding the Quality of Your Drinking Water”, prepared by the Public Information Committee of the New Jersey Section of the American Water Works Association.

SECTION II – SOURCE WATER ASSESSMENT PROGRAM OVERVIEW

SECTION II – SOURCE WATER ASSESSMENT PROGRAM OVERVIEW

Introduction

The 1996 Amendments to the Federal Safe Drinking Water Act place a strong emphasis on public awareness and the information provided to the public concerning the quality of drinking water. As part of the 1996 Amendments, all states were required to establish a Source Water Assessment Program (SWAP).

Through the SWAP, the DEP evaluated the susceptibility of public water systems to several categories of contamination. **If a system rates highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water.** The rating reflects the potential for contamination of source water, not the existence of contamination. Susceptibility to contamination is a function of several factors, including contaminant use near the water source and the characteristics of the water source.

New Jersey's SWAP Plan, which provides the framework for how DEP performed the assessments, can be found at www.state.nj.us/dep/watersupply/swap1.pdf.

The New Jersey SWAP incorporates four steps:

1. **Delineate the source water assessment area of each public drinking water source.**
2. **Inventory the potential contaminant sources within the source water assessment area.**
3. **Determine the water system's susceptibility to contaminants.**
4. **Incorporate public participation and education.**

Source Water Assessment Program Goals

The information obtained from the completed source water assessments may be used to achieve the goals listed below.

1. Protect sources of drinking water.

The source water assessments provide a susceptibility rating for each source of drinking water, which supplies information on how vulnerable the source is to contamination.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results can be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing the State's drinking water protection efforts. Based on the potential of a drinking water source to become contaminated, DEP can initiate a variety of activities to protect the drinking water source through existing DEP programs. For more information regarding DEP's Source Water Protection Strategy please refer to the Source Water Assessment Program Statewide Summary available on the Division of Water Supply's web site at http://www.state.nj.us/dep/watersupply//.

2. Public education of SWAP information.

DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP spoke to interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. Upon completion of the

source water assessments, DEP generated a source water assessment report and/or summary for each public water system to report the susceptibility ratings.

The goal of the public education efforts is to make the public more aware of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education requirement, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the EPA and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules can be customized based on the susceptibility of the sources of drinking water. The SWAP will provide better information for making these determinations.

Source Water Assessment Reports
DEP will issue the following reports to public water systems.

1. **Community Water System Source Water Assessment Report**: primarily intended for the public water system's reference and use, although the report is also available to the public. Individuals, environmental organizations, and municipalities interested in source water protection may also utilize the Community Water System Source Water Assessment Report for protection activities.

2. **Community Water System Source Water Assessment Summary**: a short (4-6 page) informative document created for distribution by the water system to the general public. In addition, DEP will post the summary document on the SWAP web site at http://www.state.nj.us/dep/swap/. The Community Water System Source Water Assessment Summary is a synopsis of the Source Water Assessment Report and provides the source susceptibility ratings for the community water system's sources.

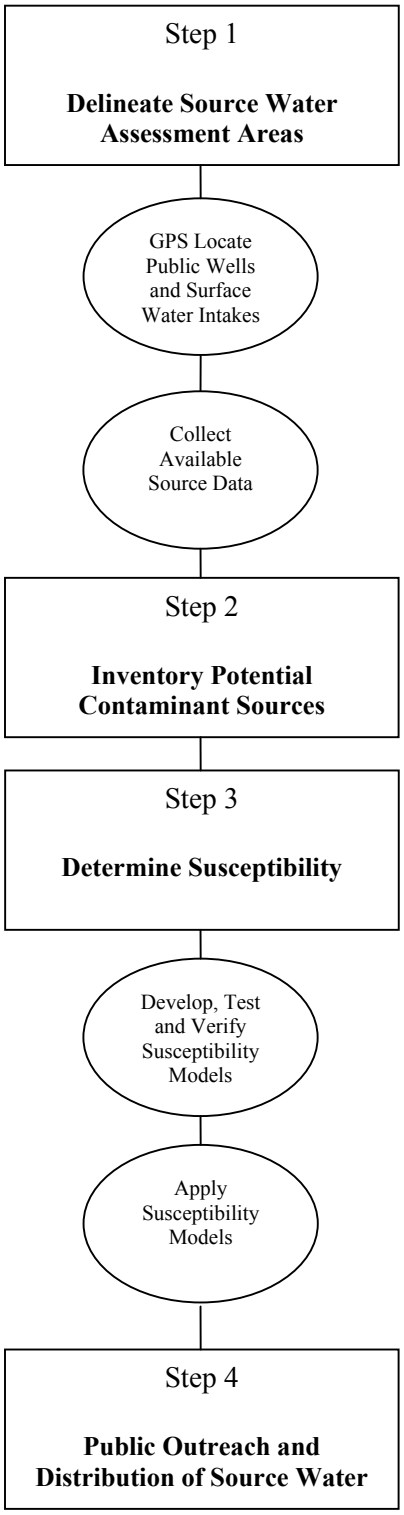
3. **Noncommunity Water System Source Water Assessment Report**: developed for the respective noncommunity water system. The report provides the susceptibility ratings of the system's sources. The general public may request the report from the noncommunity water system or the DEP. In addition, the DEP decided to develop a noncommunity water system report for each municipality. The report contains the noncommunity water system reports for the systems found in the same municipality. DEP hopes this report will assist local planning agencies and the public in source water protection efforts.

SECTION III – SOURCE WATER ASSESSMENT PROGRAM STEPS

SECTION III – SOURCE WATER ASSESSMENT PROGRAM STEPS

The SWAP consists of four fundamental steps that are illustrated in Figure 4.

Figure 4: Flowchart of Source Water Assessment Program Process



Step 1: Delineation

The first step of the SWAP process is to delineate the source water assessment area for each public water system well and surface water intake. For ground water sources, a source water assessment area in New Jersey is the area from which water is reasonably likely to flow to a well within a 12 year period. This area is also known as a wellhead protection area, or WHPA. For surface water sources, the source water assessment area is the area upstream of a surface water intake, including land that drains to the upstream areas.

Before the source water assessment area was delineated for a public well, attribute data was gathered. Since 1947, a property owner or well driller has been required to obtain a well permit from New Jersey's well permitting program to drill a well in New Jersey. After a licensed well driller drills the well, a well record must be submitted to the Division of Water Supply, DEP. The well record is an "as-built" description of the well construction, and usually contains important attribute data such as well depth, screened interval or length of open hole, and pumping rate/capacity. This information is needed to delineate the source water assessment area around the well. DEP used the well record to determine attribute data. In situations where DEP was unable to obtain attribute data, such as for a well drilled prior to 1947 or when a well record was not available, default values were generated using New Jersey Geological Survey's (NJGS) "Guidelines for Delineation of Well Head Protection Areas in New Jersey," Appendix B- Attachment 1. The guidance document is available on the internet at www.state.nj.us/dep/njgs/whpaguide.pdf, by contacting the DEP, New Jersey Geological Survey at (609) 292-1185, or from the DEP Maps and Publications Sales Office at (609) 777-1038.

For surface water intakes, source water assessment areas were developed based on the location of the intake and the entire drainage area upstream of the intake including headwaters and tributaries. These factors influence the shape and size of the delineations.

Next, the well or intake was located using Global Positioning System (GPS). All wells and intakes were GPS-located according to the "DEP GPS Data Collection Standards for GIS Data Development" available at www.state.nj.us/dep/gis/gpstrim.html. The DEP GPS-located the community water system wells and surface water intakes. The noncommunity water system wells were GPS-located by DEP, County Environmental Health Act (CEHA) Agencies, and the New Jersey Water Association.

After collecting the attribute data and GPS location, the source water assessment areas for wells and intakes were delineated. DEP performed the ground water source water assessment area delineations using the Combined Model/Calculated Fixed Radius Method for all public community water system wells and the Calculated Fixed Radius method for the noncommunity water system wells. For a detailed description of the delineation methods please refer to New Jersey's "Guidelines for Delineation of Well Head Protection Areas in New Jersey," Appendix B- Attachment 1.

For each ground water source, three tiers were calculated and labeled as Tier 1 (two year time of travel), Tier 2 (five year time of travel), and Tier 3 (12 year time of travel). Time of travel was established for determining the risk of contamination to a well. The two year time of travel was developed based on the potential for microbiological contamination. Studies show on average, bacteria can survive in ground water for approximately 170 days and

viruses can survive in ground water for approximately 270 days. The two year time of travel indicates the limits of concern for potential viable microbiological contamination of the water system through the source water.

The five year time of travel was established to address contamination from accidental discharges. This time of travel provides a reasonable amount of time to investigate, monitor, and/or remediate a spill within the source water assessment area. The third time of travel portion of the source water assessment area, 12 year, was designed in consideration of the known contaminant sources. Studies show that 10 to 15 years of time of travel generally covers the full length of a contaminant plume. The 12 year time of travel will permit enough time for responses to be made.

The DEP delineated the source water assessment areas for surface water intakes using the United States Geological Survey's (USGS) hydrologic unit code 14 (HUC14) as the base data-set for the delineations. Hydrologic unit codes identify drainage basins in a nested group from large to small. The larger the HUC number the smaller the drainage basin. For example a HUC4 will be made up of several smaller HUC8s, and the HUC8s will be made up of several smaller HUC14s. The source water assessment areas for the surface water intakes include the entire drainage area that flows past the intake, including headwaters and tributaries. For more information on the methodology used for surface water delineations, refer to Appendix B- Attachment 2, Surface Water Delineation Methodology.

The DEP has classified approximately 50 wells as "ground water under the direct influence of surface water" (GUDI). GUDI wells are classified according to site specific water quality measurements and provide additional treatment of the source water. For GUDI wells, the DEP performed a conjunctive delineation, an integrated delineation combining the ground water contribution and the surface water contribution to the well. The groundwater and surface water contribution were delineated using the same procedure described above, except the 2 year time of travel for the ground water delineation demarcated the downstream boundary.

A few GUDI wells do not have an obvious surface water body influencing the well. In these instances only the ground water delineated source water assessment area was available. Therefore, the 12 year time of travel boundary for the ground water delineation was used to define the surface water contribution area. An example of this scenario would be the Newton Water and Sewer Utility, Facility number 03, SFID number 010.

The ground water susceptibility models were applied to the GUDI wells ground water contribution area and the surface water susceptibility models were applied to the surface water contribution area. The final susceptibility rating for the GUDI well was determined by taking the higher susceptibility rating of the two (ground water and surface water). Using the pathogen contaminant category as an example, all surface water automatically received a high susceptibility rating for pathogens. Therefore, all GUDI wells received a high susceptibility rating for pathogens. Even if the GUDI well rated low to pathogens for the ground water contribution area, the high rating for the surface water contribution area was used as the final susceptibility rating (the highest rating of the two).

Step 2: Potential Contaminant Source Inventory

The second step of the SWAP is to identify the potential contaminant sources within the source water assessment area. These potential sources of contamination include point and nonpoint sources. Point source contaminants may be traced to a single source, such as known contaminated sites, industrial and commercial surface and ground water discharges, and sewage treatment discharges. Nonpoint source contaminants may not be traced to one single source because they come from several individual sources within a large area. Land use activities such as salting and runoff from roads and the application of pesticides and herbicides are examples of nonpoint sources. Nonpoint and point sources can have a significant impact on both surface water and ground water quality.

Potential contaminant source inventory information was primarily collected from existing DEP GIS databases. For nonpoint sources, digital GIS land use and land cover data for the years 1970, 1986, and 1995 were used. Several datasets of land coverage were used to account for the changes in land use over the years. The New Jersey Source Water Assessment Program Potential Contaminant Source Inventory (PCSI) Methodology, Appendix B-Attachment 3, describes how the potential contaminant source inventory was developed, the datasets used, the sites and activities included in the inventory, and the preliminary list of explanatory variables used in the susceptibility models.

For the purpose of the SWAP, the DEP, in conjunction with a Source Water Assessment Advisory Committee that met regularly during the development of the SWAP Plan, developed eight conceptual contaminant categories that represent microbiological and chemical contaminants of concern. These categories include pathogens, nutrients, volatile organic compounds, synthetic organic compounds, pesticides, inorganics, radionuclides and disinfection byproduct precursors. This list was further refined during the susceptibility model development process. Tables 2, 3, and 4 contain the final list of contaminant categories and explanatory variables. Each drinking water source was evaluated for susceptibility to each of the following contaminant categories.

Conceptual Contaminant Categories

Pathogens

Disease-causing organisms such as bacteria, protozoa, and viruses. Sources of pathogens include both point and nonpoint activities. An example of a point source of pathogens is a sewer system overflow. An example of a nonpoint source is runoff from areas where livestock are kept.

Nutrients

Common types of nutrients include nitrogen and phosphorous. Nutrients can harm environmental quality, human health, and the efficiency of the drinking water treatment plant by encouraging growth of photosynthetic microorganisms in surface water sources, which alter water characteristics (eutrophic conditions). Sources of nutrients are point and nonpoint sources. Effluents from a sewage treatment plant are a point source of nutrients. Nonpoint sources of nutrients include discharge from septic fields, areas where animal waste is stored, and runoff from agricultural and residential land where fertilizers were used.

Pesticides
Common sources of pesticides include land applications (nonpoint source) and manufacturing/distribution centers of pesticides (point source). Pesticides are manmade chemicals used to control bacteria, fungi, weeds, rodents, and insects. Examples include herbicides such as atrazine and insecticides such as chlordane.

Synthetic Organic Compounds (SOCs)
Sources of SOCs can be point and nonpoint. Common sources include chemical manufacturing plants, pharmaceutical plants, sewage treatment plants, and discharges from contaminated sites. Synthetic organic compounds are manmade.

Volatile Organic Compounds (VOCs)
Common types of VOCs include chemicals that are used as solvents, degreasers, and gasoline components. VOCs are manmade compounds and are the most common organic contaminants in ground water in New Jersey. Sources of VOCs can be point and nonpoint. Examples of VOCs are methyl tertiary butyl ether (MTBE), benzene and vinyl chloride.

Inorganics
Mineral-based compounds that are both naturally occurring and manmade. Sources of inorganics can be point and nonpoint; common sources include discharges from manufacturing plants, releases from contaminated sites, past land uses, and naturally occurring sources. Inorganics include arsenic, cadmium, copper, lead, mercury, and asbestos.

Radionuclides
Sources of radionuclides can be point and nonpoint; common sources include the decay of naturally occurring minerals, leaching of subsurface material (for example rocks and sedimentary materials) into ground water, and improper disposal of radioactive waste. Radionuclides are a category of contaminant that is both naturally occurring and manmade. Radionuclides are radioactive substances such as radium and radon.

Disinfection Byproduct (DBP) Precursors
Disinfection byproducts are formed when the disinfectants used to kill pathogens during treatment react with dissolved organic material present in the water. A common source of DBP precursors is naturally occurring organic material such as leaves in surface water. The amount of organic matter, the type of disinfectant, the concentration of disinfectant, time of contact, pH, and temperature all have an effect on the concentration of disinfection byproducts produced. Chlorine is the most common disinfectant used in New Jersey.

Step 3: Susceptibility Determination
The third step of the SWAP is to determine the public water system's susceptibility to contamination. Susceptibility is a function of source sensitivity (for example soil type and well construction characteristics) and the intensity of surrounding use factors (for example the density of contamination sites or the type of land use).

SUSCEPTIBILITY = Sensitivity + Intensity

DEP contracted with the USGS to develop susceptibility assessment models, with DEP guidance, to determine susceptibility ratings for public supply wells and surface water intakes

for the contaminant categories of concern described in Step 2. Some states have determined susceptibility using relatively simple approaches that account for factors such as distance to contaminant sources, but the more thorough modeling approach employed for New Jersey provides a more accurate estimate of susceptibility. The models were based on results from an extensive analysis of ground water and surface water quality data from the DEP-USGS statewide cooperative monitoring networks for a select set of sites in New Jersey. Please refer to the documentation Methods to Determine the Susceptibility of Source Water to Community and Noncommunity Water Supplies in New Jersey to Contamination, Appendix B- Attachment 4 for more information.

USGS developed susceptibility models for seven contaminant categories and radon for both ground water and surface water. DEP had originally intended to develop a susceptibility model for "synthetic organic compounds" (SOCs), but did not do so for two reasons. First, SOCs under the Federal and State Safe Drinking Water Acts consist primarily of pesticides and as part of SWAP, USGS developed a pesticide susceptibility model. Secondly, as USGS investigated whether it could construct a SOCs model, USGS and DEP jointly determined that there was insufficient SOC data that was neither pesticide nor volatile organic compound (VOC) related. (USGS also developed a separate VOC model.) However, it is DEP's experience that the presence of non-pesticide, non-volatile SOCs will typically co-occur with VOCs. Specifically, recent work by DEP and others at community water systems using ground water as a source and known to be contaminated by volatile organic contamination from hazardous waste sites determined that "tentatively identified compounds" (TICs) were present. In this study, although DEP and others were primarily looking for non-volatile organic compounds, TICs were found at some frequency at these sites. As part of the study, a "control" water system with no hazardous waste site nearby and with no volatile contamination was tested and contained no TICs. Qualitative evaluation of the data show systems with the higher levels of volatile organic chemicals and with more than one VOC present contained the highest number of TICs. For these reasons, DEP has determined the SOC rating for a water system would be the same as the public water system's VOC rating, and that a separate SOC susceptibility model was unnecessary.

Separate susceptibility models were developed for radon and other radionuclides for two reasons. First, radon, a gas, is chemically and physically different from other radionuclide constituents. Second, radon most often occurs in areas where other radionuclides are not present. The remedy for radon is different from the remedy for other radionuclides. DEP was concerned that if both radon and other radionuclides were combined, the susceptibility rating would not show the difference in susceptibility of water systems' sources to the different radionuclides.

For the purpose of the source water assessments, all surface water was assumed to be highly susceptible to pathogens, therefore a pathogen model was not developed for surface water. Surface water sources are subject to various sources of microbial contamination runoff containing fecal matter. All surface water intakes received a high rating for pathogens. Secondly, a radionuclide model was not developed for surface water. Radionuclides are primarily a concern of ground water, therefore, all surface water intakes received a low susceptibility rating for radionuclides.

The susceptibility models determined source water susceptibility based on the well or intake's location and explanatory variables. An explanatory variable is a variable that can be used to

predict the presence of a contaminant or the potential presence of a contaminant in ground water or surface water. Tables 2, 3, and 4 illustrate the final explanatory variables used in determining sensitivity and intensity ratings for surface water intakes, unconfined wells, and confined wells. These tables also contain the conceptual variables used in the susceptibility rating determinations. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

A list of all contaminant variables reviewed can be found in the documentation Methods to Determine the Susceptibility of Source Water to Community and Noncommunity Water Supplies in New Jersey to Contamination, Appendix B- Attachment 4. For further information, Appendix B- Attachment 5 and 6, Contaminant Group Reports, provide detailed descriptions of the models used for SWAP.

In addition to evaluating the contaminant variables separately, groupings of several point source variables together as a single explanatory variable were investigated to determine if a certain subset of point sources produced meaningful results. USGS determined that although several types of point sources are not statistically significant individually, grouping them as a unit could produce meaningful results. These combinations are known as "Point Source Groupings."

Point Source Grouping 1: consists of sites on the Known Contaminated Site List and on the Solid Waste Landfill Site list. In general, these point sources are existing contamination sources.

Point Source Grouping 2: consists of New Jersey Pollutant Discharge Elimination System for permitted discharges to surface water, New Jersey Pollutant Discharge Elimination System storm water discharges, and Compost Facilities. These point sources are potential surface water contamination problems.

Point Source Grouping 3: consists of New Jersey Pollutant Discharge Elimination System discharges for ground water (NJPDES/DGW), Solid Waste Resource Recovery Facilities (RRF), Solid Waste Transfer Facilities (SWTF), and Class B Recycling Facilities. These point sources are potential ground water contamination problems. The last three activities (RRF, SWTF, and Class B) are designed not to discharge contamination and degrade ground water. They do handle pollutants, and there is a potential to cause contamination. Thus, they are included in the inventory. Facilities that discharge via a NJPDES/DGW permit are given strict permit limits. The discharge standards are typically at or below the ground water quality standards. While these activities are grouped for modeling purposes, the RRF, SWTF, and Class B Recycling Facilities do not appreciably affect the model, based on analysis by USGS.

Point Source Grouping 4: consists of sites regulated by the DEP Discharge Prevention and Countermeasures Plan regulations and Discharge Cleanup and Removal Plan regulations. These facilities store, transfer, process, or use hazardous substances and must specify and submit information regarding prevention, containment and countermeasure plans and discharge cleanup and removal plans.

Point Source Grouping 5: consists of regulated Underground Storage Tanks (USTs). USTs were treated as a separate point source grouping due to the large number of USTs in New Jersey, relative to the number of other types of potential point sources. There are approximately 19,454 underground storage tank registrations in New Jersey, consisting of active and inactive tanks. USTs were treated separately so that the number of USTs would not obscure possible statistical relations between susceptibility and other potential contaminant sources.

Point Source Grouping 6: consists of the entire Potential Contaminant Source Inventory of point sources.

Several point source groupings were combined to determine whether or not these point source groupings had an effect on a source's susceptibility. If a point source grouping combination was found to be significant it was used as an explanatory variable in the susceptibility models. The explanatory variables can be found in Tables 2, 3, and 4 dependent on the type of drinking water source.

Table 2: Surface Water Explanatory Variables

Illustrates the explanatory variables USGS used in their SWAP surface water modeling.

Constituent/Variable	Pathogens [1]	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides [1]	Radon [1]	DBPs - conceptual [2]
Sensitivity								
% Soil Clay			X					
% Soil Organic Matter				X [2]	X [2]			X [2]
PH of water-quality sample					X			
Physiographic Province					X [2]			
Water Region					X			
Intensity								
% Agricultural Land Use, 1995		X						
% Commercial/Industrial Land Use, 1995					X [2]			
% Developed Land, 1995					X [2]			
% Residential Land Use, 1995			X					
% Urban Land Use, 1995		X		X	X			
Distance to Agricultural Land, 1995			X		X [2]			
Distance to Wetlands, 1995								X [2]
Density of NJPDES SW/Storm, Compost Facilities (Point Source Grouping 2)					X			
Density of KCSL, SWL, NJPDES SW/Storm, Compost Facilities (Point Source Groupings 1,2)				X				
Density of KCSL, SWL, NJPDES GW, SWRRF, SWTF200011, Class B Recycling, DPCC, UST (Point Source Groupings 1, 3, 4, 5)					X			
Sewage Treatment Plant Density		X						
Total Pesticide Application			X					

[1] For the purpose of developing susceptibility models, a pathogen model was not developed because all surface water sources are considered highly susceptible to pathogens; a radionuclide model was not developed because radionuclides are not a concern in surface water.

[2] This conceptual variable shows a graphical relation to water-quality, improves the model, and is supported by scientific investigations.

Table 3: Ground Water Unconfined Explanatory Variables

Illustrates the explanatory variables USGS used in their SWAP ground water unconfined modeling.

Constituent/Variable	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	DBPs
Sensitivity								
% Soil Clay					X[4]		X[2]	
% Soil Organic Matter				X	X[2]			X[1]
Conceptual - GWUDI	X[3]							
Depth to Top of Open Interval	X	X[2]	X[2]		X[4]		X	
Depth of Well						X[2]		
Dissolved Oxygen of water-quality sample					X			
Length of Open Interval		X[2]	X[2]					
NJGS Hydrologic Unit (Aquifer)								X[1]
pH of water-quality sample					X	X		
Physiographic Province					X[4]	X	X	
Soil Available Water Capacity	X[1]							
Soil Hydraulic Conductivity					X	X[2]		
Intensity								
% Agricultural Land Use, 1970						X		
% Agricultural Land Use, 1986		X	X					
% Agricultural Land Use, 1995							X	
% Barren Land Use, 1995					X			
% Commercial/Industrial Land Use, 1995				X				
% Urban Land Use, 1970					X			
% Urban Land Use, 1995		X	X[2]					
Area of Urban Land Use, 1995 (square miles)				X				
% Urban Land Use, Tier 1, 1995						X		
% Developed Land, Tier 1, 1995						X		
% Impervious Surface, 1995				X				
Distance to Agricultural Land, 1995	X		X		X	X[1]		
Distance to Golf Course			X[2]					
Distance to DOT Roads					X			
Distance to Sewage Treatment Plant					X			
Distance to Wetlands, 1995							X[2]	
Square Miles of Wetlands, 1995								X[2]
Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC (Point Source Groupings 2, 3, 4)								X

Table 3 continued

Constituent/Variable	**Pathogens**	**Nutrients**	**Pesticides - conceptual[3]**	**SOCs[1]**	**VOCs**	**Inorganics**	**Radionuclides**	**Radon**	**DBPs**
Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facility, SWRRF, SWTF200011, Class B Recycling, DPCC, UST (Point Source Groupings 1, 2, 3, 4, 5)						X			
Density of SWL, UST, KCSL (Point Source Groupings 1, 5)					X				
Population Density						X			
Population Density, Tier 1						X			
Septic Tank Density	X[1]								
Septic Tank Density in Piedmont							X		
Sewage Treatment Plant Density						X			
Conceptual - Presence of Streams, Tier 1	X[3]								
Length of Railroads						X			

[1] This conceptual variable shows a graphical relation, improves the model, and is supported by scientific investigations.
[2] This conceptual variable shows a graphical relation to water quality and improves the model.
[3] Statistical tests could not be used because the variable was unavailable for the data set used to develop the model.
[4] This factor is a conceptual variable and an explanatory variable for the contaminant category. As a result of the contaminant category consisting of several inorganics (arsenic, barium, beryllium, fluoride, lead, and mercury), the factor is used as a conceptual and statistically significant variable. Percent soil clay is a conceptual variable (X^2) for lead and mercury, but a statistically significant explanatory variable for beryllium. For depth to top of open interval, the factor is conceptual (X^2) for fluoride and lead, and a statistically significant explanatory variable for beryllium. Thirdly, physiographic province is a conceptual variable (X^3) for mercury and a statistically significant explanatory variable for the arsenic, barium, beryllium, and fluoride models.

Table 4: Ground Water Confined Explanatory Variables

Illustrates the explanatory variables USGS used in their SWAP ground water modeling.

Constituent/Variable	**Pathogens**	**Nutrients**	**Pesticides**	**VOCs**	**Inorganics**	**Radionuclides**	**Radon**	**DBPs**
Sensitivity								
% Soil Organic Matter								
NJGS Hydrologic Unit (Aquifer)								X
Geologic Unit					X	X	X	
pH of water-quality sample								X
Intensity [1]								

[1] Confined wells are not susceptible to intensity variables.

Susceptibility is the measurement of potential for a public water system to become contaminated. The susceptibility models developed by the USGS were applied to all noncommunity water system sources and resulted in a high, medium, or low susceptibility rating for each source of water.

If a drinking water source's susceptibility is high, it does not mean the water is contaminated. High susceptibility is a vulnerability rating, not a factor determining whether or not the water is or is not safe to drink. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels. The water utility may be contacted for additional water quality information.

DEP calculated the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the contaminant categories. Table 5 summarizes the susceptibility rating information.

Table 5: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent %)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	DBPs
Ground Water[1]								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water[2]								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

[1] Noncommunity water systems wells in New Jersey in 2003 = 3480
[2] Noncommunity water system surface water sources in New Jersey in 2003 = 3

USGS developed a rating scoring system for each susceptibility model. When each model was applied to a well or intake, a rating score was generated. This score was then converted into a susceptibility rating of high, medium, or low. For further information on the susceptibility rating score scheme please refer to Appendix A- Attachment 2. The Safe Drinking Water Maximum Contaminant Levels (MCLs) were used to guide the division between the three susceptibility ratings. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant. A medium susceptibility rating was assigned where the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high susceptibility rating was assigned where the potential contaminant level was equal to or greater than 50 percent of the MCL. For the list of New Jersey primary and secondary drinking water standards, containing the MCLs, please refer to http://www.state.nj.us/dep/watersupply/standard.htm.

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens). In fact, a high percentage of community water system surface water intakes were found to be highly susceptible to the same contaminant categories. Eighty-one percent of community water system surface water intakes were found to be highly

susceptible to inorganics and 98% were found to be highly susceptible to disinfection byproduct precursors.

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%). When reviewing the results of the medium susceptibility ratings for noncommunity water system wells, the three contaminant categories in which a high percentage of the wells rated medium are disinfection byproduct precursors (97%), radon (72%), pesticides and nutrients (both 66%).

Step 4: Public Participation and Outreach

The fourth step, public participation and outreach, is an essential component of the SWAP. The 1996 Amendments to the Federal Safe Drinking Water Act place a strong emphasis on public participation. To ensure the source water assessments are used for source water protection efforts, the public was involved from the beginning of the program.

The DEP used a variety of techniques to include the public in the program.

1. **Created a Source Water Assessment Advisory Committee to provide input on the draft and final SWAP Plan**. The Source Water Assessment Advisory Committee continued to meet with the DEP regularly to discuss the status of the assessments and provide suggestions during the development of the program. In addition, the Source Water Assessment Advisory Committee provided advice concerning the source water assessment summaries and reports.

2. **Developed a SWAP newsletter, the "New Jersey Source Water Assessment News."** Issues of the "New Jersey Source Water Assessment News" may be found at www.state.nj.us/dep/swap. The newsletter was sent to committee members, public water systems, county health agencies, environmental organizations, municipalities, drinking water laboratories, and other interested parties. The New Jersey Source Water Assessment News informed readers of the status of the SWAP, contact information, source water protection issues, and other related topics.

3. **Published SWAP articles in several organizations' newsletters.** For example, articles were published in the New Jersey Section of American Water Works Association newsletter "Pipeline" and the DEP Division of Watershed Management newsletter "Focus."

4. **Provided speakers for numerous SWAP presentations throughout the State.** The presentations were regularly presented to water purveyors at New Jersey Water Association training courses and other interested organizations such as the watershed management area committees.

The DEP will continue its public outreach following the release of the source water assessments. Public outreach activities will include training sessions for water purveyors, published SWAP articles, and correspondence with interested parties such as purveyors, municipalities, planning boards, and environmental commissions.

SECTION IV - NONCOMMUNITY PUBLIC WATER SYSTEM INDIVIDUAL SOURCE WATER ASSESSMENT REPORTS (ARRANGED BY PWID)

Camp Vacamas Asscoiation of New Jersey

1615302

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

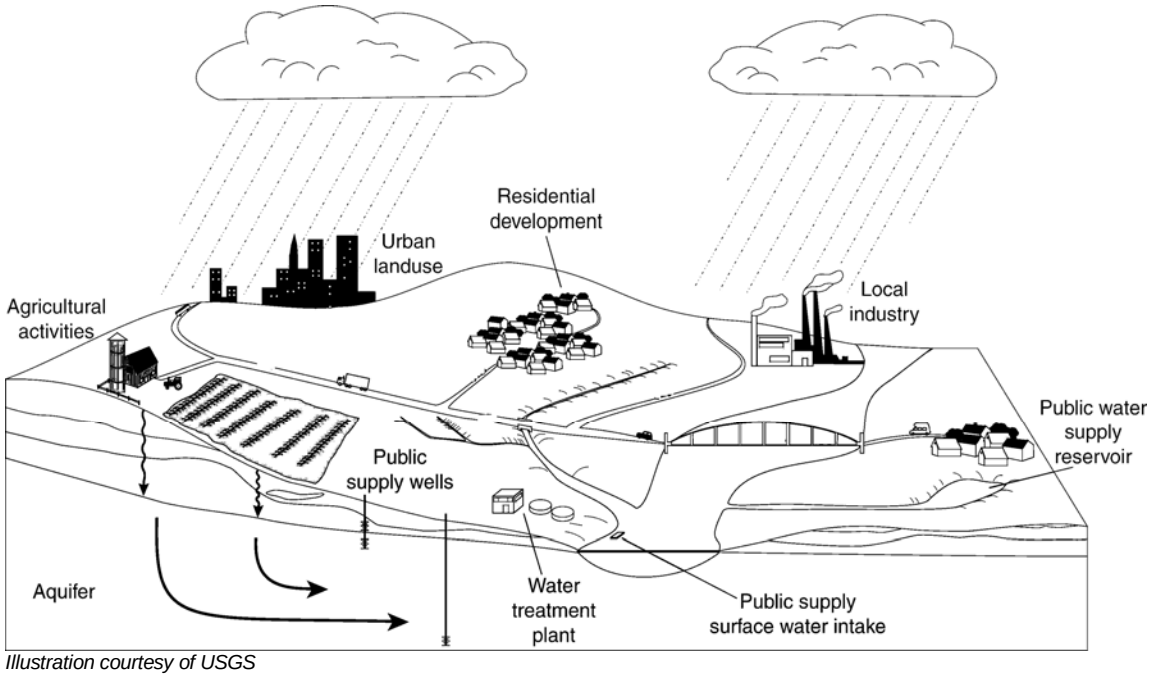


Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Camp Vacamas Asscoiation of New Jersey

Camp Vacamas Asscoiation of New Jersey (PWID 1615302) at 256 Macopin Road, West Milford, NJ, is a public noncommunity water system that serves approximately 400 people (in 2003). Camp Vacamas Asscoiation of New Jersey consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Camp Vacamas Asscoiation of New Jersey's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Franklin Well	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Franklin Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	39.24
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	39.24
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.29	% Impervious Surface, 1995	5.3
		% Commercial/Industrial Land Use, 1995	0
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	11.37	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	5.02	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.29	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	544.49
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	70.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	70.2
Conceptual Soil Hydraulic Conductivity	5.02	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	11.37	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	388.56
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.29	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Danata Dangelo Strip Stores

1615305

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

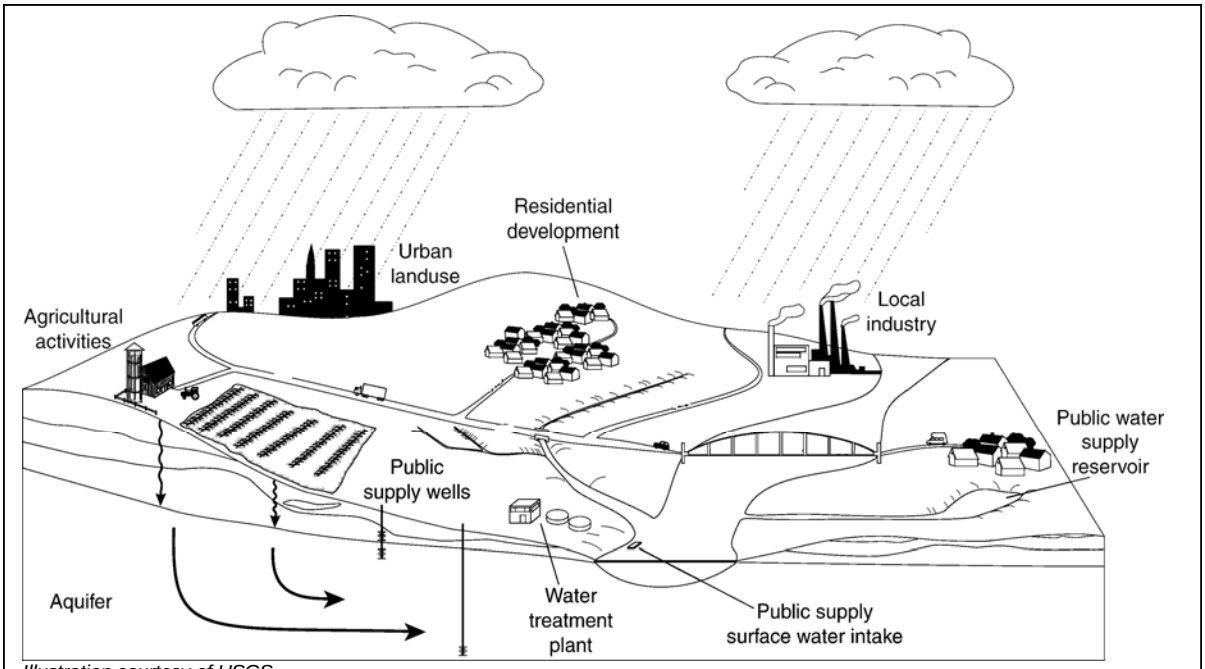


Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Danata Dangelo Strip Stores

Danata Dangelo Strip Stores (PWID 1615305) at 2915 Route 23 South, Newfoundland, NJ, is a public noncommunity water system that serves approximately 75 people (in 2003). Danata Dangelo Strip Stores consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Danata Dangelo Strip Stores's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	45.17
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	527.66
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	47.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	47.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.45	% Impervious Surface, 1995	21.6
		% Commercial/Industrial Land Use, 1995	34.13
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	55.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	132.22
% Soil Clay	9.76	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	46.82	% Urban Land Use, 1970	74.3
Conceptual % Soil Organic Matter	0.45	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	78.89
		Length of railroads	1462.08
		Population Density	141.13
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	61.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	61.2
Conceptual Soil Hydraulic Conductivity	46.82	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.76	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	114.08
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.45	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Lakeland Plaza

1615306

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

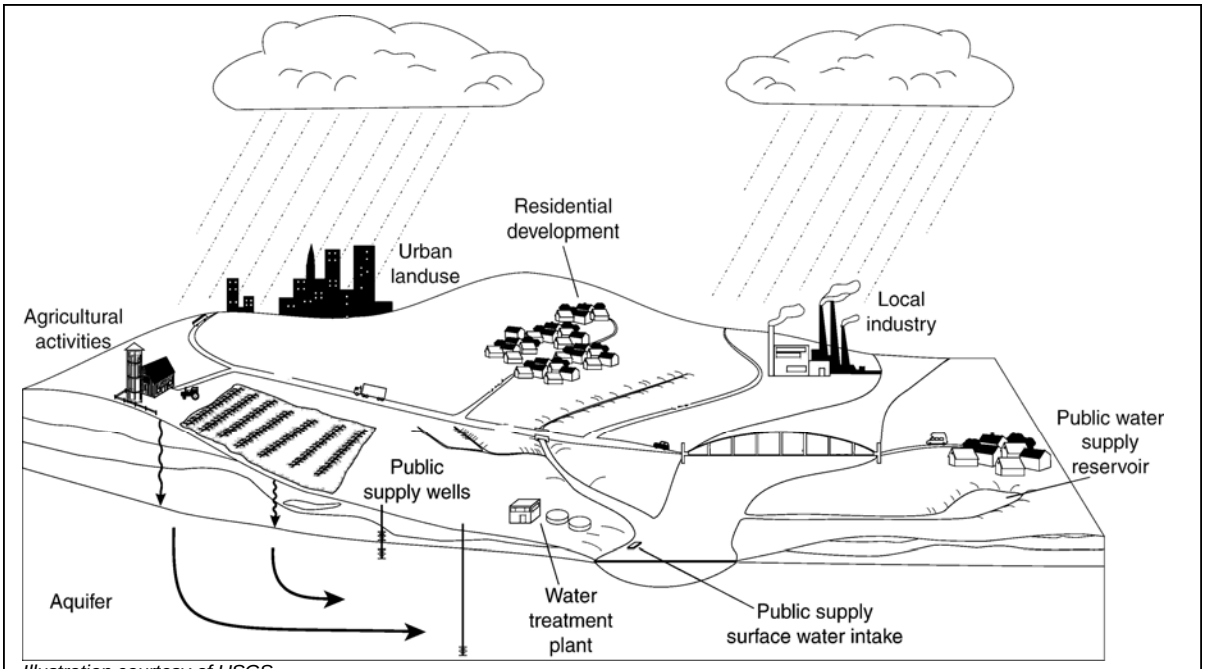


Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Lakeland Plaza

Lakeland Plaza (PWID 1615306) at 2717 Route 23 South, Newfoundland, NJ, is a public noncommunity water system that serves approximately 55 people (in 2003). Lakeland Plaza consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Lakeland Plaza's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	46.41
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	636.32
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	52.65
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	52.65
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.58	% Impervious Surface, 1995	19.7
		% Commercial/Industrial Land Use, 1995	46.45
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	135.69
% Soil Clay	10.5	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	53.9	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.58	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	70.23
		Length of railroads	961.07
		Population Density	144.52
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	84.38
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	84.3
Conceptual Soil Hydraulic Conductivity	53.9	% Agricultural Land Use, 1970	88.8
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.5	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	244.94
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.58	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Mcdonalds Restaurant

1615307

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

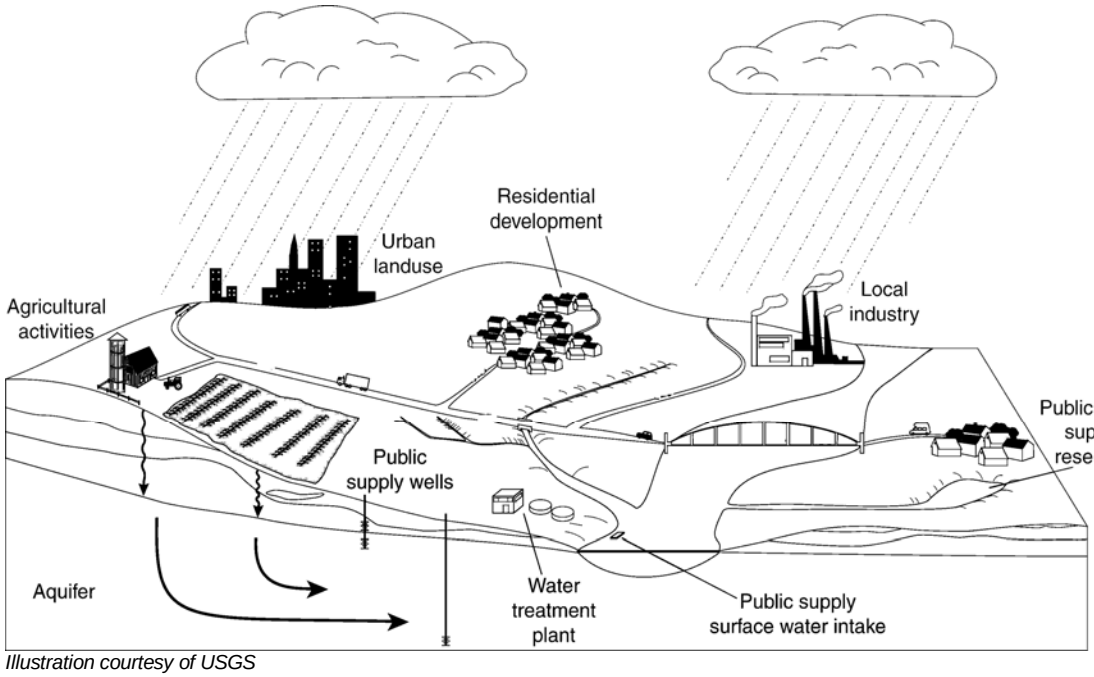


Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

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- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Mcdonalds Restaurant

Mcdonalds Restaurant (PWID 1615307) at 43a Marshall Hill Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 943 people (in 2003). Mcdonalds Restaurant consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Mcdonalds Restaurant's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	316.08
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	410.33
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	69.17
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	69.17
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.48	% Impervious Surface, 1995	40.8
		% Commercial/Industrial Land Use, 1995	38.54
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	1071.74
% Soil Clay	15.19	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	6.93	% Urban Land Use, 1970	92.12
Conceptual % Soil Organic Matter	0.48	Distance to STP	552.08
Physiographic Province	NEW ENGLAND	STP Density	13.97
		Distance to DOT roads	113.3
		Length of railroads	0
		Population Density	972.52
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	86.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	86.8
Conceptual Soil Hydraulic Conductivity	6.93	% Agricultural Land Use, 1970	4.69
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15.19	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	173.5
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.48	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Belcher Run Shopping Center

1615308

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
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- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

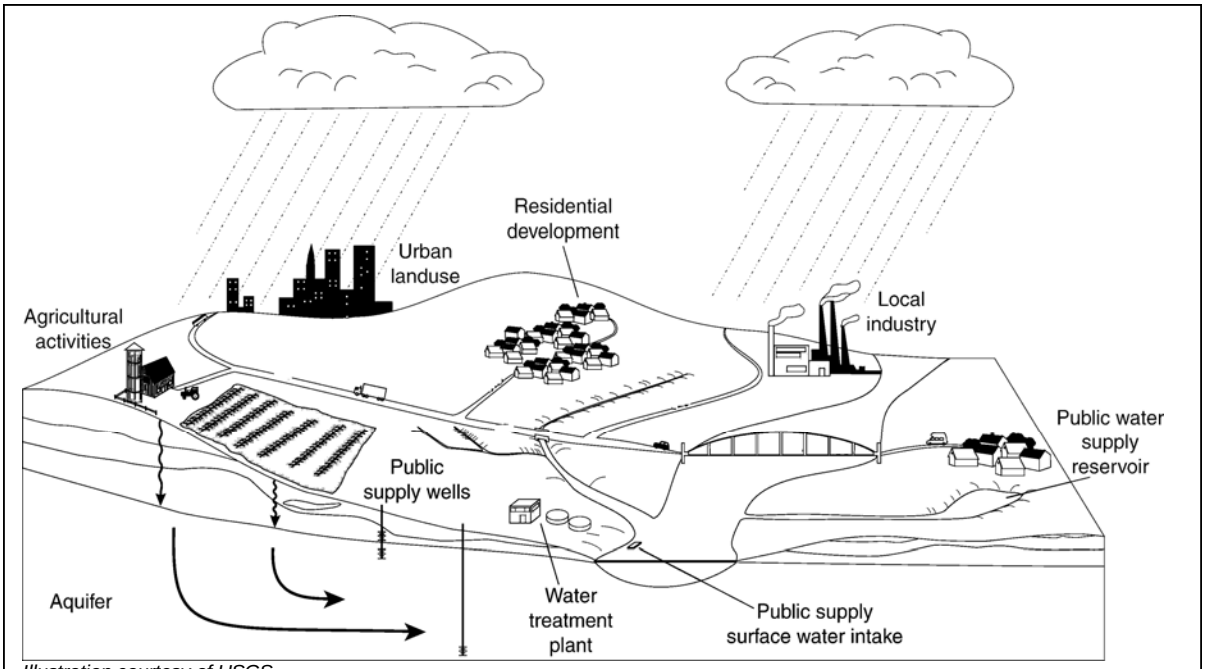

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Belcher Run Shopping Center

Belcher Run Shopping Center (PWID 1615308) at 1590-1610 Union Valley Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 150 people (in 2003). Belcher Run Shopping Center consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Belcher Run Shopping Center's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**L**	**L**	**H**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	271.92
Depth to Top of Open Interval		Conceptual Septic Tank Density	251.39
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	744.68
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	37.27
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	20.35
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	37.27
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	20.35
		Distance to Agricultural Land Use, 1995	271.92
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.57	% Impervious Surface, 1995	20.6
		% Commercial/Industrial Land Use, 1995	24.55
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	271.92
Depth to Top of Open Interval	211	Population Density, Tier 1	817.82
% Soil Clay	14.73	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	15.24	% Urban Land Use, 1970	91.8
Conceptual % Soil Organic Matter	0.57	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	118.72
		Length of railroads	0
		Population Density	814.4
Radionuclides Explanatory Variables – Source Rating = H			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	63.1
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	271.92
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	67.2
Conceptual Soil Hydraulic Conductivity	15.24	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.73	% Agricultural Land Use, 1995	20.74
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	173.48
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.57	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Pizza Place

1615310

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

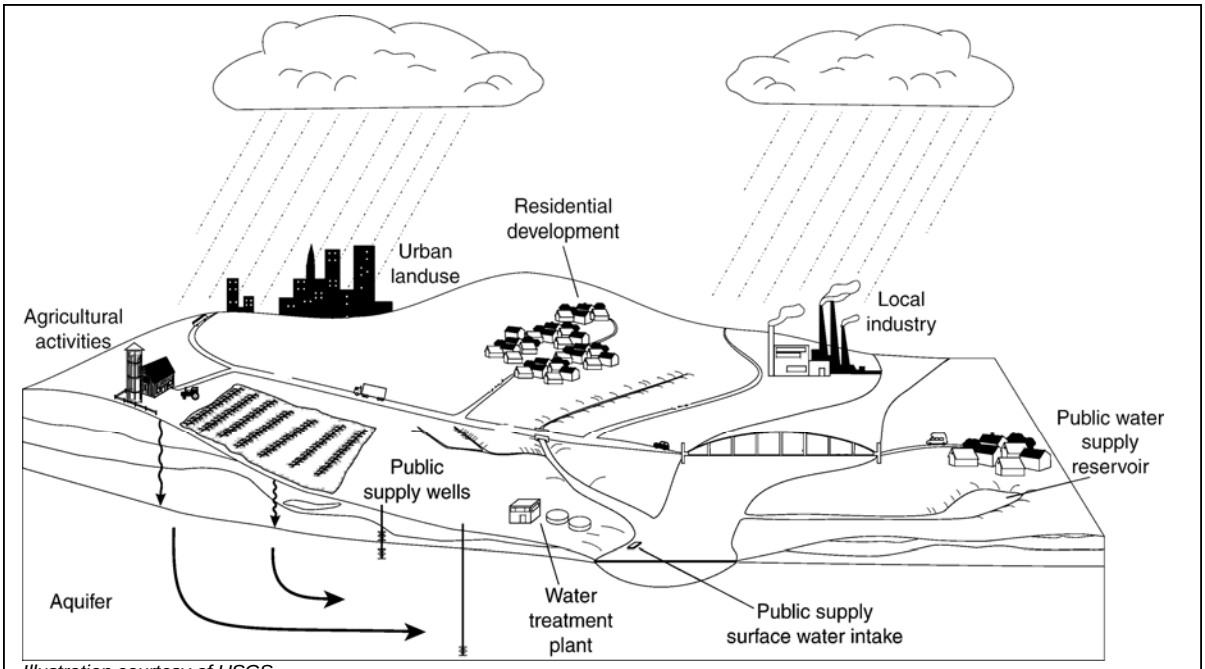

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Pizza Place

Pizza Place (PWID 1615310) at 18 Marshall Hill Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). Pizza Place consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Pizza Place's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	256.25
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	83.97
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	83.97
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.28	% Impervious Surface, 1995	56.2
		% Commercial/Industrial Land Use, 1995	53.21
		Sq. Mi. of Urban Land Use, 1995	0.06
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	1070.99
% Soil Clay	13.74	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	3.28	% Urban Land Use, 1970	92.8
Conceptual % Soil Organic Matter	0.28	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	76.34
		Length of railroads	0
		Population Density	809.32
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	100
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	100
Conceptual Soil Hydraulic Conductivity	3.28	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.74	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	425.99
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.28	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Upper Greenwood Lake School

1615312

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

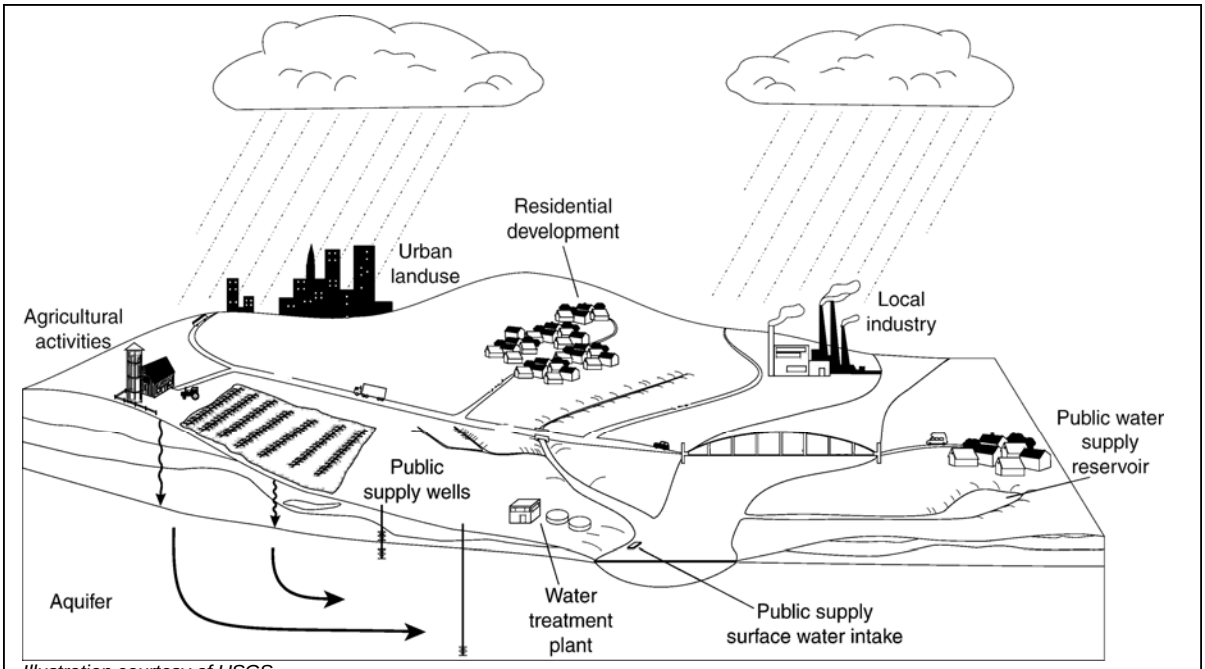

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Upper Greenwood Lake School

Upper Greenwood Lake School (PWID 1615312) at 41 Henry Rd, Hewitt, NJ, is a public noncommunity water system that serves approximately 510 people (in 2003). Upper Greenwood Lake School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Upper Greenwood Lake School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	488.14
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	46.15
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	46.15
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.33	% Impervious Surface, 1995	15.7
		% Commercial/Industrial Land Use, 1995	10.49
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	9.5
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	9.5
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	500	Population Density, Tier 1	1515.2
% Soil Clay	9.11	% Barren Land Use, 1995	0.6
Soil Hydraulic Conductivity	8.95	% Urban Land Use, 1970	99.3
Conceptual % Soil Organic Matter	0.33	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	661.09
		Length of railroads	0
		Population Density	1262.11
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	58.86
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	500	% Developed Land, Tier 1, 1995	58.8
Conceptual Soil Hydraulic Conductivity	8.95	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.11	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	500		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.33	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Shell Oil Company VMPW

1615314

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

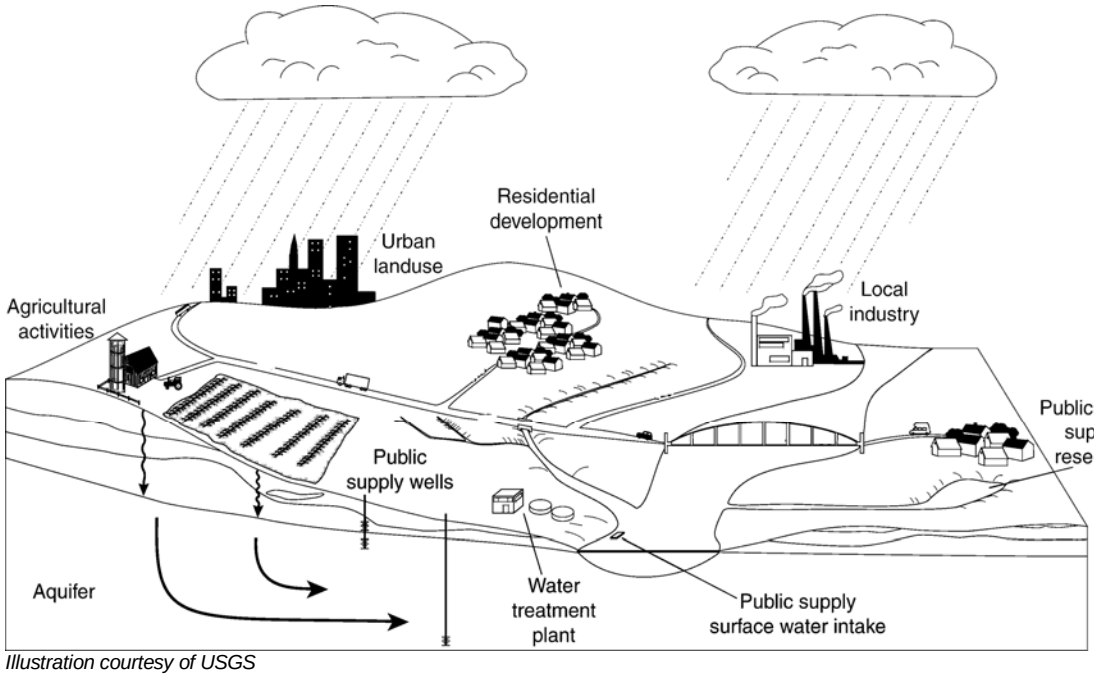

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Shell Oil Company VMPW

Shell Oil Company VMPW (PWID 1615314) at Route 23 & Union Valley Road, Mt Olive, NJ, is a public noncommunity water system that serves approximately 25 people (in 2003). Shell Oil Company VMPW consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Shell Oil Company VMPW's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	45.61
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	629.13
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	57.98
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	57.98
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.59	% Impervious Surface, 1995	21.5
		% Commercial/Industrial Land Use, 1995	50.9
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	131.49
% Soil Clay	11.17	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	48.03	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.59	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	58.1
		Length of railroads	519.17
		Population Density	142.35
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	79.3
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	79.3
Conceptual Soil Hydraulic Conductivity	48.03	% Agricultural Land Use, 1970	78.5
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	11.17	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	438.85
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.59	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

United Methodist Church

1615316

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

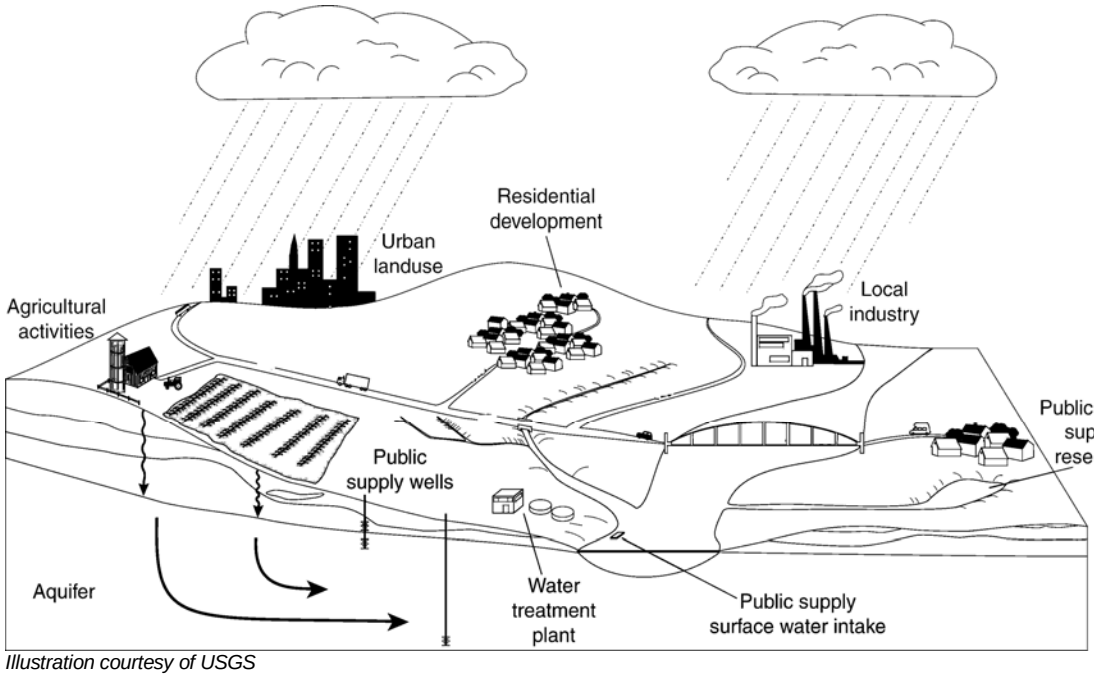

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for United Methodist Church

United Methodist Church (PWID 1615316) at 65 Larue Rd, Newfoundland, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). United Methodist Church consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for United Methodist Church's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**L**	**M**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	40.27
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	14.3
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	14.3
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.43	% Impervious Surface, 1995	4.7
		% Commercial/Industrial Land Use, 1995	9.1
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = M			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	71	Population Density, Tier 1	125.87
% Soil Clay	7.16	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	63.71	% Urban Land Use, 1970	10.61
Conceptual % Soil Organic Matter	0.43	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	176.56
		Length of railroads	0
		Population Density	127.64
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	17.08
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	71	% Developed Land, Tier 1, 1995	17.1
Conceptual Soil Hydraulic Conductivity	63.71	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	7.16	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	466.12
Depth to Top of Open Interval	71		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.43	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.02
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Village Square Inn

1615317

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

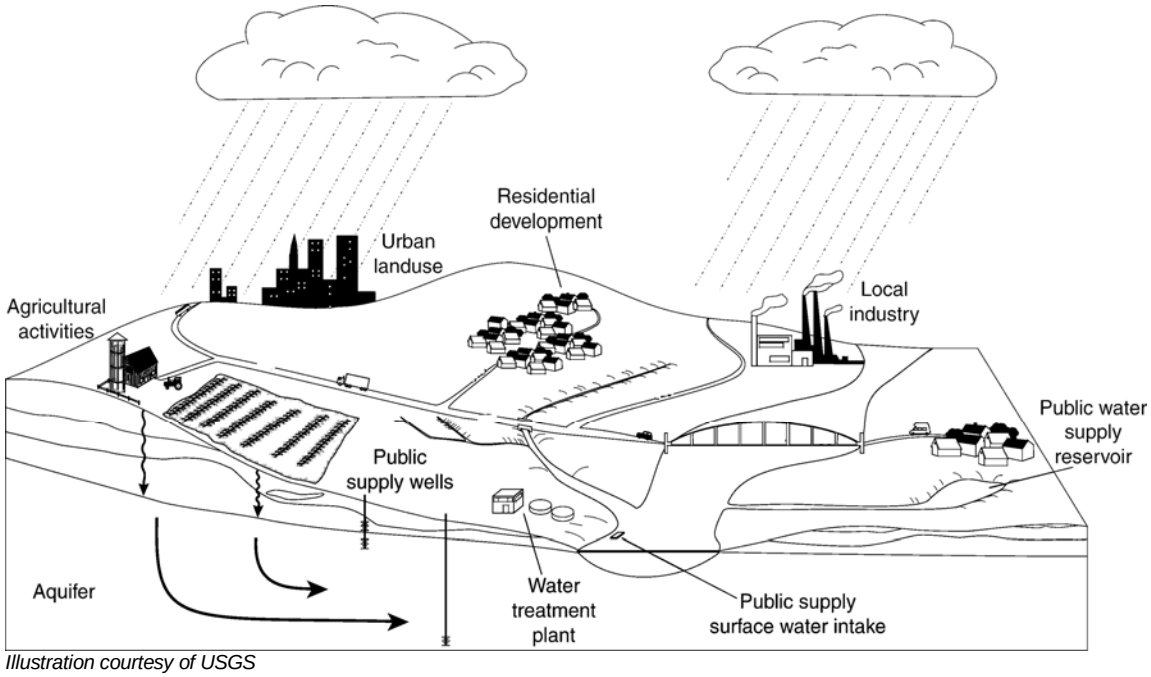

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Village Square Inn

Village Square Inn (PWID 1615317) at 2991 Route 23, West Milford, NJ, is a public noncommunity water system that serves approximately 300 people (in 2003). Village Square Inn consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Village Square Inn's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	43.85
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	56.93
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	56.93
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.32	% Impervious Surface, 1995	23.6
		% Commercial/Industrial Land Use, 1995	33.7
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	55.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	125.87
% Soil Clay	8.58	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	46.82	% Urban Land Use, 1970	86.6
Conceptual % Soil Organic Matter	0.32	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	65.53
		Length of railroads	1214.52
		Population Density	137.53
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	87.4
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	87.4
Conceptual Soil Hydraulic Conductivity	46.82	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.58	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	324.52
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.32	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Big Johns Pub

1615319

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

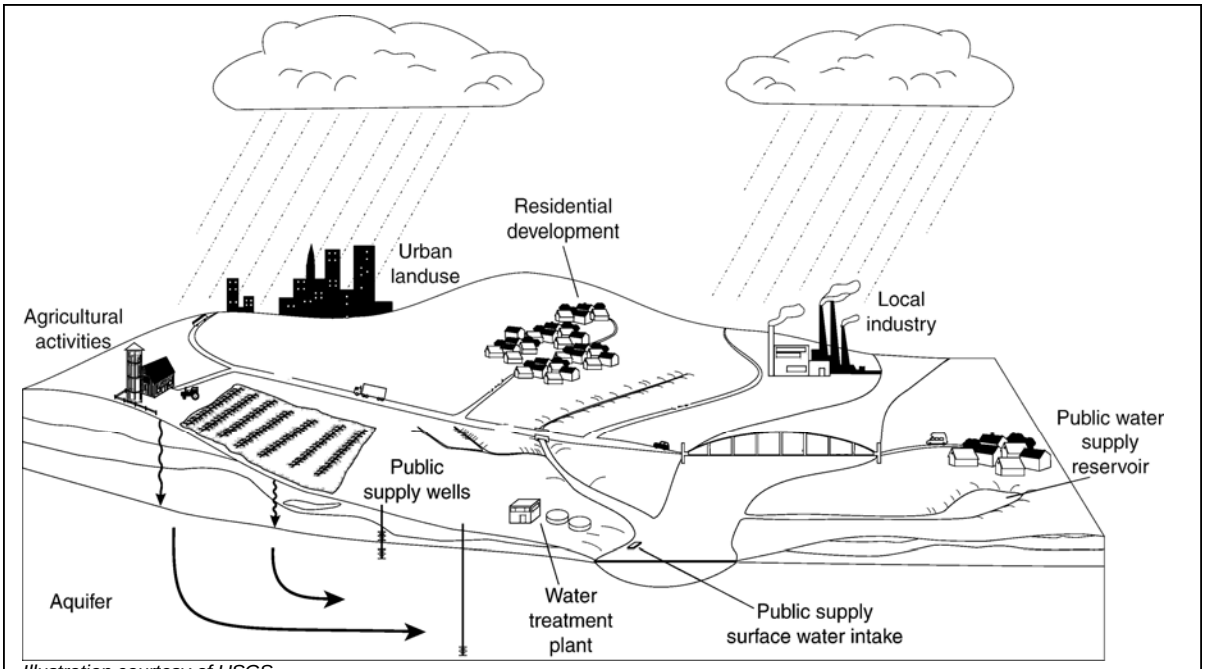

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Big Johns Pub

Big Johns Pub (PWID 1615319) at 49 Old Route 23, Newfoundland, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). Big Johns Pub consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Big Johns Pub's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.11	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	39.63
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	52.95
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	52.95
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	5.16	% Impervious Surface, 1995	27.7
		% Commercial/Industrial Land Use, 1995	30.07
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	55.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	125.87
% Soil Clay	8.6	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	49.54	% Urban Land Use, 1970	33.73
Conceptual % Soil Organic Matter	5.16	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	71.82
		Length of railroads	0
		Population Density	125.87
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	72.7
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	72.7
Conceptual Soil Hydraulic Conductivity	49.54	% Agricultural Land Use, 1970	16.22
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.6	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	98.39
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	5.16	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Dairy Queen

1615320

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

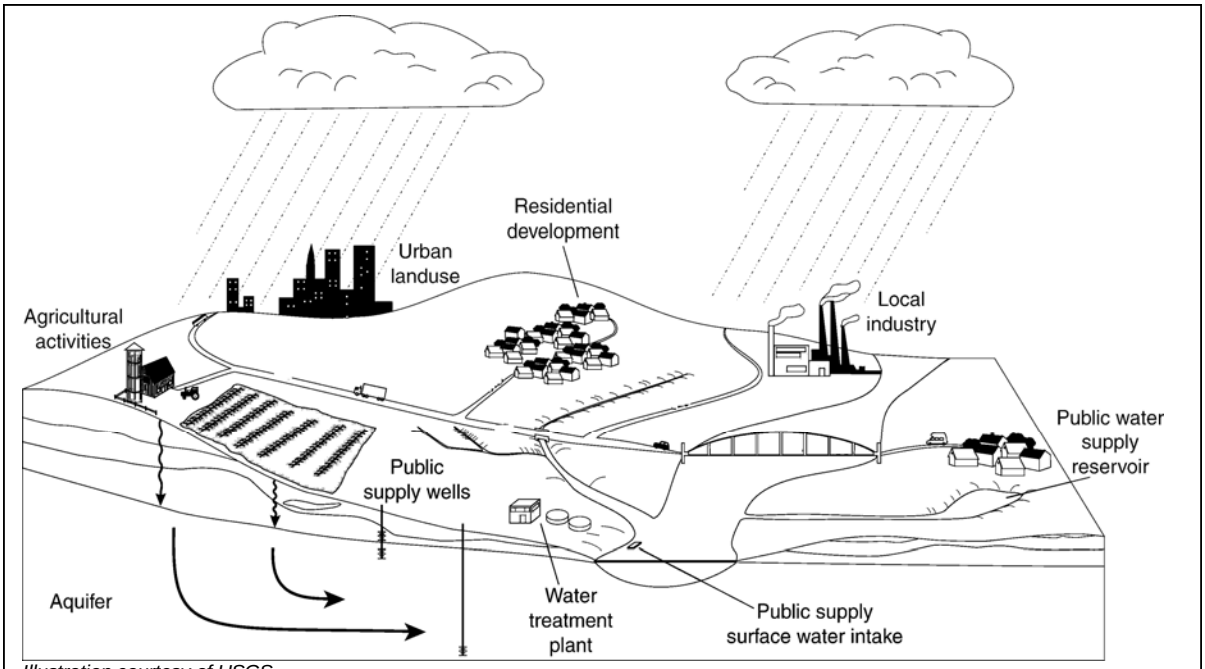

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Dairy Queen

Dairy Queen (PWID 1615320) at 2648 Rte 23 N, New Foundland, NJ, is a public noncommunity water system that serves approximately 166 people (in 2003). Dairy Queen consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Dairy Queen's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.13	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	39.63
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	27.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	27.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	7.8	% Impervious Surface, 1995	17.8
		% Commercial/Industrial Land Use, 1995	23.8
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	41.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	41.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	125.87
% Soil Clay	8.06	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	64.73	% Urban Land Use, 1970	13.21
Conceptual % Soil Organic Matter	7.8	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	78.51
		Length of railroads	0
		Population Density	125.82
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	40.3
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	40.3
Conceptual Soil Hydraulic Conductivity	64.73	% Agricultural Land Use, 1970	9.51
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.06	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	177.38
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	7.8	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.02
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Greenwoo Lake Beach Supply

1615321

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

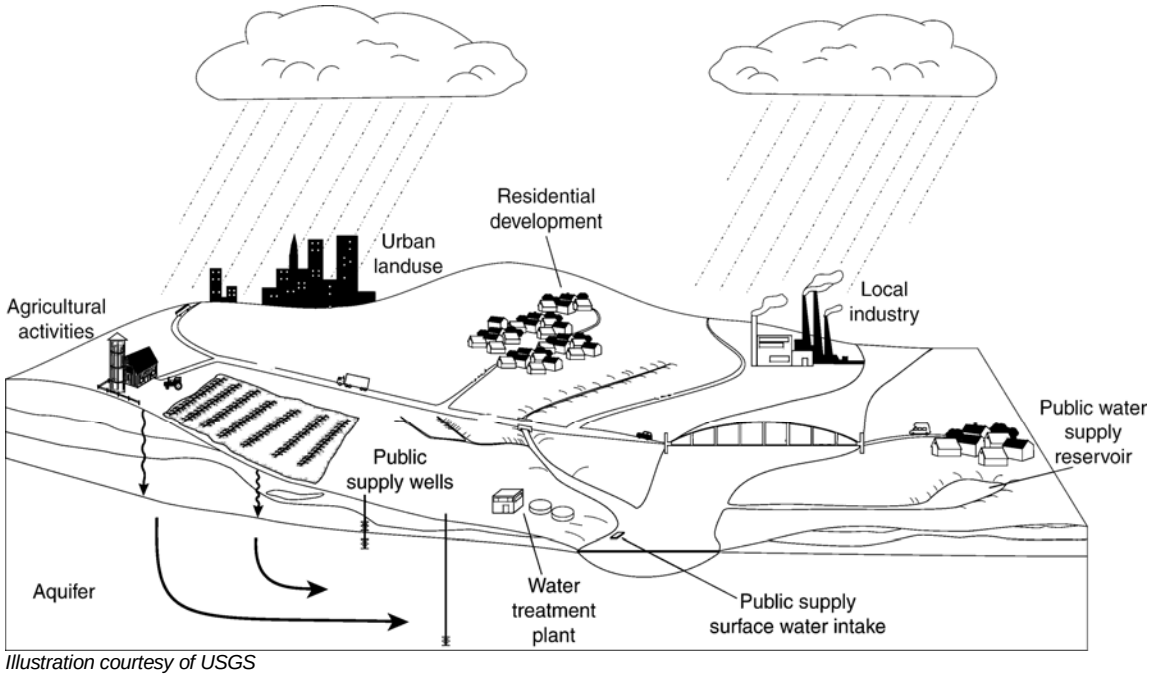

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Greenwoo Lake Beach Supply

Greenwoo Lake Beach Supply (PWID 1615321) at Lake Park Terrace, West Milford Twp, NJ, is a public noncommunity water system that serves approximately 46 people (in 2003). Greenwoo Lake Beach Supply consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Greenwoo Lake Beach Supply's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	141.36
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	91.89
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	91.89
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.38	% Impervious Surface, 1995	38.3
		% Commercial/Industrial Land Use, 1995	46.85
		Sq. Mi. of Urban Land Use, 1995	0.06
		Density of SWL, USTs, and KCSL	97.8
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	111.8
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	568.06
% Soil Clay	14.15	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	5.34	% Urban Land Use, 1970	100
Conceptual % Soil Organic Matter	0.38	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	138.14
		Length of railroads	0
		Population Density	544.37
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	99.3
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	99.3
Conceptual Soil Hydraulic Conductivity	5.34	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.15	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	534.27
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.38	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Our Lady Queen of Peace

1615323

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

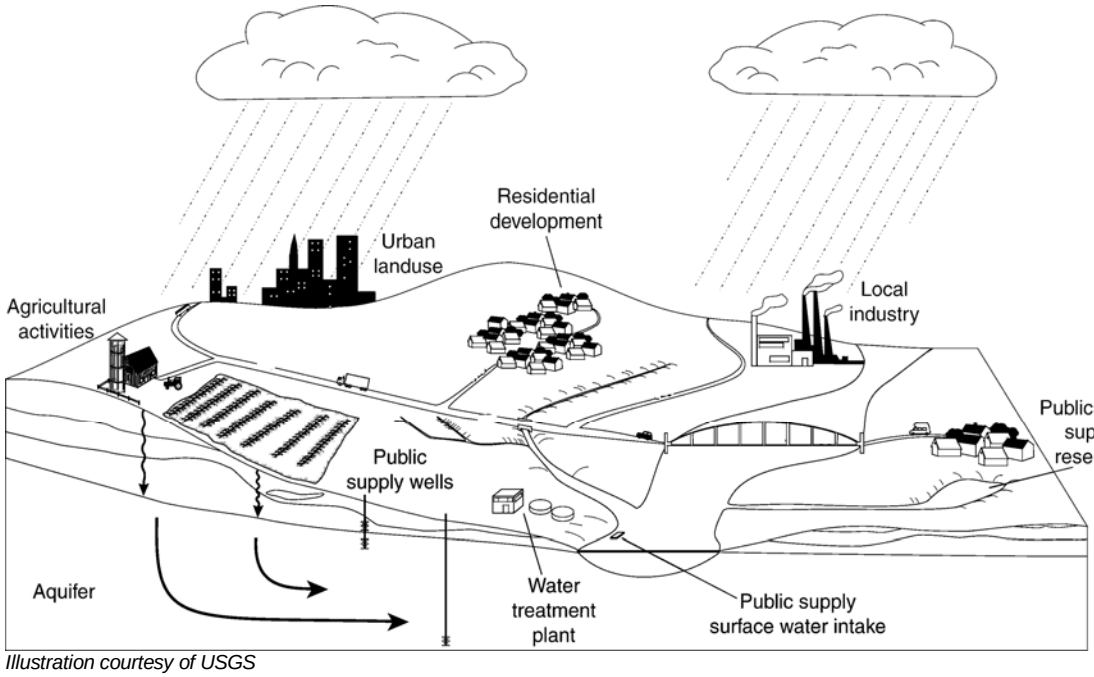

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Our Lady Queen of Peace

Our Lady Queen of Peace (PWID 1615323) at 1905 Union Valley Rd., Hewitt, NJ, is a public noncommunity water system that serves approximately 172 people (in 2003). Our Lady Queen of Peace consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Our Lady Queen of Peace's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**M**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	156.82
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	632.46
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	62.86
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	62.86
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.75	% Impervious Surface, 1995	31.2
		% Commercial/Industrial Land Use, 1995	36.74
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	55.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	353.28
% Soil Clay	9.85	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	44.19	% Urban Land Use, 1970	45.8
Conceptual % Soil Organic Matter	0.75	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	251.31
		Length of railroads	0
		Population Density	380.57
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	53.5
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	53.5
Conceptual Soil Hydraulic Conductivity	44.19	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.85	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	199.07
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.75	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Maple Road School

1615324

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

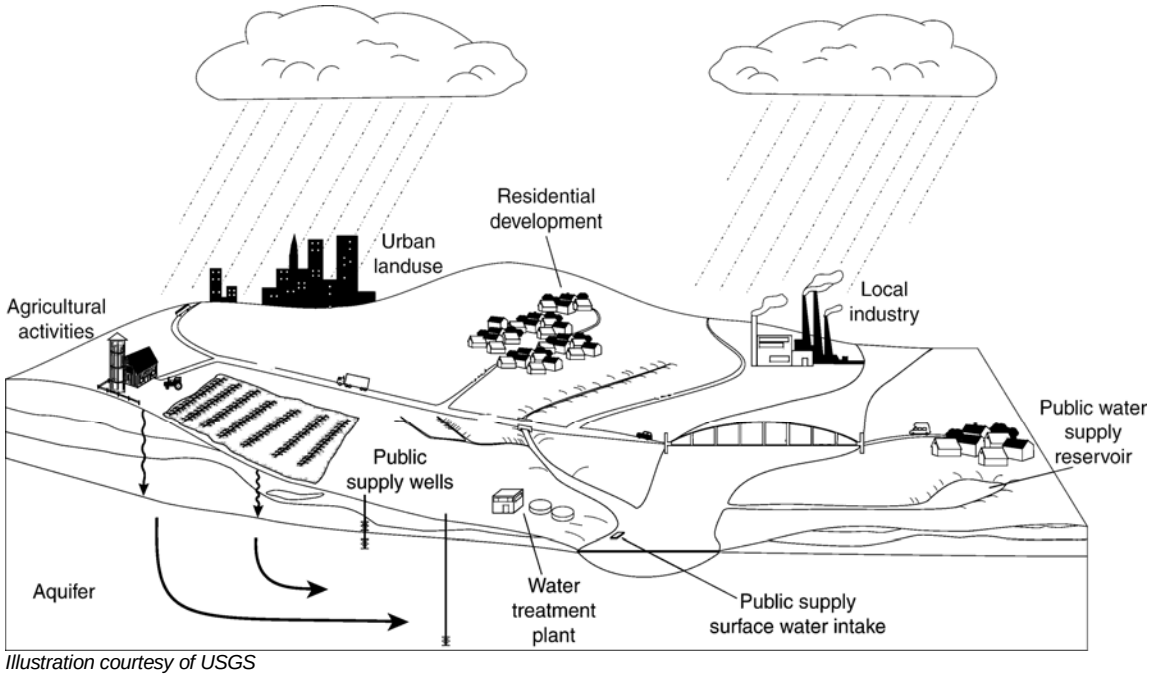

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

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What can you and others do to help?

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Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Maple Road School

Maple Road School (PWID 1615324) at 36 Maple Road, West Milford, NJ, is a public noncommunity water system that serves approximately 454 people (in 2003). Maple Road School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Maple Road School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.11	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	205.59
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	30.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	30.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	3.47	% Impervious Surface, 1995	10.3
		% Commercial/Industrial Land Use, 1995	19.3
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	16
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	16
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	485	Population Density, Tier 1	634.01
% Soil Clay	10.11	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	44.29	% Urban Land Use, 1970	49.6
Conceptual % Soil Organic Matter	3.47	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	255.17
		Length of railroads	0
		Population Density	673.3
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	60.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	485	% Developed Land, Tier 1, 1995	60.2
Conceptual Soil Hydraulic Conductivity	44.29	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.11	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	350.69
Depth to Top of Open Interval	485		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	3.47	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.02
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Macopin School

1615325

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

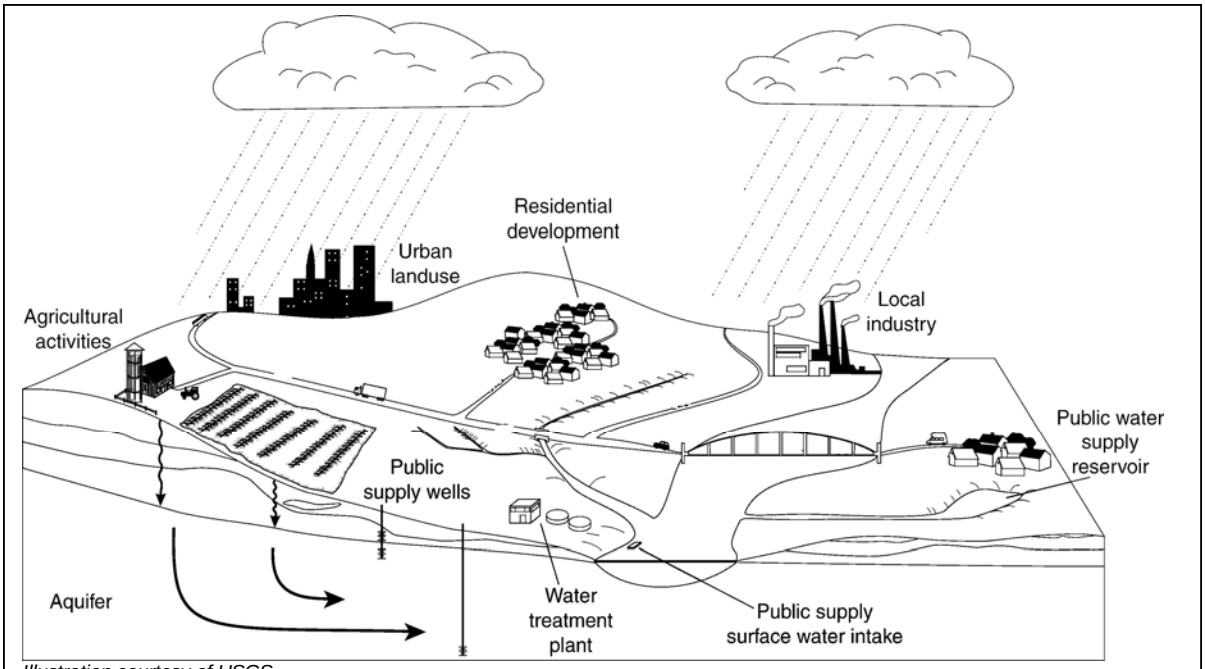

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Macopin School

Macopin School (PWID 1615325) at 70 Highlander Road, West Milford, NJ, is a public noncommunity water system that serves approximately 800 people (in 2003). Macopin School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Macopin School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	186.74
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	64.04
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	64.04
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.32	% Impervious Surface, 1995	39.5
		% Commercial/Industrial Land Use, 1995	49.65
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	829.58
% Soil Clay	10.96	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	9.08	% Urban Land Use, 1970	96
Conceptual % Soil Organic Matter	0.32	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	291.61
		Length of railroads	0
		Population Density	829.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	92.1
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	92.1
Conceptual Soil Hydraulic Conductivity	9.08	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.96	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	446.24
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.32	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

West Milford High School

1615326

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

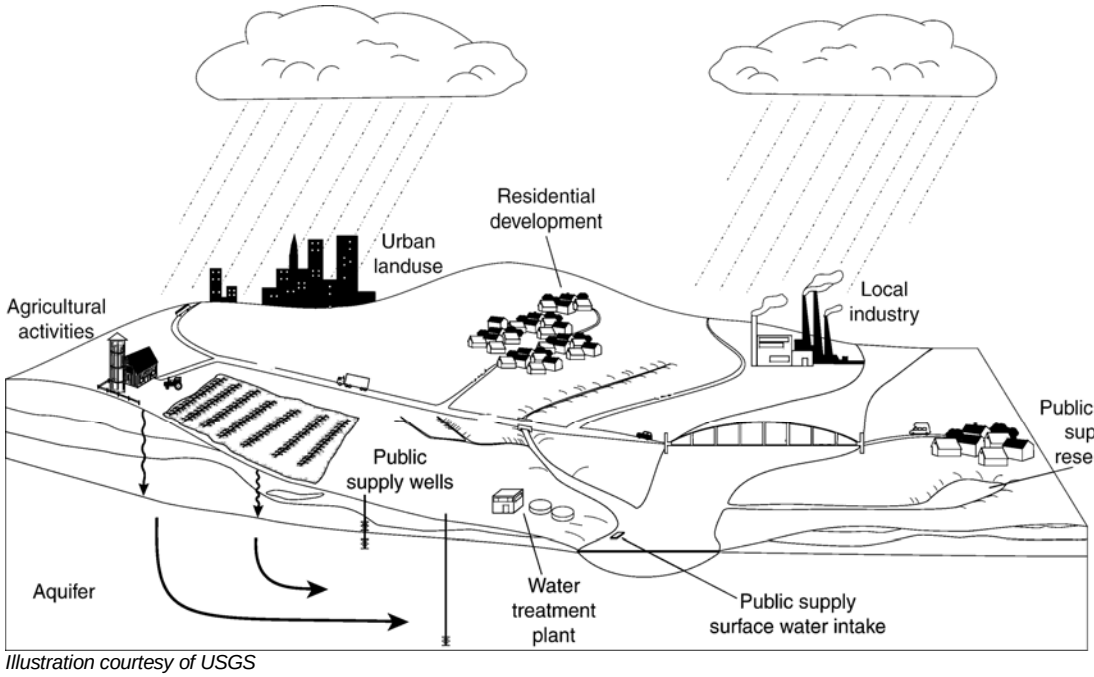

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for West Milford High School

West Milford High School (PWID 1615326) at 67 Highlander Road, West Milford, NJ, is a public noncommunity water system that serves approximately 1800 people (in 2003). West Milford High School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for West Milford High School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	186.74
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	62.8
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	62.8
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	2.06	% Impervious Surface, 1995	40.2
		% Commercial/Industrial Land Use, 1995	51.9
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	829.58
% Soil Clay	10.07	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	20.08	% Urban Land Use, 1970	94.8
Conceptual % Soil Organic Matter	2.06	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	210.26
		Length of railroads	0
		Population Density	829.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	87.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	87.2
Conceptual Soil Hydraulic Conductivity	20.08	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.07	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	188.73
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	2.06	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Westbrook School

1615327

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

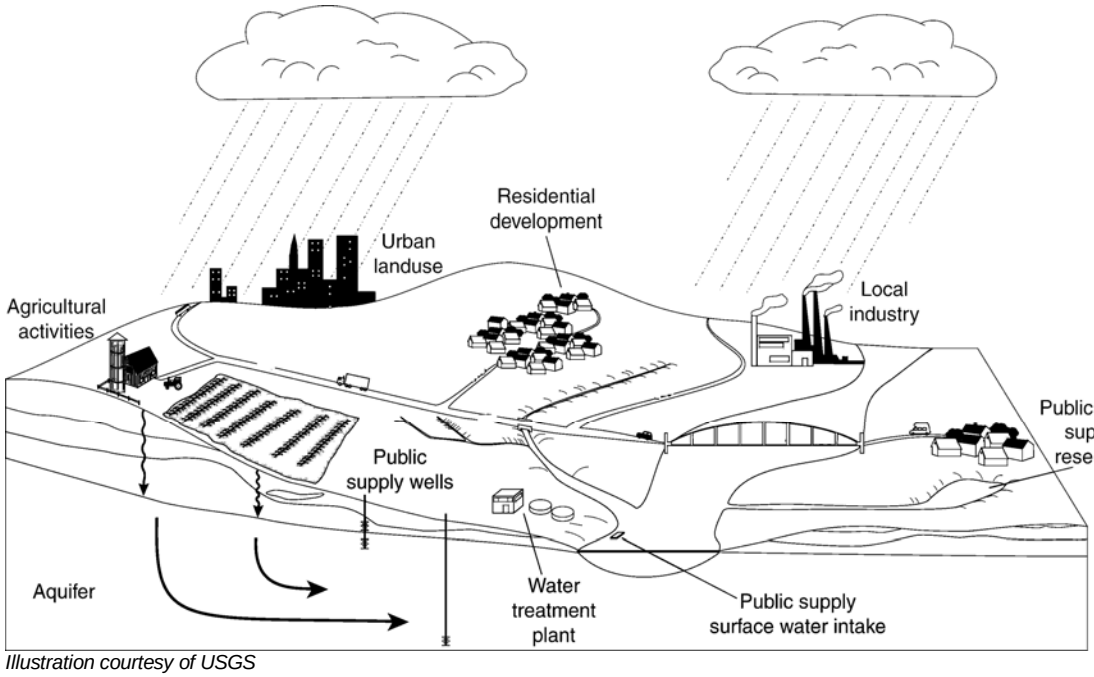

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

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- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Westbrook School

Westbrook School (PWID 1615327) at 55 Nosenzo Pond Road, West Milford, NJ, is a public noncommunity water system that serves approximately 700 people (in 2003). Westbrook School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Westbrook School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	186.74
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	55
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	55
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.46	% Impervious Surface, 1995	10.5
		% Commercial/Industrial Land Use, 1995	21.8
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	829.58
% Soil Clay	9.29	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	18.85	% Urban Land Use, 1970	86.59
Conceptual % Soil Organic Matter	0.46	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	45.86
		Length of railroads	0
		Population Density	829.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	85.5
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	85.5
Conceptual Soil Hydraulic Conductivity	18.85	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.29	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	241.48
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.46	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

West Milford Board of Education - Transportation

1615328

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

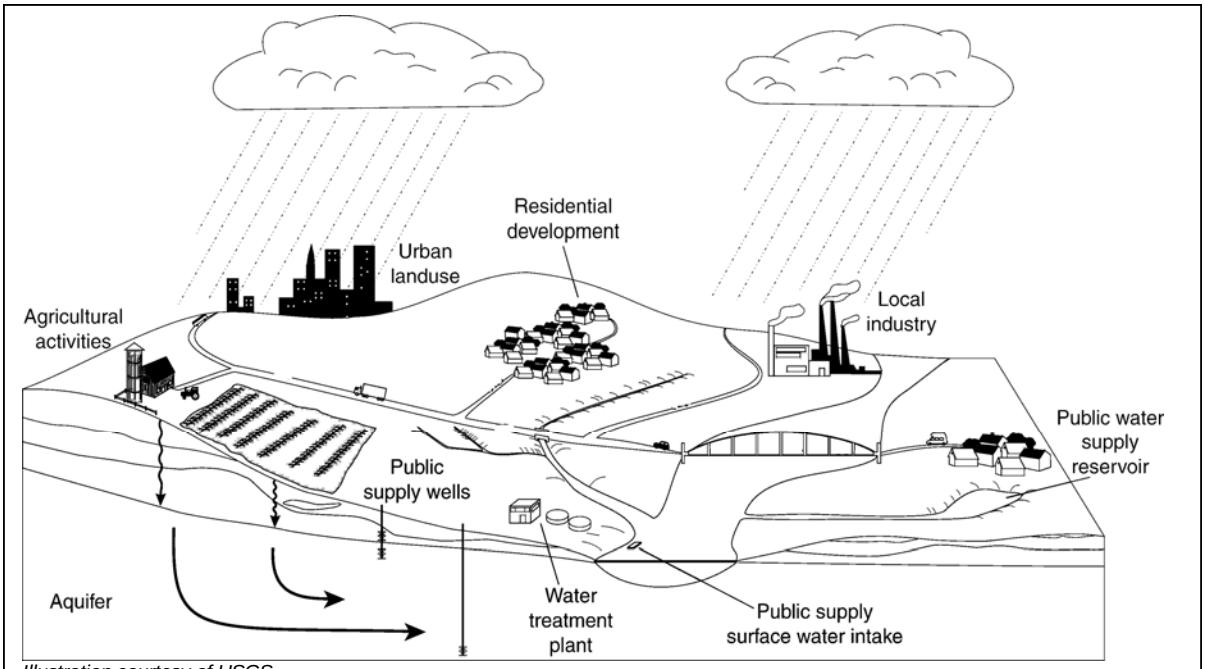

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for West Milford Board of Education - Transportation

West Milford Board of Education - Transportation (PWID 1615328) at 51 Highlander Road, West Milford, NJ, is a public noncommunity water system that serves approximately 75 people (in 2003). West Milford Board of Education - Transportation consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for West Milford Board of Education - Transportation's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	186.74
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	54.95
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	54.95
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.39	% Impervious Surface, 1995	41.8
		% Commercial/Industrial Land Use, 1995	54.95
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	829.58
% Soil Clay	10.24	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	9.87	% Urban Land Use, 1970	100
Conceptual % Soil Organic Matter	0.39	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	147.66
		Length of railroads	0
		Population Density	829.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	62.64
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	62.7
Conceptual Soil Hydraulic Conductivity	9.87	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.24	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	82.14
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.39	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Marshall Hill School

1615329

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

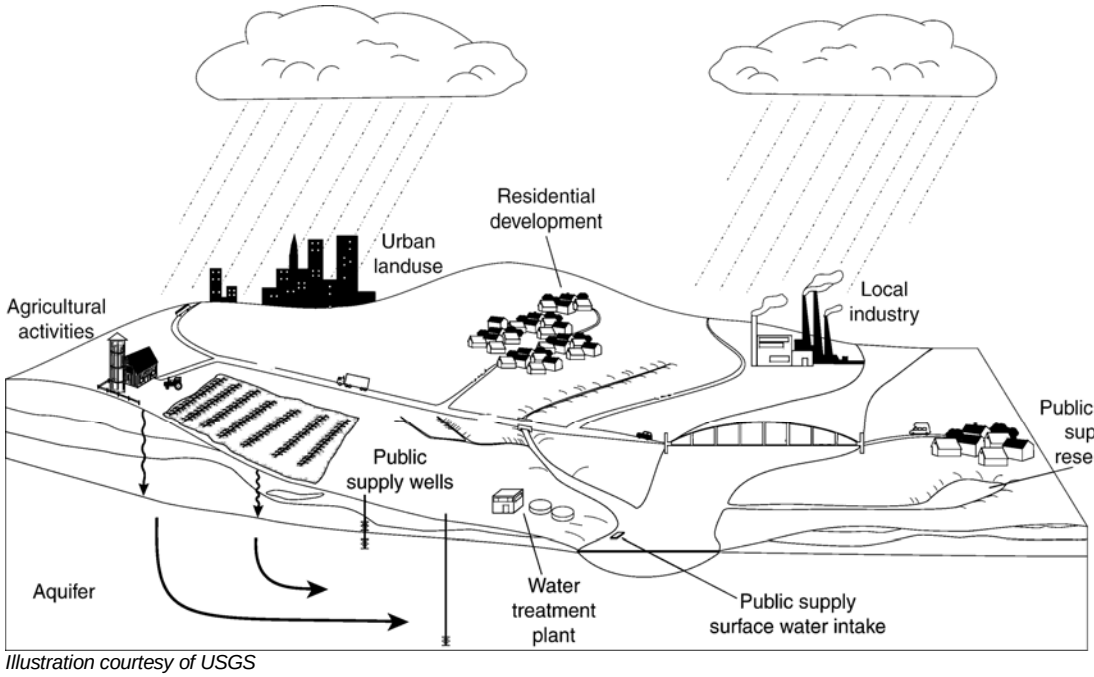

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Marshall Hill School

Marshall Hill School (PWID 1615329) at 210 Marshall Hill Road, West Milford, NJ, is a public noncommunity water system that serves approximately 650 people (in 2003). Marshall Hill School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Marshall Hill School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	199.59
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	42.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	42.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.7	% Impervious Surface, 1995	18.1
		% Commercial/Industrial Land Use, 1995	25.4
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	20.1
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	30.1
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	425	Population Density, Tier 1	601.55
% Soil Clay	15	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	17.62	% Urban Land Use, 1970	82.28
Conceptual % Soil Organic Matter	0.7	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	387.4
		Length of railroads	0
		Population Density	635.92
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	63
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	425	% Developed Land, Tier 1, 1995	63
Conceptual Soil Hydraulic Conductivity	17.62	% Agricultural Land Use, 1970	3.1
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	377.69
Depth to Top of Open Interval	425		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.7	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Paradise Knoll School

1615330

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

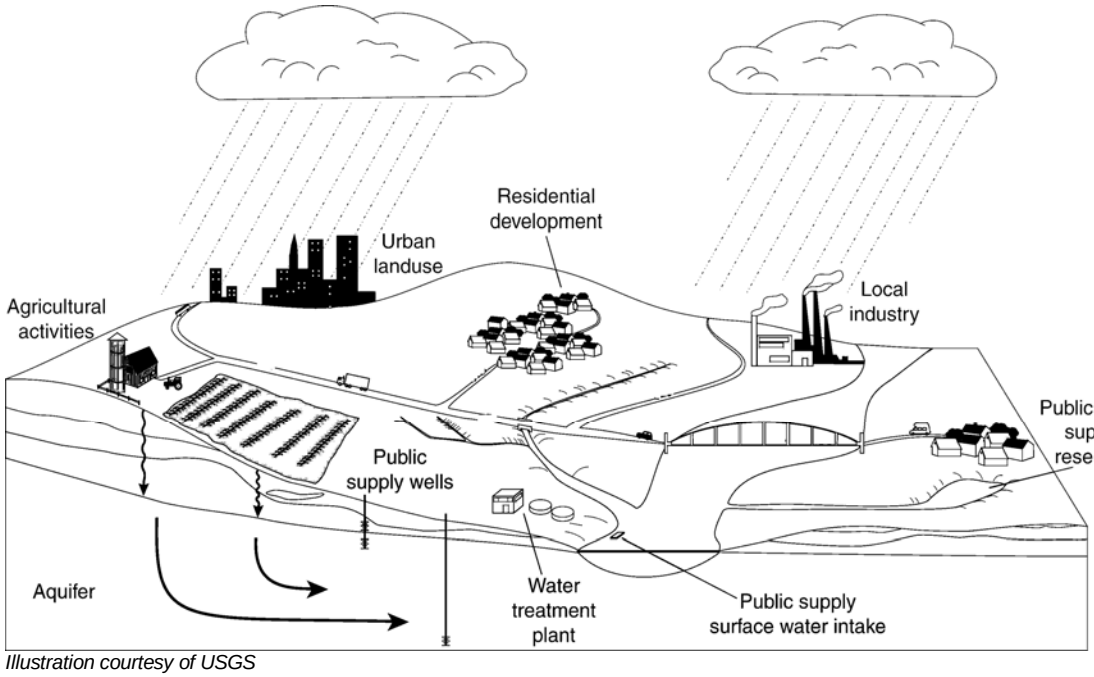

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Paradise Knoll School

Paradise Knoll School (PWID 1615330) at 103 Paradise Road, Oak Ridge, NJ, is a public noncommunity water system that serves approximately 387 people (in 2003). Paradise Knoll School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Paradise Knoll School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	35.33
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	51.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	51.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.42	% Impervious Surface, 1995	15
		% Commercial/Industrial Land Use, 1995	15.73
		Sq. Mi. of Urban Land Use, 1995	0.15
		Density of SWL, USTs, and KCSL	17.2
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	17.2
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	156	Population Density, Tier 1	108.78
% Soil Clay	13.47	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	6.54	% Urban Land Use, 1970	51.55
Conceptual % Soil Organic Matter	0.42	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	259.58
		Length of railroads	0
		Population Density	113
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	73.47
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	156	% Developed Land, Tier 1, 1995	73.4
Conceptual Soil Hydraulic Conductivity	6.54	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.47	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	475.1
Depth to Top of Open Interval	156		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.42	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

St Josephs School

1615333

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- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
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Source Water Assessment Program Goals

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1. Protect sources of drinking water.

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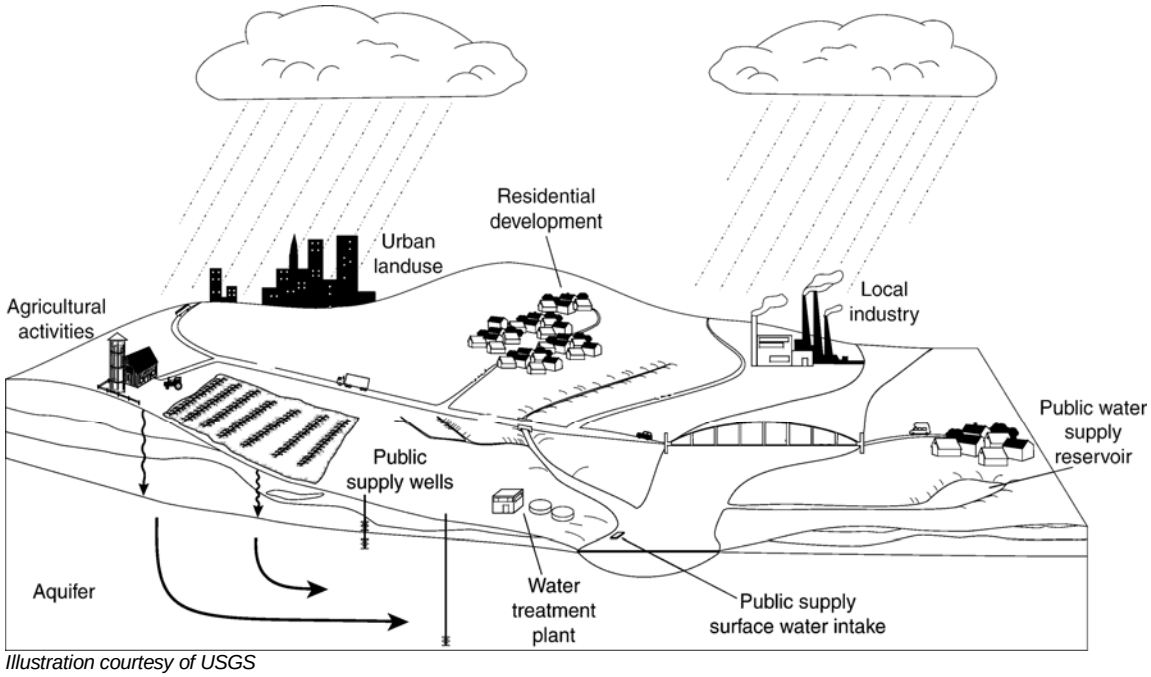

Illustration courtesy of USGS

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- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for St Josephs School

St Josephs School (PWID 1615333) at 484 Germantown Rd., West Milford, NJ, is a public noncommunity water system that serves approximately 188 people (in 2003). St Josephs School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

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Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
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Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for St Josephs School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

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This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	36.8
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	3.2
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	36.8
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	3.2
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.42	% Impervious Surface, 1995	9.2
		% Commercial/Industrial Land Use, 1995	13.8
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	11.71	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	10.15	% Urban Land Use, 1970	37.94
Conceptual % Soil Organic Matter	0.42	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	103.45
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	67.6
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	67.6
Conceptual Soil Hydraulic Conductivity	10.15	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	11.71	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	377.38
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.42	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Oakridge Presbyterian Church/My School Day Care

1615334

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

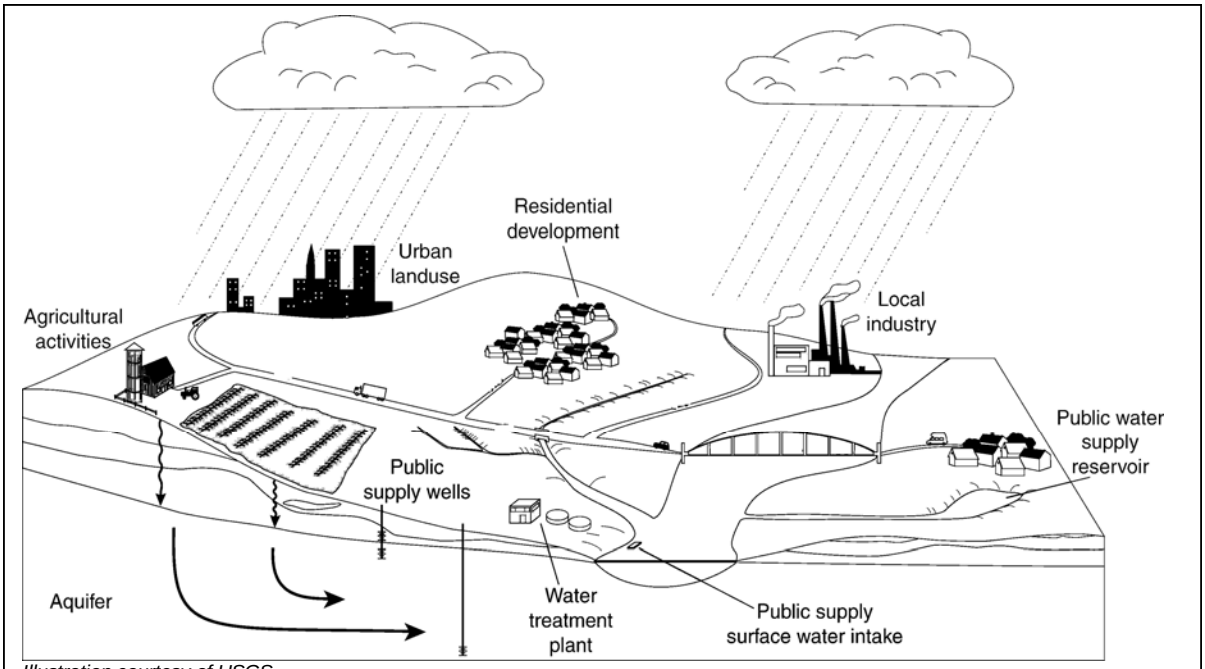

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Oakridge Presbyterian Church/My School Day Care

Oakridge Presbyterian Church/My School Day Care (PWID 1615334) at 321 Oak Ridge Road, Oak Ridge, NJ, is a public noncommunity water system that serves approximately 90 people (in 2003). Oakridge Presbyterian Church/My School Day Care consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Oakridge Presbyterian Church/My School Day Care's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**H**	**M**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	33.41
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	69.67
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	69.67
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.42	% Impervious Surface, 1995	16.3
		% Commercial/Industrial Land Use, 1995	9.31
		Sq. Mi. of Urban Land Use, 1995	0.09
		Density of SWL, USTs, and KCSL	15.3
Inorganics Explanatory Variables – Source Rating = M			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	15.3
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	116	Population Density, Tier 1	107.23
% Soil Clay	7.97	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	37.67	% Urban Land Use, 1970	81.5
Conceptual % Soil Organic Matter	0.42	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	19.03
		Length of railroads	0
		Population Density	107.23
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	76.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	116	% Developed Land, Tier 1, 1995	76.2
Conceptual Soil Hydraulic Conductivity	37.67	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	7.97	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	829.12
Depth to Top of Open Interval	116		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.42	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Strenghten Our Sisters Outreach/Omni School

1615335

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

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- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

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Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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What factors may affect the quality of your drinking water source?

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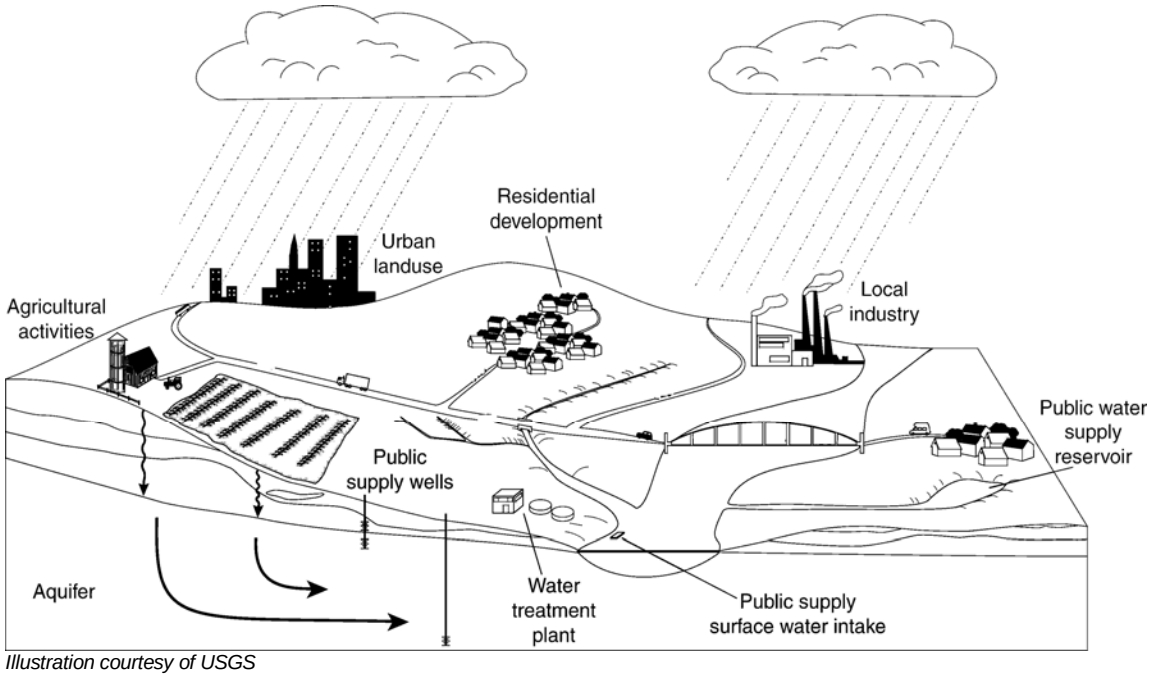

Illustration courtesy of USGS

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- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Strenghten Our Sisters Outreach/Omni School

Strenghten Our Sisters Outreach/Omni School (PWID 1615335) at 1221 Union Valley Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 60 people (in 2003). Strenghten Our Sisters Outreach/Omni School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Strenghten Our Sisters Outreach/Omni School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**M**	**L**	**L**	**L**	**M**	**L**	**H**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.12	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	131.36
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	718.03
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	10.11
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	10.11
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.6	% Impervious Surface, 1995	2.9
		% Commercial/Industrial Land Use, 1995	0
		Sq. Mi. of Urban Land Use, 1995	0.01
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = M			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	7.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	72	Population Density, Tier 1	575.11
% Soil Clay	17.72	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	4.94	% Urban Land Use, 1970	29.27
Conceptual % Soil Organic Matter	0.6	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	92.72
		Length of railroads	0
		Population Density	548.8
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	11.09
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	72	% Developed Land, Tier 1, 1995	11.1
Conceptual Soil Hydraulic Conductivity	4.94	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = H			
Conceptual % Soil Clay	17.72	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	149.36
Depth to Top of Open Interval	72		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.6	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.04
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Grace Fellowship Church

1615337

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

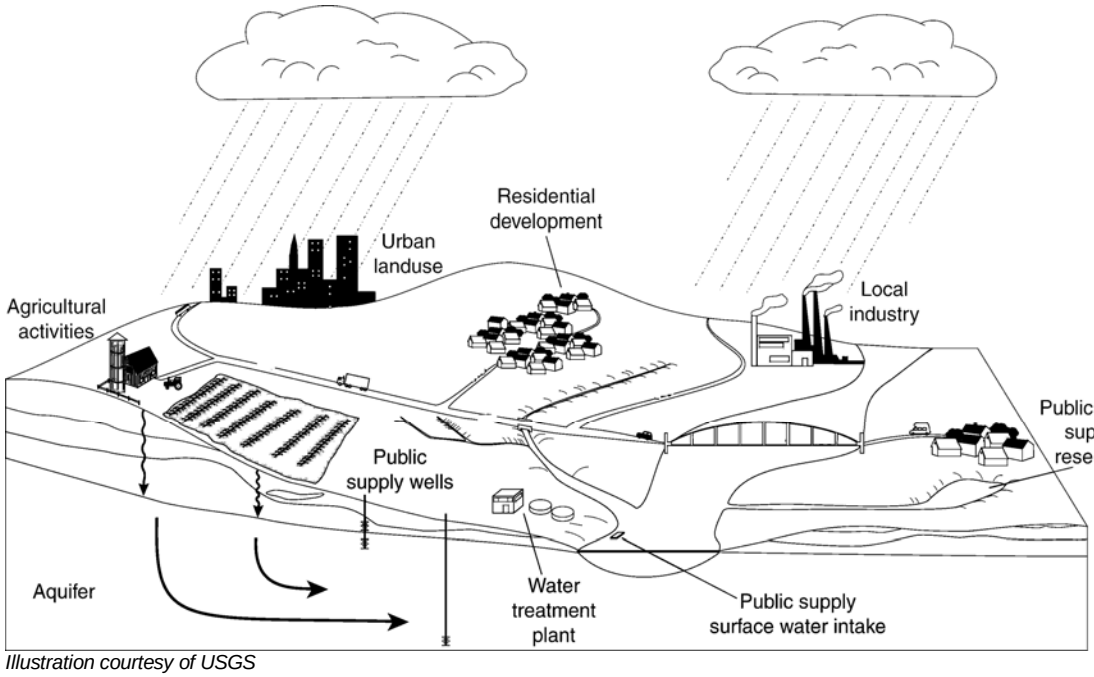

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Grace Fellowship Church

Grace Fellowship Church (PWID 1615337) at 37 Stephens Road, West Milford, NJ, is a public noncommunity water system that serves approximately 80 people (in 2003). Grace Fellowship Church consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Grace Fellowship Church's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	57.63
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	40.88
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	40.88
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.48	% Impervious Surface, 1995	12.1
		% Commercial/Industrial Land Use, 1995	17.84
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	225	Population Density, Tier 1	127.71
% Soil Clay	11.49	% Barren Land Use, 1995	2.1
Soil Hydraulic Conductivity	6.94	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.48	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	365.47
		Length of railroads	0
		Population Density	192.93
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	53.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	225	% Developed Land, Tier 1, 1995	53.8
Conceptual Soil Hydraulic Conductivity	6.94	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	11.49	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	548.73
Depth to Top of Open Interval	225		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.48	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Christian Life Day Care Center

1615338

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

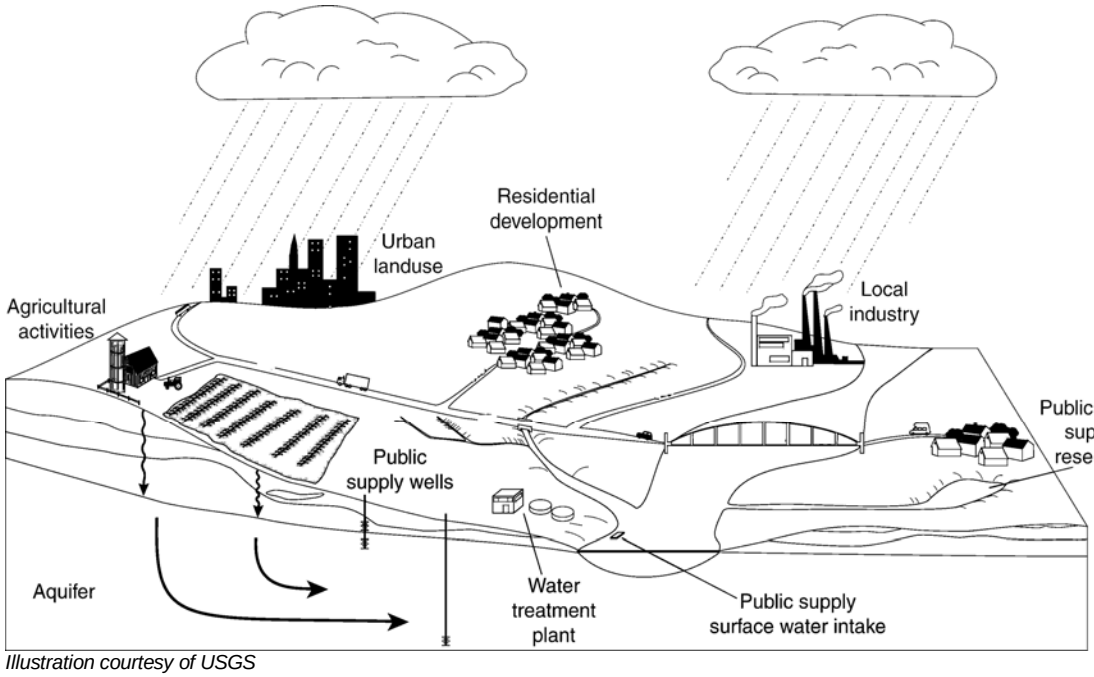

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Christian Life Day Care Center

Christian Life Day Care Center (PWID 1615338) at 184 Marshall Hill Road, West Milford, NJ, is a public noncommunity water system that serves approximately 40 people (in 2003). Christian Life Day Care Center consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Christian Life Day Care Center's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	739.86
Depth to Top of Open Interval		Conceptual Septic Tank Density	279.56
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	59.26
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	1.1
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	59.26
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	1.1
		Distance to Agricultural Land Use, 1995	739.86
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.75	% Impervious Surface, 1995	22.6
		% Commercial/Industrial Land Use, 1995	17.02
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	41.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	739.86
Depth to Top of Open Interval	211	Population Density, Tier 1	1071.74
% Soil Clay	15.18	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	28.77	% Urban Land Use, 1970	67.23
Conceptual % Soil Organic Matter	0.75	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	93.7
		Length of railroads	0
		Population Density	866.98
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	59.1
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	739.86
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	59.1
Conceptual Soil Hydraulic Conductivity	28.77	% Agricultural Land Use, 1970	32.77
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15.18	% Agricultural Land Use, 1995	1.1
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	306.01
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.75	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Hillcrest Community Center

1615339

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

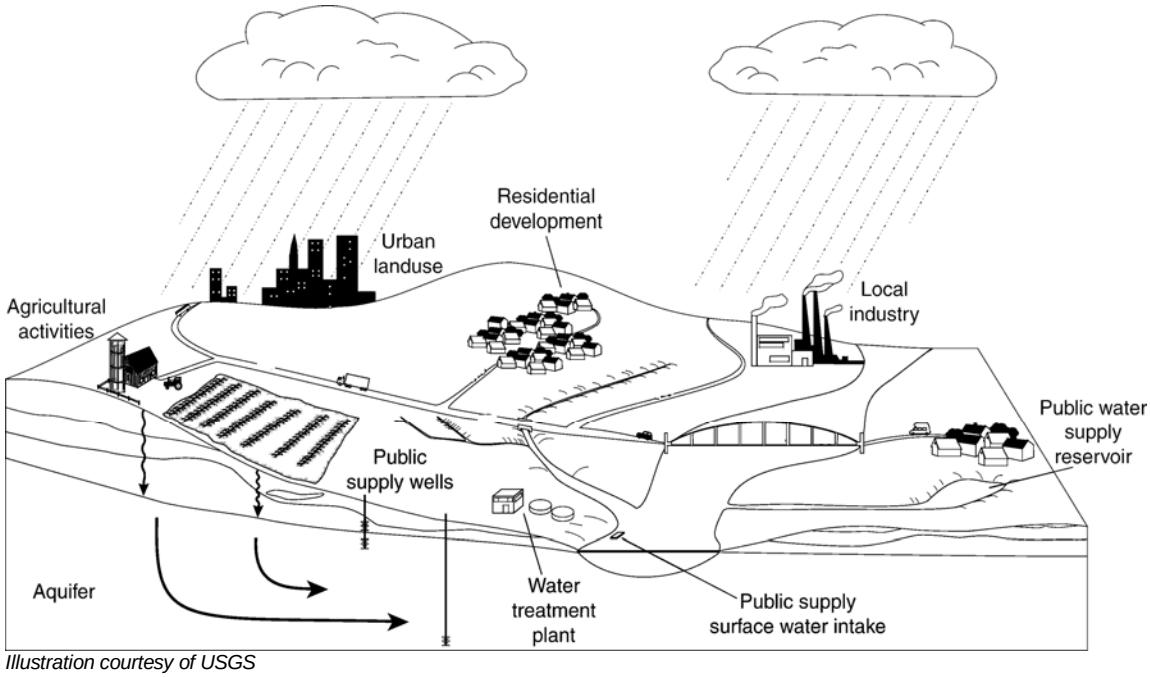

Illustration courtesy of USGS

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What can you and others do to help?

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- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Hillcrest Community Center

Hillcrest Community Center (PWID 1615339) at 1810 Macopin Rd., West Milford, NJ, is a public noncommunity water system that serves approximately 40 people (in 2003). Hillcrest Community Center consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

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Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Hillcrest Community Center's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	67.08
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	38.64
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	38.64
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.59	% Impervious Surface, 1995	12.9
		% Commercial/Industrial Land Use, 1995	10.71
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	478.37
% Soil Clay	12.46	% Barren Land Use, 1995	4.8
Soil Hydraulic Conductivity	10.4	% Urban Land Use, 1970	68.6
Conceptual % Soil Organic Matter	0.59	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	180.14
		Length of railroads	0
		Population Density	478.37
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	80.9
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	80.9
Conceptual Soil Hydraulic Conductivity	10.4	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	12.46	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	227.24
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.59	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Milford Manor

1615340

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

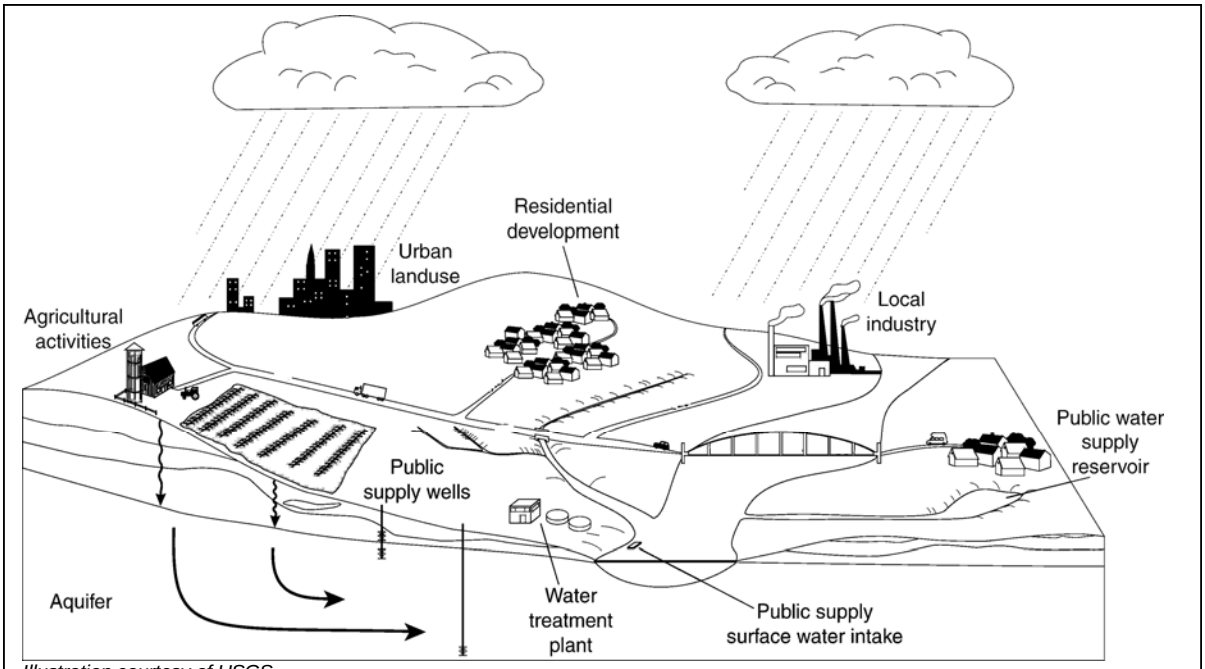

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Milford Manor

Milford Manor (PWID 1615340) at 69 Maple Avenue, West Milford, NJ, is a public noncommunity water system that serves approximately 221 people (in 2003). Milford Manor consists of 2 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Milford Manor's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 2	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**
Well 1	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 2 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.13	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	187.33
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	112.09
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	29.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	29.5
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	7.98	% Impervious Surface, 1995	11.8
		% Commercial/Industrial Land Use, 1995	8.8
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	829.58
% Soil Clay	8.96	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	25.06	% Urban Land Use, 1970	16.78
Conceptual % Soil Organic Matter	7.98	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	591.51
		Length of railroads	0
		Population Density	824.71
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	42.5
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	42.5
Conceptual Soil Hydraulic Conductivity	25.06	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.96	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	17.26
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	7.98	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.04
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.13	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	187.33
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	129.76
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	29.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	29.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	8	% Impervious Surface, 1995	11.8
		% Commercial/Industrial Land Use, 1995	8.7
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	829.58
% Soil Clay	8.95	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	25.1	% Urban Land Use, 1970	16.78
Conceptual % Soil Organic Matter	8	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	591.44
		Length of railroads	0
		Population Density	824.71
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	42.5
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	42.5
Conceptual Soil Hydraulic Conductivity	25.1	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.95	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	17.12
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	8	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.04
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Hewitt Plaza Professional Condominium

1615341

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

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Where does drinking water come from?

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Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

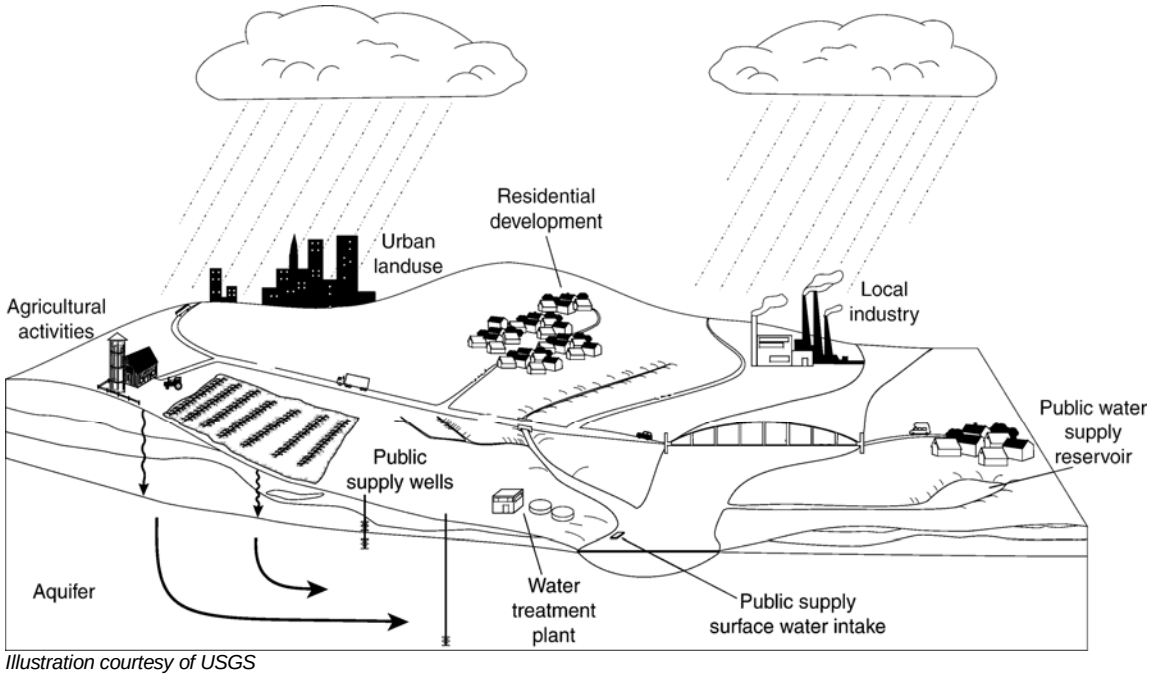

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

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- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Hewitt Plaza Professional Condominium

Hewitt Plaza Professional Condominium (PWID 1615341) at 1900 Union Valley Road, Hewitt, NJ, is a public noncommunity water system that serves approximately 40 people (in 2003). Hewitt Plaza Professional Condominium consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

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	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
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High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Hewitt Plaza Professional Condominium's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	214.37
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	693.85
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	62.9
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	62.9
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.74	% Impervious Surface, 1995	38.4
		% Commercial/Industrial Land Use, 1995	48.2
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	41.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	41.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	493.37
% Soil Clay	10.88	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	40.04	% Urban Land Use, 1970	65.6
Conceptual % Soil Organic Matter	0.74	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	81.07
		Length of railroads	0
		Population Density	586.07
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	83.28
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	83.2
Conceptual Soil Hydraulic Conductivity	40.04	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.88	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	184.68
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.74	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Rockport Shopping Park

1615342

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

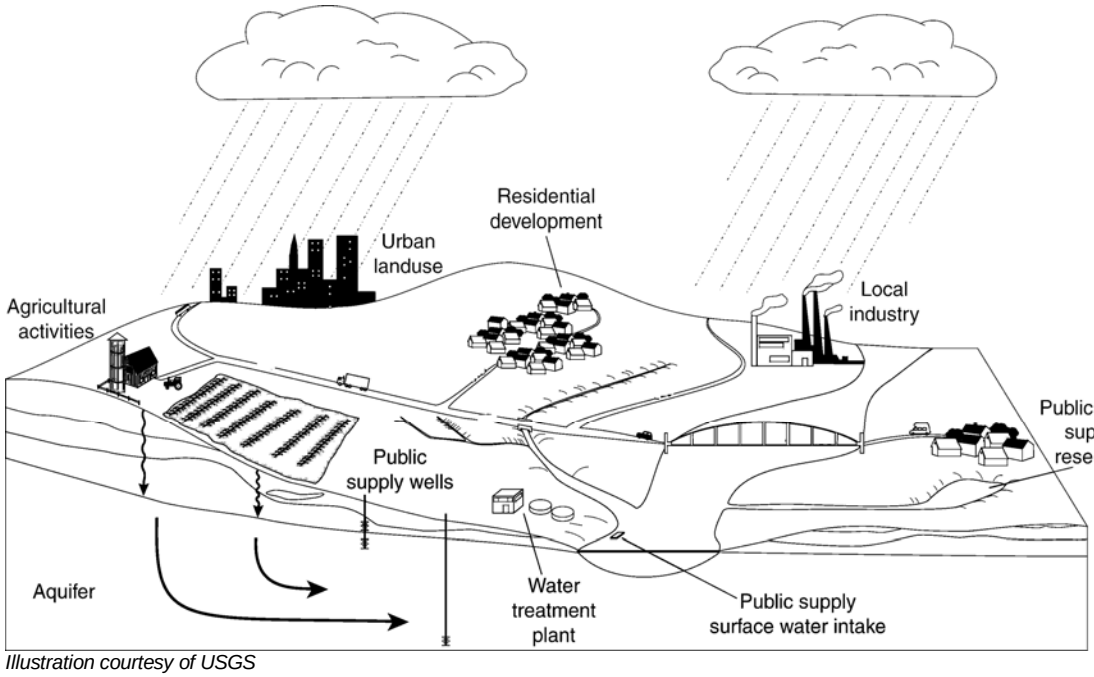

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Rockport Shopping Park

Rockport Shopping Park (PWID 1615342) at 1618 Union Valley Road, West Milford, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). Rockport Shopping Park consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Rockport Shopping Park's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**M**	**M**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.13	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	283.58
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	68.1
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	68.1
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.79	% Impervious Surface, 1995	24.7
		% Commercial/Industrial Land Use, 1995	25.5
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	994.43
% Soil Clay	15.99	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	16	% Urban Land Use, 1970	100
Conceptual % Soil Organic Matter	0.79	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	358.09
		Length of railroads	0
		Population Density	898.06
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	79
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	79
Conceptual Soil Hydraulic Conductivity	16	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15.99	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	220.8
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.79	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.02
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

West Milford Town Hall

1615344

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

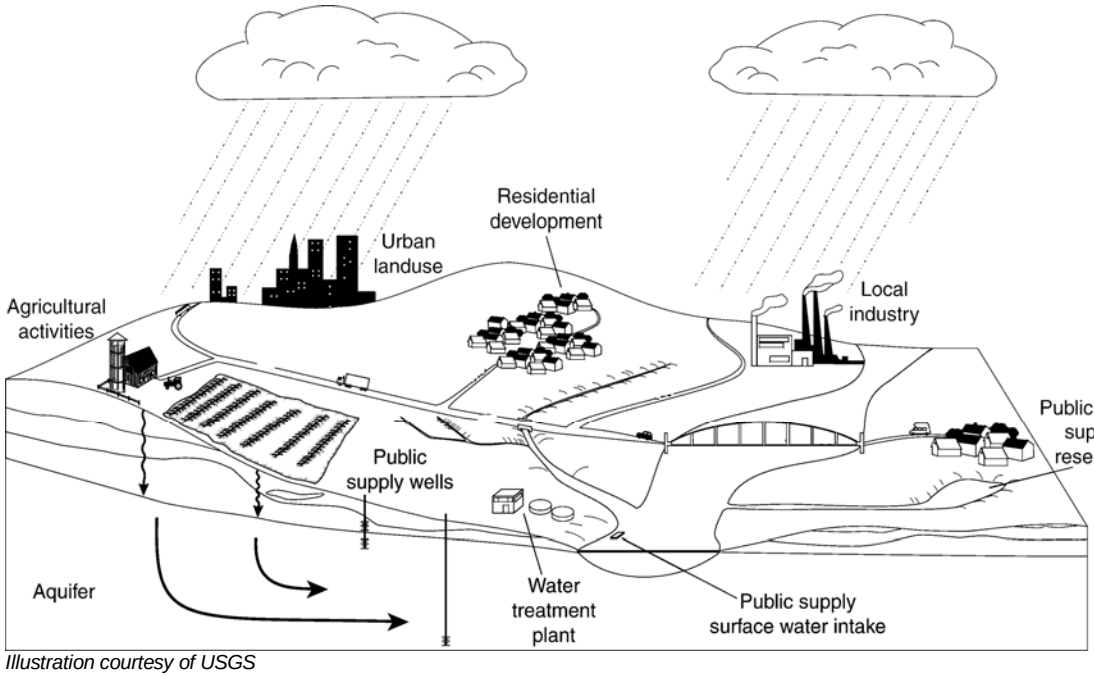

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for West Milford Town Hall

West Milford Town Hall (PWID 1615344) at 1480 Union Valley Road, West Milford, NJ, is a public noncommunity water system that serves approximately 90 people (in 2003). West Milford Town Hall consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for West Milford Town Hall's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	116.99
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	90.59
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	90.59
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.43	% Impervious Surface, 1995	35.4
		% Commercial/Industrial Land Use, 1995	41.44
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	82.6
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	82.6
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	250	Population Density, Tier 1	418.7
% Soil Clay	14.08	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	6.37	% Urban Land Use, 1970	99.2
Conceptual % Soil Organic Matter	0.43	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	28.66
		Length of railroads	0
		Population Density	473.81
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	90.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	250	% Developed Land, Tier 1, 1995	90.8
Conceptual Soil Hydraulic Conductivity	6.37	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.08	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	572.12
Depth to Top of Open Interval	250		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.43	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

West Milford Road Department

1615345

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

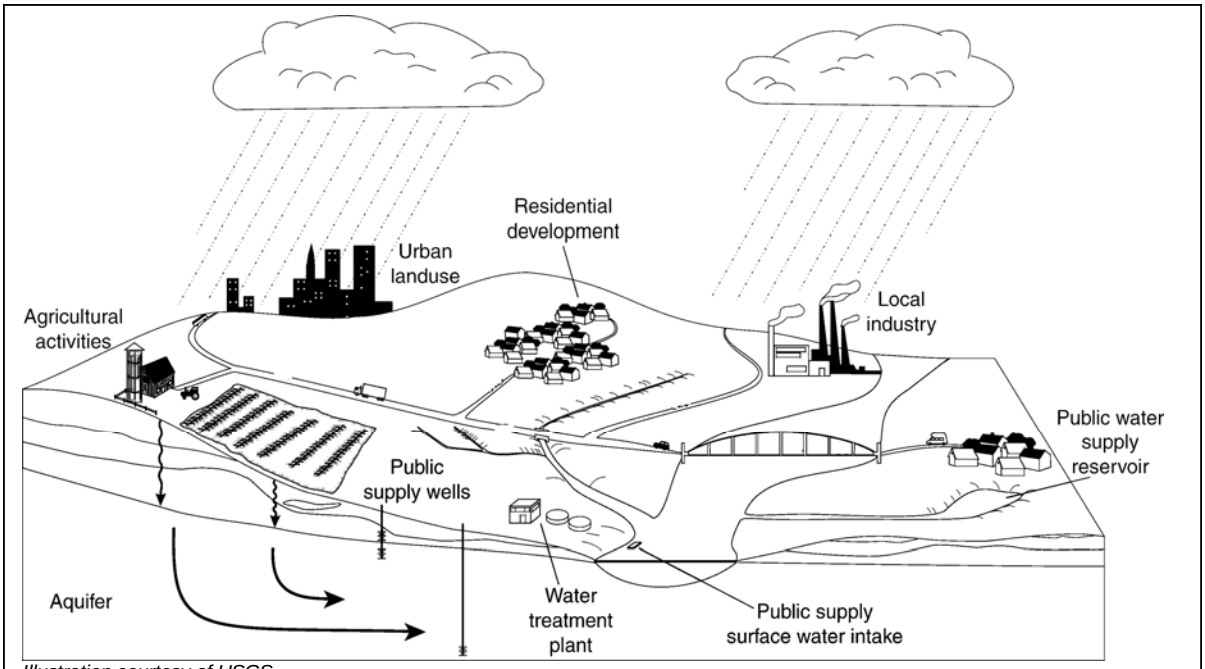

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for West Milford Road Department

West Milford Road Department (PWID 1615345) at 30 Lycosky Drive, West Milford, NJ, is a public noncommunity water system that serves approximately 25 people (in 2003). West Milford Road Department consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for West Milford Road Department's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	109.51
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	72.37
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	72.37
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.63	% Impervious Surface, 1995	7.8
		% Commercial/Industrial Land Use, 1995	72.37
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	69.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	308.47
% Soil Clay	14.83	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	4.12	% Urban Land Use, 1970	29.87
Conceptual % Soil Organic Matter	0.63	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	62.21
		Length of railroads	0
		Population Density	375.71
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	100
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	100
Conceptual Soil Hydraulic Conductivity	4.12	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.83	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.63	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Geod Corporation

1615347

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

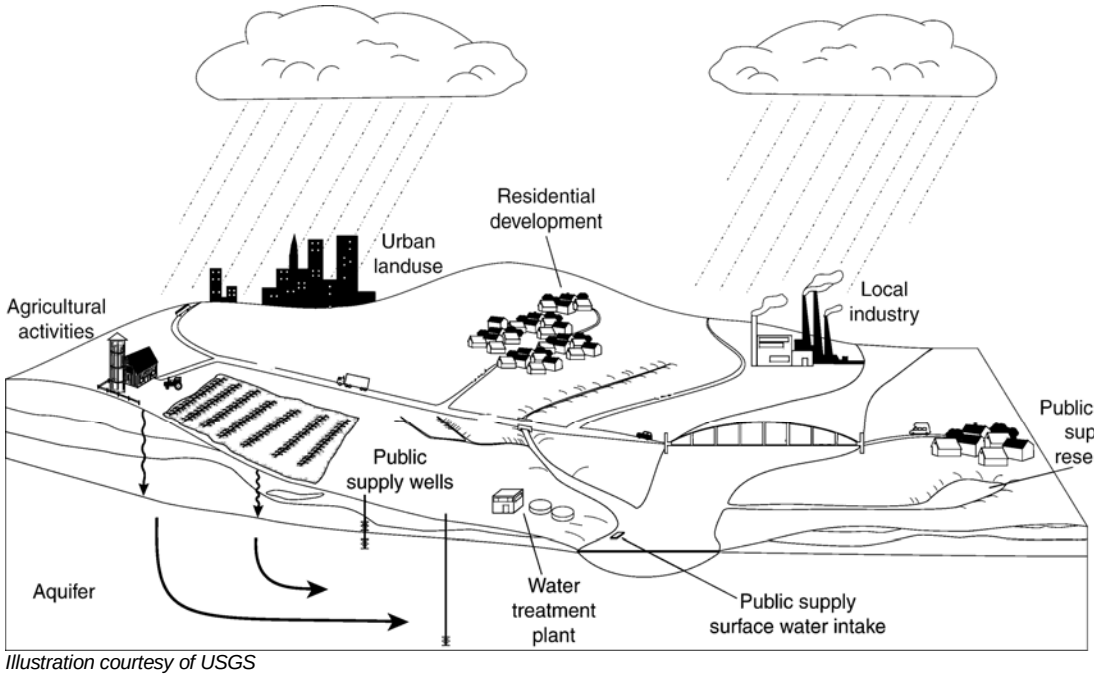

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Geod Corporation

Geod Corporation (PWID 1615347) at 18-24 Kanouse Rd, Newfoundland, NJ, is a public noncommunity water system that serves approximately 40 people (in 2003). Geod Corporation consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Geod Corporation's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.11	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	39.63
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	57.19
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	57.19
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.68	% Impervious Surface, 1995	20.6
		% Commercial/Industrial Land Use, 1995	18.06
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	55.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	125.87
% Soil Clay	13.15	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	28.69	% Urban Land Use, 1970	75.6
Conceptual % Soil Organic Matter	0.68	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	96.63
		Length of railroads	0
		Population Density	125.87
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	91.9
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	91.9
Conceptual Soil Hydraulic Conductivity	28.69	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.15	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	375.21
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.68	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Esco Products

1615353

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

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Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

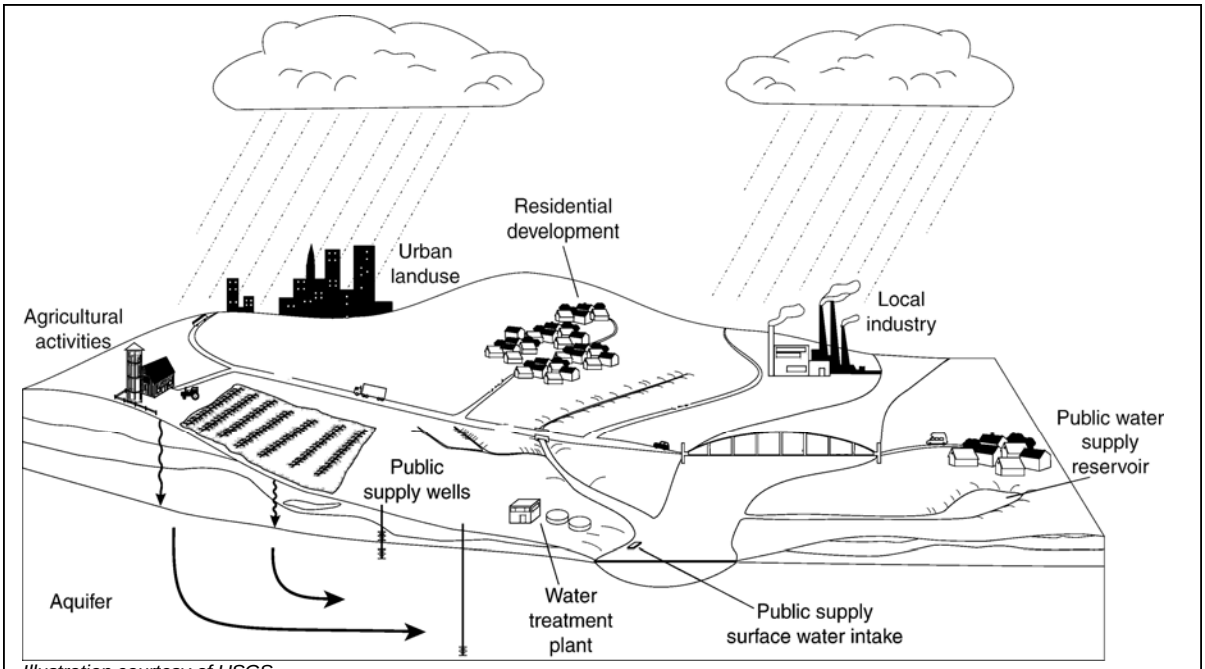

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

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- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Esco Products

Esco Products (PWID 1615353) at 171 Oak Ridge Road, Oak Ridge, NJ, is a public noncommunity water system that serves approximately 31 people (in 2003). Esco Products consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Esco Products's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**H**	**M**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	33.41
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	33.47
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	33.47
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.24	% Impervious Surface, 1995	13.6
		% Commercial/Industrial Land Use, 1995	20.48
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = M			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	107.23
% Soil Clay	6.43	% Barren Land Use, 1995	12.39
Soil Hydraulic Conductivity	42.97	% Urban Land Use, 1970	47.45
Conceptual % Soil Organic Matter	0.24	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	33.18
		Length of railroads	0
		Population Density	107.23
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	68.9
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	68.9
Conceptual Soil Hydraulic Conductivity	42.97	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	6.43	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	388.76
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.24	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Lakeland Plaza

1615354

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

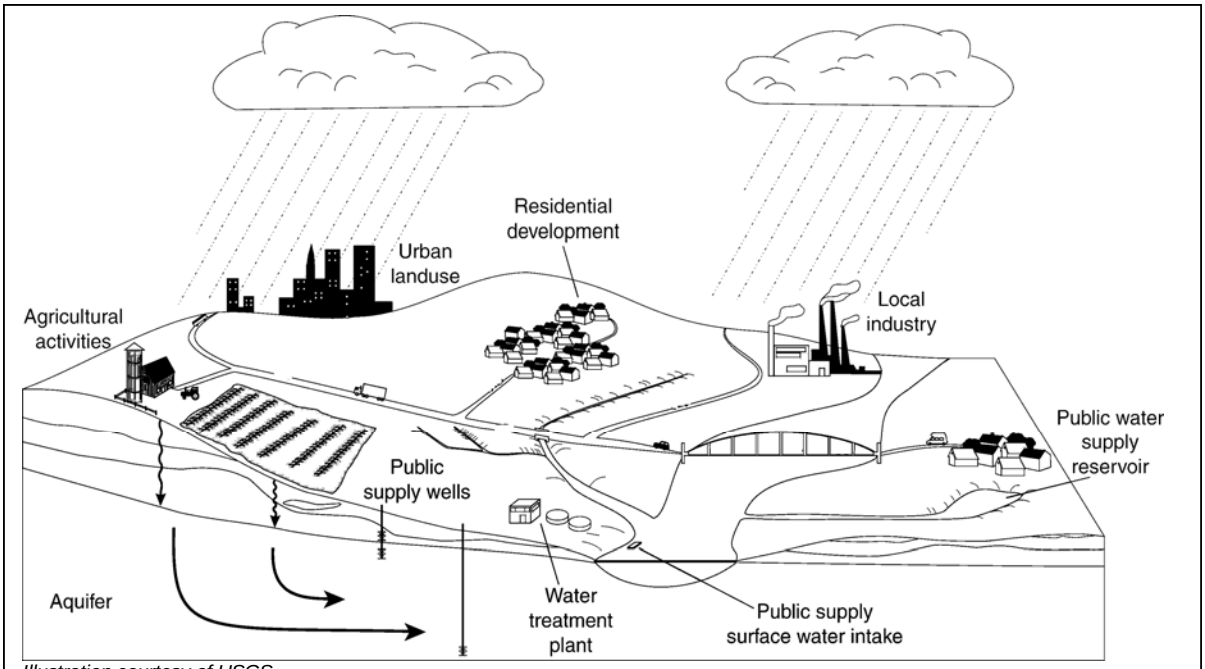

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Lakeland Plaza

Lakeland Plaza (PWID 1615354) at 2713 Route 23 South, Newfoundland, NJ, is a public noncommunity water system that serves approximately 33 people (in 2003). Lakeland Plaza consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Lakeland Plaza's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**M**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	46.54
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	637.53
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	48.65
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	48.65
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.56	% Impervious Surface, 1995	21.6
		% Commercial/Industrial Land Use, 1995	43.94
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	55.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	142.79
% Soil Clay	9.49	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	61.67	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.56	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	291.75
		Length of railroads	1273.23
		Population Density	143.9
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	58.34
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	58.4
Conceptual Soil Hydraulic Conductivity	61.67	% Agricultural Land Use, 1970	98.5
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.49	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	78.88
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.56	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Our Lady Queen of Peace

1615355

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

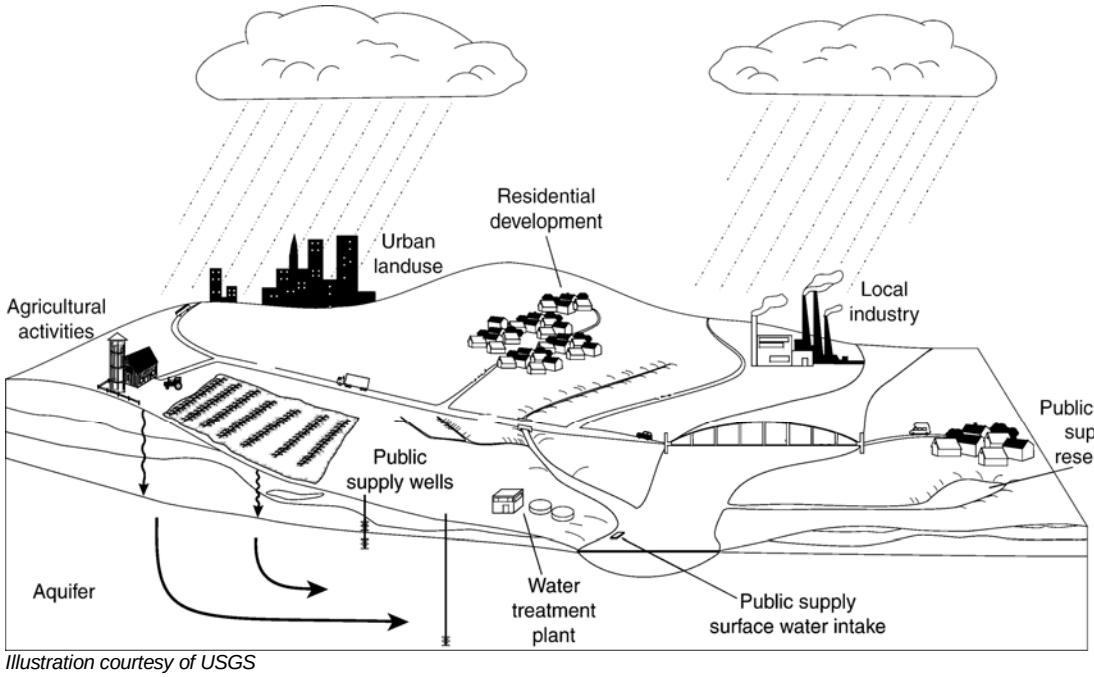

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

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- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Our Lady Queen of Peace

Our Lady Queen of Peace (PWID 1615355) at 1911 Union Valley Rd, Clifton, NJ, is a public noncommunity water system that serves approximately 457 people (in 2003). Our Lady Queen of Peace consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Our Lady Queen of Peace's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	179.77
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	157.17
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	73.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	73.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.74	% Impervious Surface, 1995	43.6
		% Commercial/Industrial Land Use, 1995	51.4
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	69.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	69.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	353.28
% Soil Clay	10.1	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	44.46	% Urban Land Use, 1970	66.4
Conceptual % Soil Organic Matter	0.74	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	134.77
		Length of railroads	0
		Population Density	462.47
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	89.6
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	89.6
Conceptual Soil Hydraulic Conductivity	44.46	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.1	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	225.12
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.74	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Storms Island Association

1615356

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

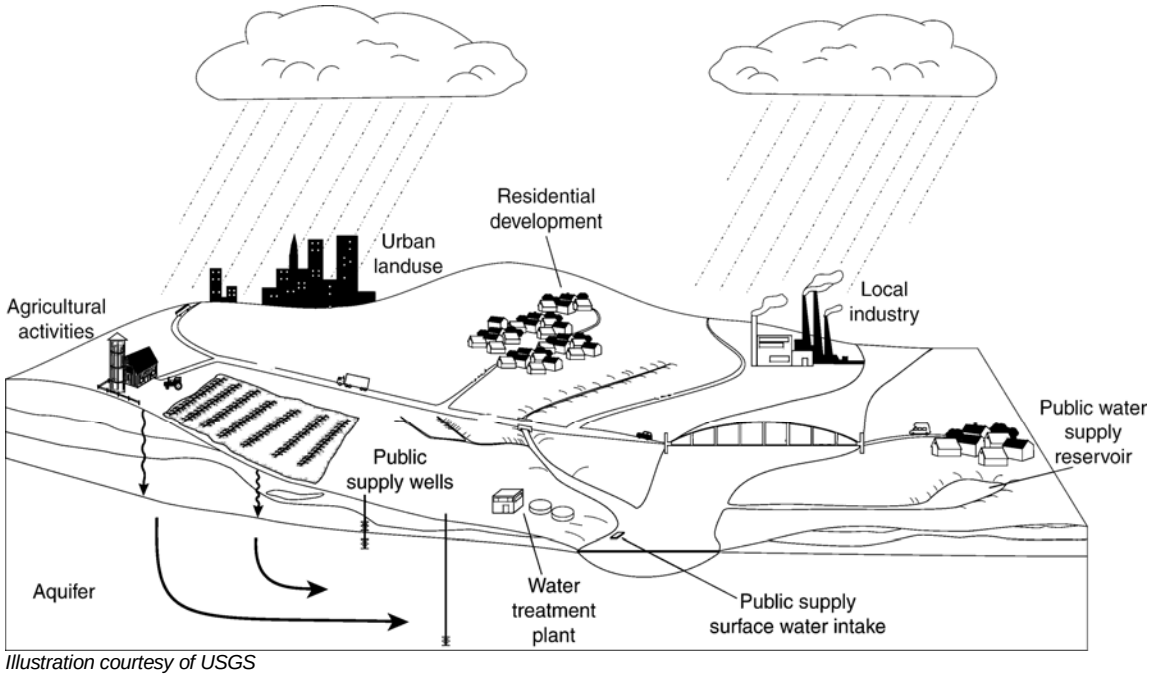

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Storms Island Association

Storms Island Association (PWID 1615356) at 105 Storms Island Rd., Hewitt, NJ, is a public noncommunity water system that serves approximately 28 people (in 2003). Storms Island Association consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Storms Island Association's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	L	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.05	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	47.92
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	37.78
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	37.78
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.37	% Impervious Surface, 1995	12.8
		% Commercial/Industrial Land Use, 1995	0.3
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	157.47
% Soil Clay	12.61	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	3.4	% Urban Land Use, 1970	39.96
Conceptual % Soil Organic Matter	0.37	Distance to STP	
Physiographic Province		STP Density	0
		Distance to DOT roads	6.77
		Length of railroads	0
		Population Density	157.47
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	60.9
Physiographic Province		Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	60.9
Conceptual Soil Hydraulic Conductivity	3.4	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	12.61	% Agricultural Land Use, 1995	0
Physiographic Province		Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.37	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Camp Hope (Main Well)

1615357

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
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DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

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- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
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- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

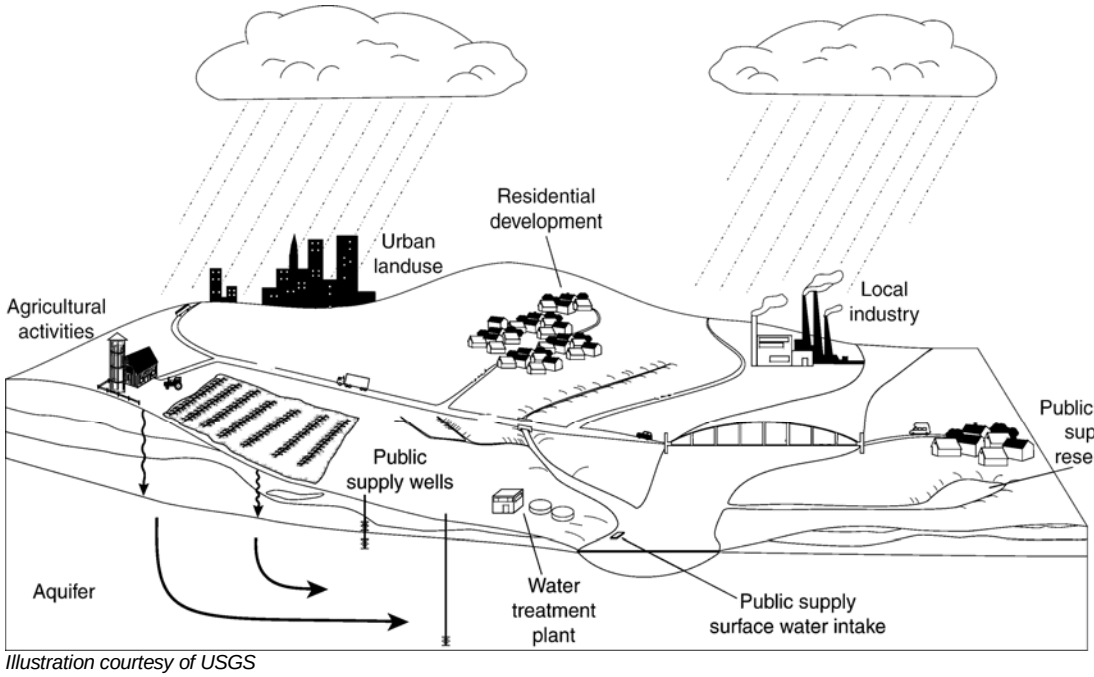

Illustration courtesy of USGS

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While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Camp Hope (Main Well)

Camp Hope (Main Well) (PWID 1615357) at 1792 Union Valley Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 185 people (in 2003). Camp Hope (Main Well) consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Camp Hope (Main Well)'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**M**	**M**	**H**	**L**	**H**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	534.66
Depth to Top of Open Interval		Conceptual Septic Tank Density	286.53
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	49.55
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	10.53
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	49.55
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	10.53
		Distance to Agricultural Land Use, 1995	534.66
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.66	% Impervious Surface, 1995	10.1
		% Commercial/Industrial Land Use, 1995	9.81
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	534.66
Depth to Top of Open Interval	211	Population Density, Tier 1	970.97
% Soil Clay	8.08	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	52.23	% Urban Land Use, 1970	92.99
Conceptual % Soil Organic Matter	0.66	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	102.35
		Length of railroads	0
		Population Density	905.72
Radionuclides Explanatory Variables – Source Rating = H			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	66.63
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	534.66
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	66.7
Conceptual Soil Hydraulic Conductivity	52.23	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.08	% Agricultural Land Use, 1995	10.41
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	288.64
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.66	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Camp Hope (Caretaker Well)

1615358

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

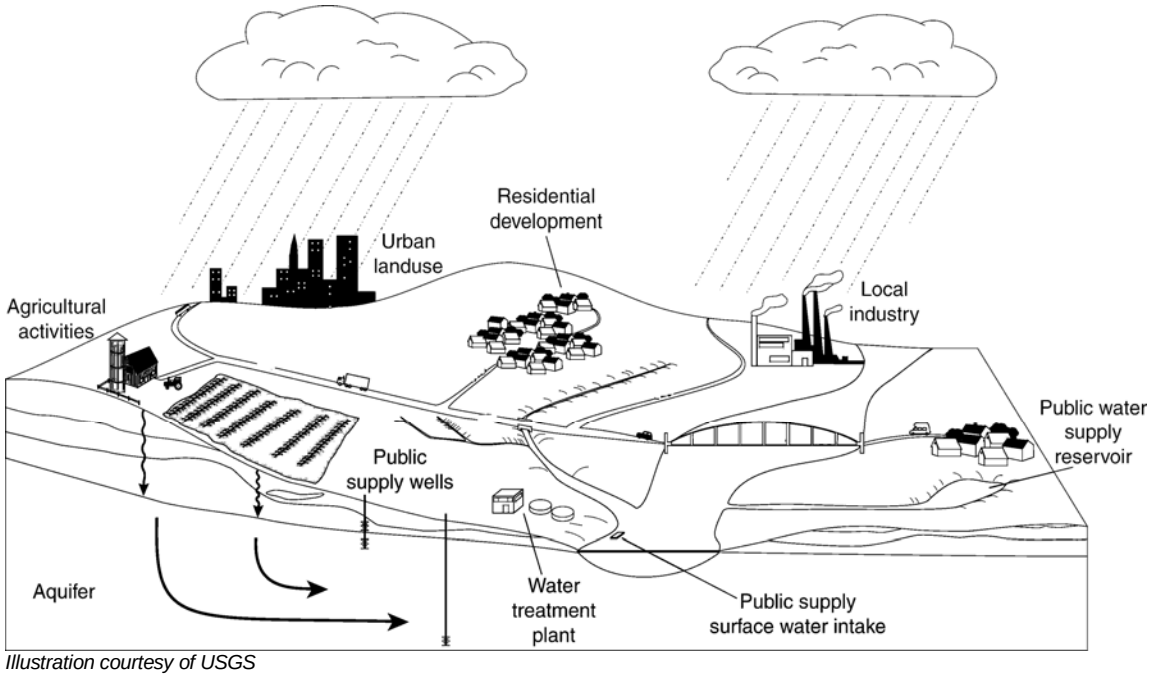

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Camp Hope (Caretaker Well)

Camp Hope (Caretaker Well) (PWID 1615358) at 1792 Union Valley Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 25 people (in 2003). Camp Hope (Caretaker Well) consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Camp Hope (Caretaker Well)'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 2	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 2 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	702.21
Depth to Top of Open Interval		Conceptual Septic Tank Density	302.07
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	48.25
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	2.21
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	48.25
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	2.21
		Distance to Agricultural Land Use, 1995	702.21
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.69	% Impervious Surface, 1995	10.3
		% Commercial/Industrial Land Use, 1995	9.51
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	702.21
Depth to Top of Open Interval	211	Population Density, Tier 1	1052.65
% Soil Clay	8.49	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	49.79	% Urban Land Use, 1970	99.4
Conceptual % Soil Organic Matter	0.69	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	282.57
		Length of railroads	0
		Population Density	946.13
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	42.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	702.21
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	42.8
Conceptual Soil Hydraulic Conductivity	49.79	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.49	% Agricultural Land Use, 1995	2.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	110.96
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.69	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Camp Hope (Dining Hall)

1615359

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

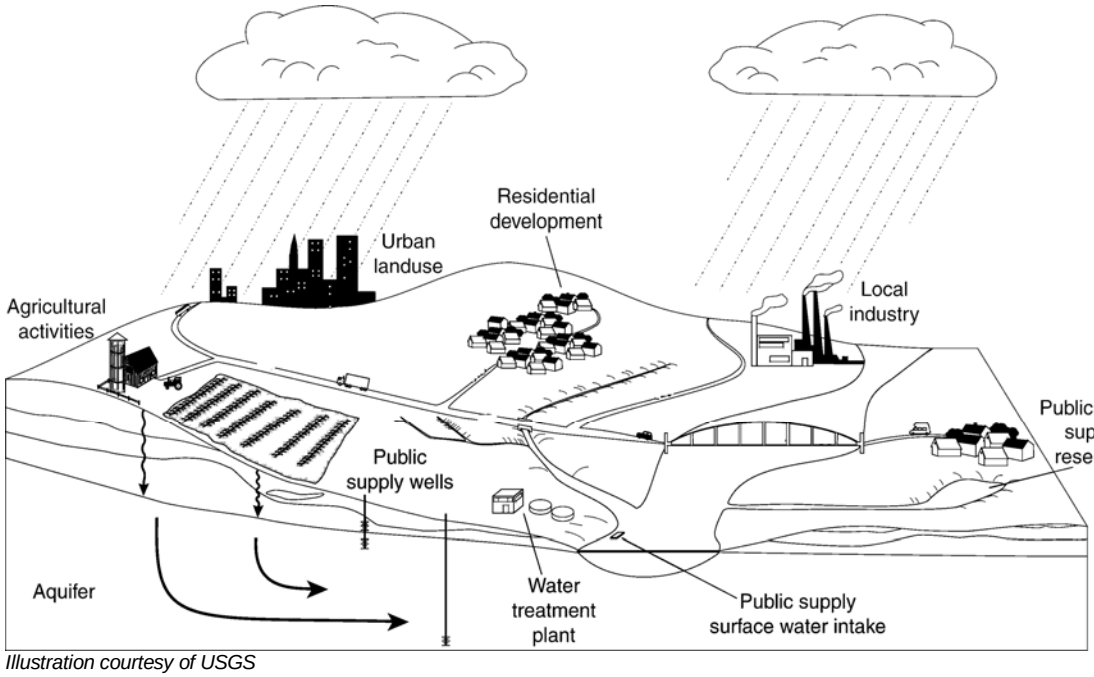

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Camp Hope (Dining Hall)

Camp Hope (Dining Hall) (PWID 1615359) at 1792 Union Valley Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 125 people (in 2003). Camp Hope (Dining Hall) consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Camp Hope (Dining Hall)'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 3	**L**	**M**	**M**	**L**	**L**	**H**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 3 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	85.49
Depth to Top of Open Interval		Conceptual Septic Tank Density	275.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	34.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	36.32
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	34.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	36.32
		Distance to Agricultural Land Use, 1995	85.49
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.67	% Impervious Surface, 1995	6
		% Commercial/Industrial Land Use, 1995	4.2
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	9.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	9.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	85.49
Depth to Top of Open Interval	150	Population Density, Tier 1	905.88
% Soil Clay	8.46	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	50.96	% Urban Land Use, 1970	59.8
Conceptual % Soil Organic Matter	0.67	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	139.22
		Length of railroads	0
		Population Density	876.33
Radionuclides Explanatory Variables – Source Rating = H			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	55.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	85.49
Conceptual Depth of Well	150	% Developed Land, Tier 1, 1995	90.8
Conceptual Soil Hydraulic Conductivity	50.96	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.46	% Agricultural Land Use, 1995	36.1
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	713.4
Depth to Top of Open Interval	150		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.67	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Camp Hope (Pool Well)

1615360

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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What factors may affect the quality of your drinking water source?

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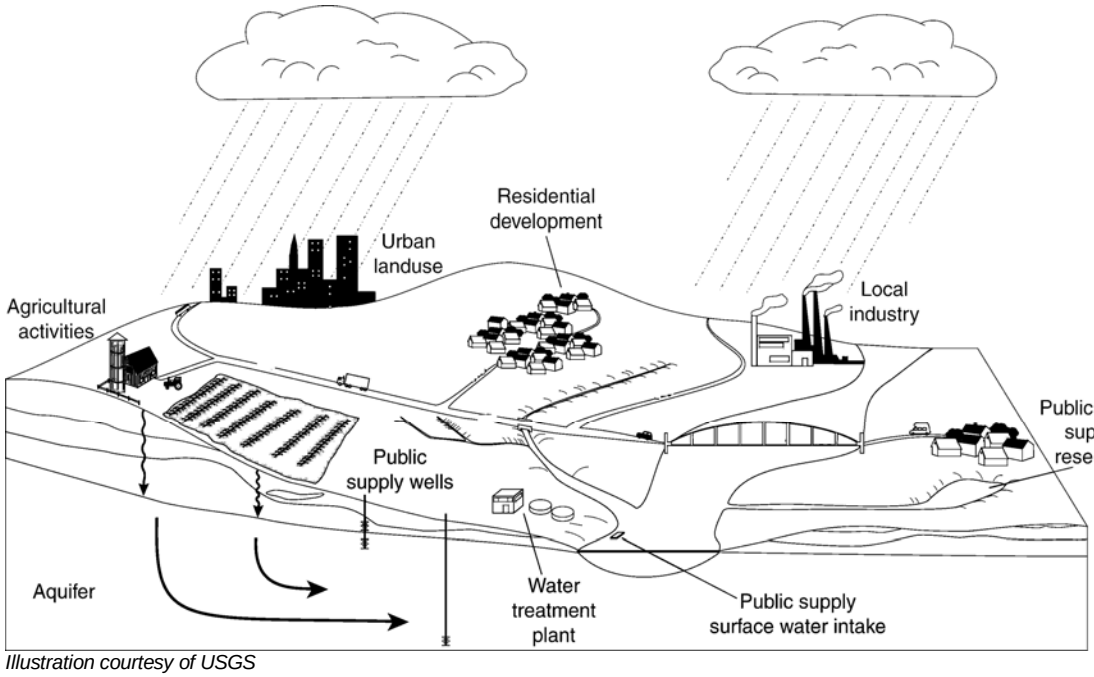

Illustration courtesy of USGS

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	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
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High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Camp Hope (Pool Well)'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 4	**L**	**M**	**M**	**L**	**L**	**H**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

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This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 4 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	205.64
Depth to Top of Open Interval		Conceptual Septic Tank Density	334.81
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	31.53
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	20.62
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	31.53
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	20.62
		Distance to Agricultural Land Use, 1995	205.64
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.68	% Impervious Surface, 1995	2.2
		% Commercial/Industrial Land Use, 1995	0
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	205.64
Depth to Top of Open Interval	211	Population Density, Tier 1	1071.74
% Soil Clay	9.36	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	47.76	% Urban Land Use, 1970	60.56
Conceptual % Soil Organic Matter	0.68	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	98.58
		Length of railroads	0
		Population Density	1031.13
Radionuclides Explanatory Variables – Source Rating = H			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	77.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	205.64
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	89.6
Conceptual Soil Hydraulic Conductivity	47.76	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.36	% Agricultural Land Use, 1995	20.62
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	252.75
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.68	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Eastern Propane Corporation

1615362

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

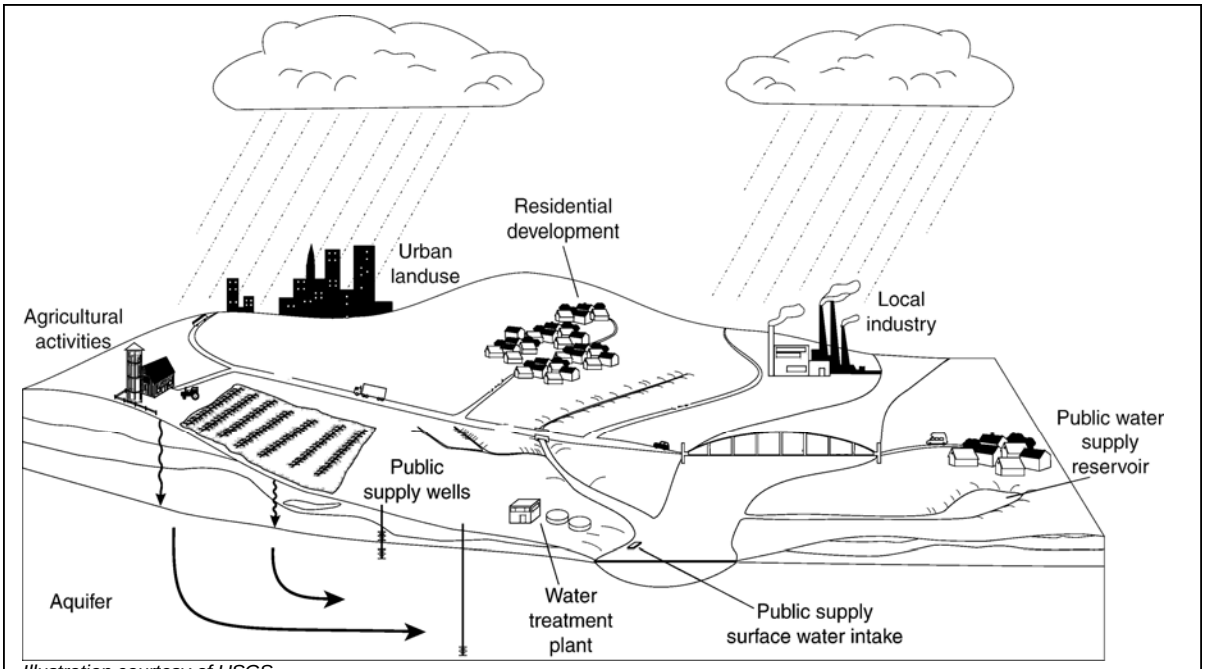

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Eastern Propane Corporation

Eastern Propane Corporation (PWID 1615362) at 255 Oak Ridge Road, Oak Ridge, NJ, is a public noncommunity water system that serves approximately 36 people (in 2003). Eastern Propane Corporation consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Eastern Propane Corporation's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	33.41
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	36.26
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	36.26
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.33	% Impervious Surface, 1995	12.5
		% Commercial/Industrial Land Use, 1995	23.08
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	40.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	54.5
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	206	Population Density, Tier 1	107.23
% Soil Clay	5.54	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	78.05	% Urban Land Use, 1970	69.97
Conceptual % Soil Organic Matter	0.33	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	92.21
		Length of railroads	445.58
		Population Density	107.23
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	73.87
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	206	% Developed Land, Tier 1, 1995	73.8
Conceptual Soil Hydraulic Conductivity	78.05	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	5.54	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	574.33
Depth to Top of Open Interval	206		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.33	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Town Tavern Country Inn (Well 1)

1615363

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- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

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Source Water Assessment Program Goals

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1. Protect sources of drinking water.

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What factors may affect the quality of your drinking water source?

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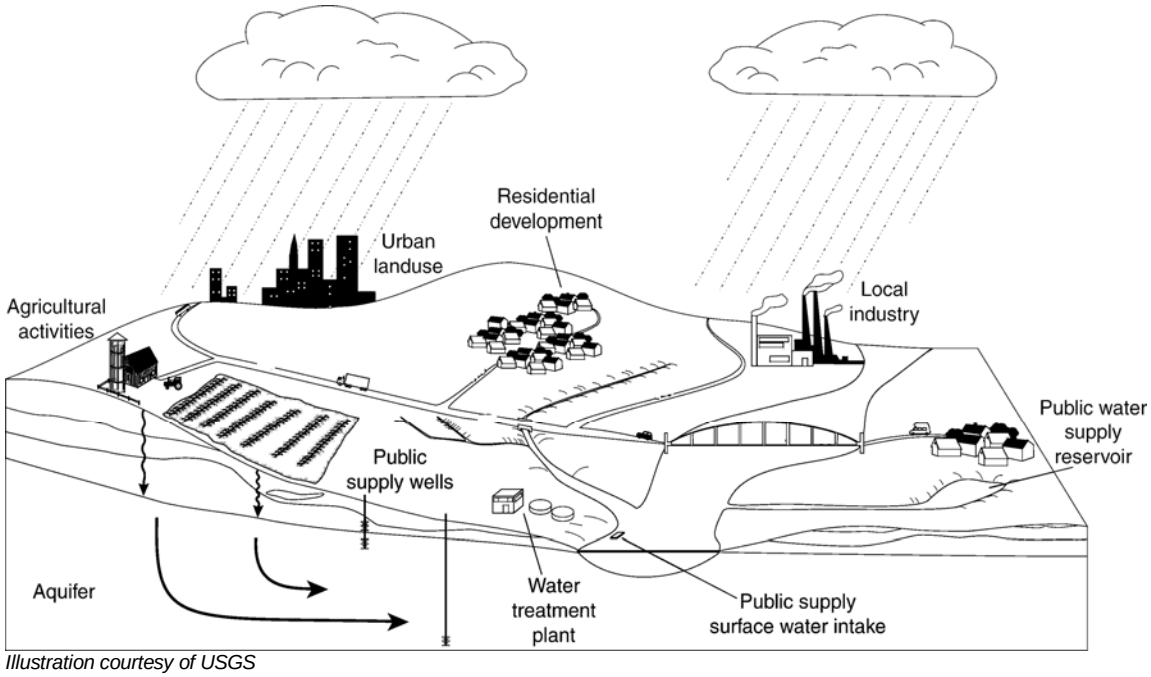

Illustration courtesy of USGS

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- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Town Tavern Country Inn (Well 1)

Town Tavern Country Inn (Well 1) (PWID 1615363) at 673 Macopin Road, W. Milford, NJ, is a public noncommunity water system that serves approximately 120 people (in 2003). Town Tavern Country Inn (Well 1) consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

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Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Town Tavern Country Inn (Well 1)'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

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If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	478.25
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	28.73
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	28.73
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.47	% Impervious Surface, 1995	7.7
		% Commercial/Industrial Land Use, 1995	6.21
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	10.47	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	6.77	% Urban Land Use, 1970	7.8
Conceptual % Soil Organic Matter	0.47	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	70.87
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	36
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	36
Conceptual Soil Hydraulic Conductivity	6.77	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.47	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	128.26
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.47	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Valley View Pub

1615364

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

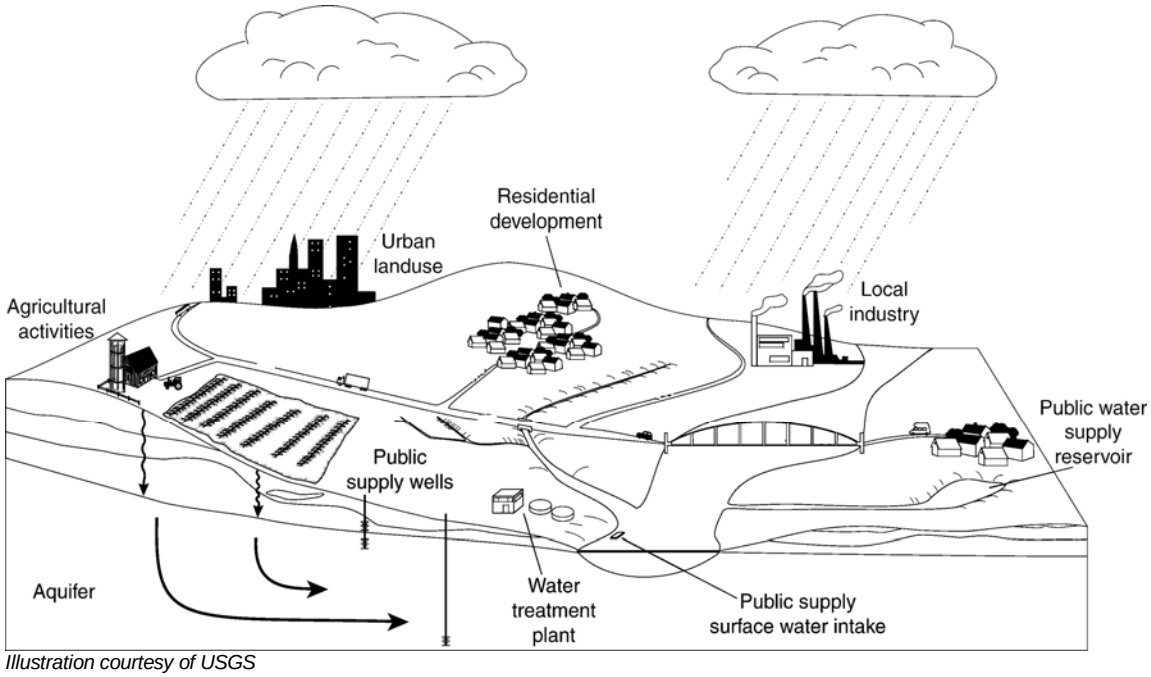

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Valley View Pub

Valley View Pub (PWID 1615364) at 1612 Union Valley Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 111 people (in 2003). Valley View Pub consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Valley View Pub's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.11	Distance to Agricultural Land Use, 1995	615.44
Depth to Top of Open Interval		Conceptual Septic Tank Density	238.38
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	360.92
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	52.85
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	6.45
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	52.85
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	6.45
		Distance to Agricultural Land Use, 1995	615.44
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.61	% Impervious Surface, 1995	23.4
		% Commercial/Industrial Land Use, 1995	27.73
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	615.44
Depth to Top of Open Interval	211	Population Density, Tier 1	723.39
% Soil Clay	16.2	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	9.94	% Urban Land Use, 1970	96.2
Conceptual % Soil Organic Matter	0.61	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	70.47
		Length of railroads	0
		Population Density	780.63
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	59.1
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	615.44
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	59.1
Conceptual Soil Hydraulic Conductivity	9.94	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	16.2	% Agricultural Land Use, 1995	5.11
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	106.42
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.61	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Mckeage's Tavern

1615367

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
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- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
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- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

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- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

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Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

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A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

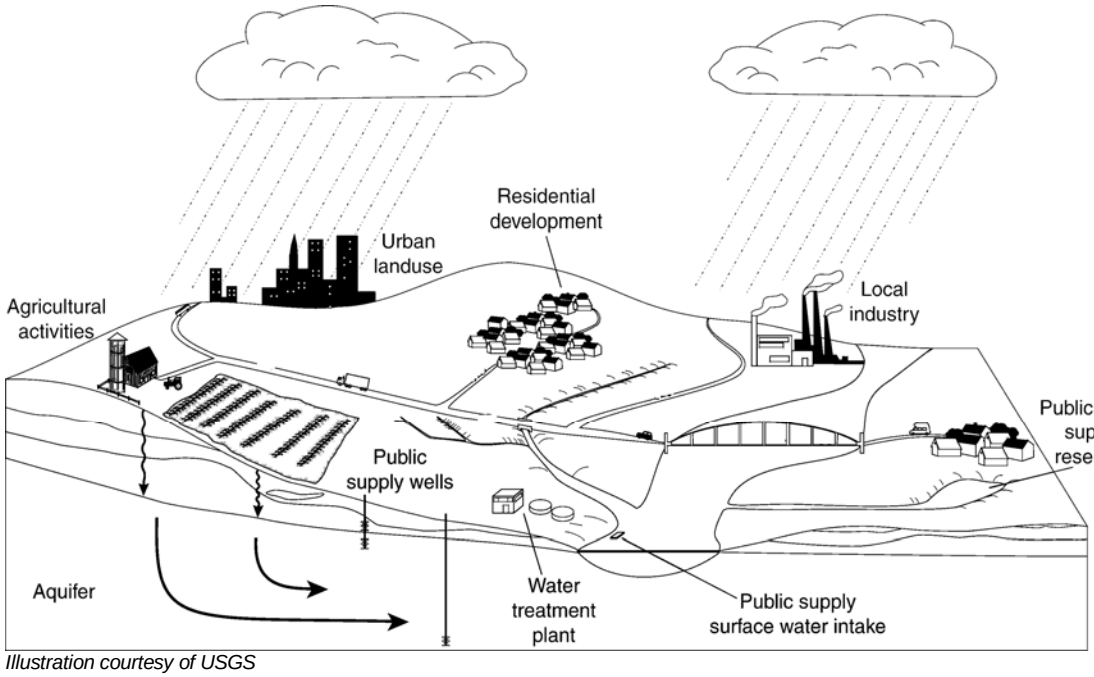

Illustration courtesy of USGS

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- Limit your use of fertilizer, pesticides, and herbicides.

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- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Mckeage's Tavern

Mckeage's Tavern (PWID 1615367) at 341 Macopin Road, W. Milford, NJ, is a public noncommunity water system that serves approximately 25 people (in 2003). Mckeage's Tavern consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Mckeage's Tavern's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	41.3
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	41.3
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.24	% Impervious Surface, 1995	14
		% Commercial/Industrial Land Use, 1995	6.3
		Sq. Mi. of Urban Land Use, 1995	0.01
		Density of SWL, USTs, and KCSL	39.7
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	39.7
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	300	Population Density, Tier 1	340.58
% Soil Clay	12.49	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	7.18	% Urban Land Use, 1970	95.3
Conceptual % Soil Organic Matter	0.24	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	109.77
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	29.5
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	300	% Developed Land, Tier 1, 1995	29.5
Conceptual Soil Hydraulic Conductivity	7.18	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	12.49	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	201.53
Depth to Top of Open Interval	300		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.24	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Pizza Station

1615368

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

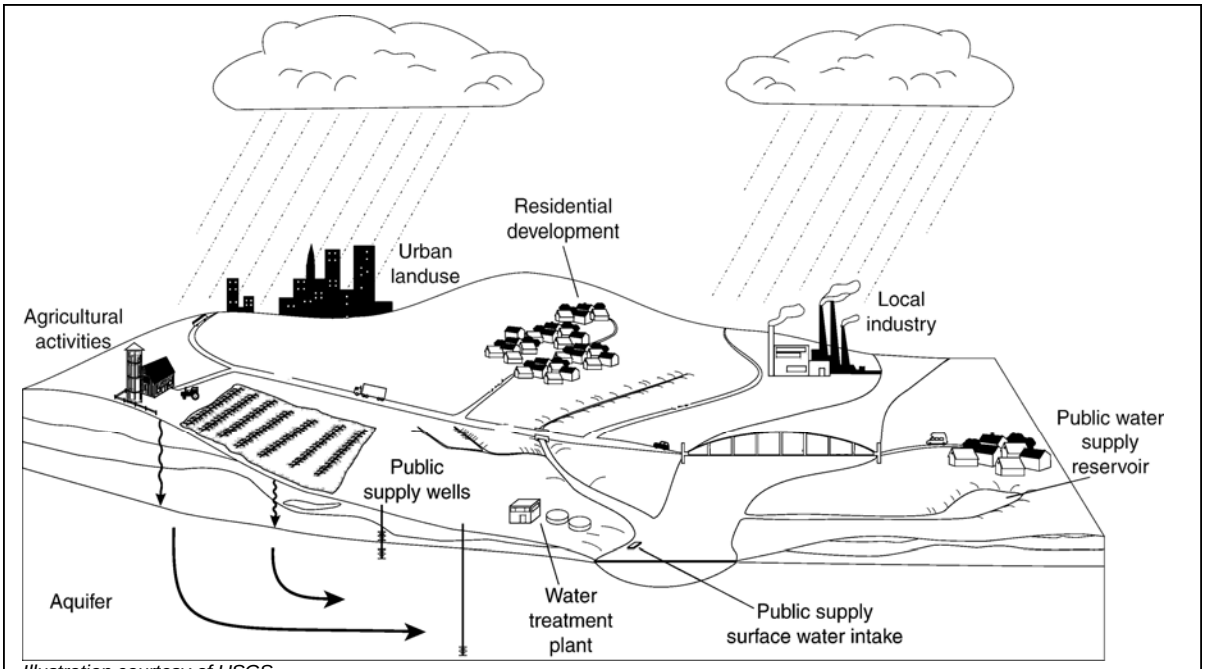

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Pizza Station

Pizza Station (PWID 1615368) at 3043 Route 23, Oak Ridge, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). Pizza Station consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Pizza Station's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	33.41
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	76.25
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	76.25
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.33	% Impervious Surface, 1995	27
		% Commercial/Industrial Land Use, 1995	31.74
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	41.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	41.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	107.23
% Soil Clay	13.33	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	6.96	% Urban Land Use, 1970	61.7
Conceptual % Soil Organic Matter	0.33	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	101.21
		Length of railroads	0
		Population Density	107.23
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	98.4
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	98.3
Conceptual Soil Hydraulic Conductivity	6.96	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.33	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	346.37
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.33	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

The Philadelphia Church Ministry

1615369

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

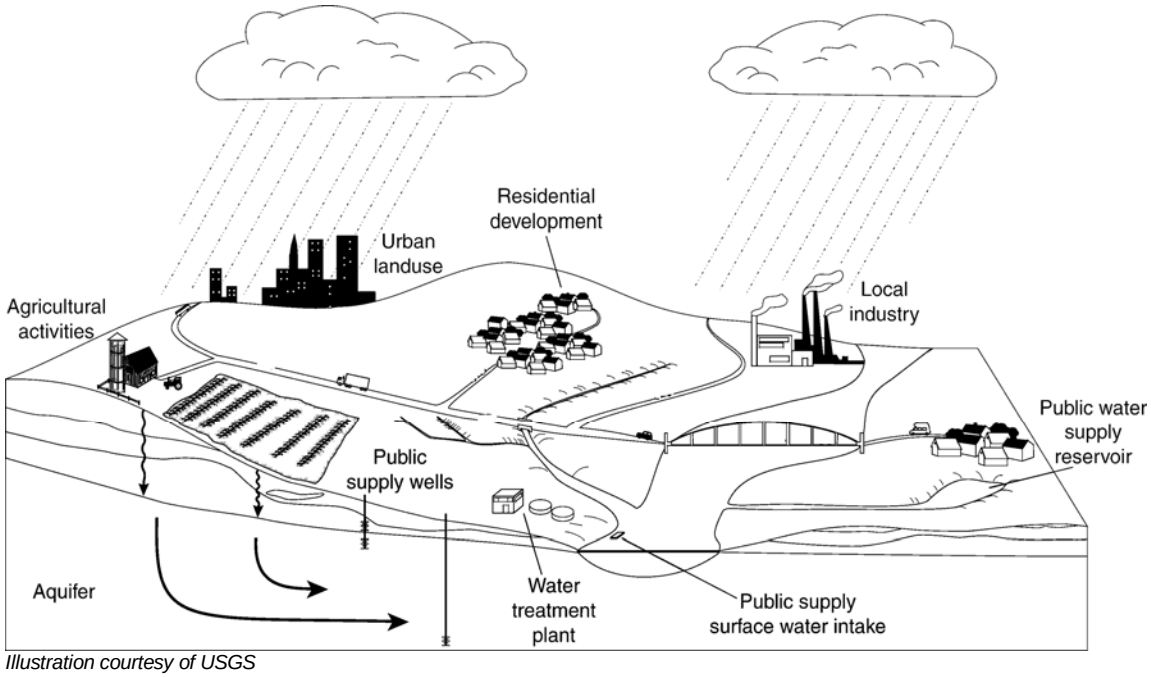

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for The Philadelphia Church Ministry

The Philadelphia Church Ministry (PWID 1615369) at 145 Oak Ridge Road, West Milford, NJ, is a public noncommunity water system that serves approximately 150 people (in 2003). The Philadelphia Church Ministry consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for The Philadelphia Church Ministry's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**H**	**M**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	33.41
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	34.03
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	34.03
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.86	% Impervious Surface, 1995	15
		% Commercial/Industrial Land Use, 1995	21.22
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = M			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	107.23
% Soil Clay	5.47	% Barren Land Use, 1995	12.81
Soil Hydraulic Conductivity	60.25	% Urban Land Use, 1970	50.65
Conceptual % Soil Organic Matter	0.86	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	137.41
		Length of railroads	0
		Population Density	107.23
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	66
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	66
Conceptual Soil Hydraulic Conductivity	60.25	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	5.47	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	201.62
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.86	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

The Philadelphia Church Ministry

1615370

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

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The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

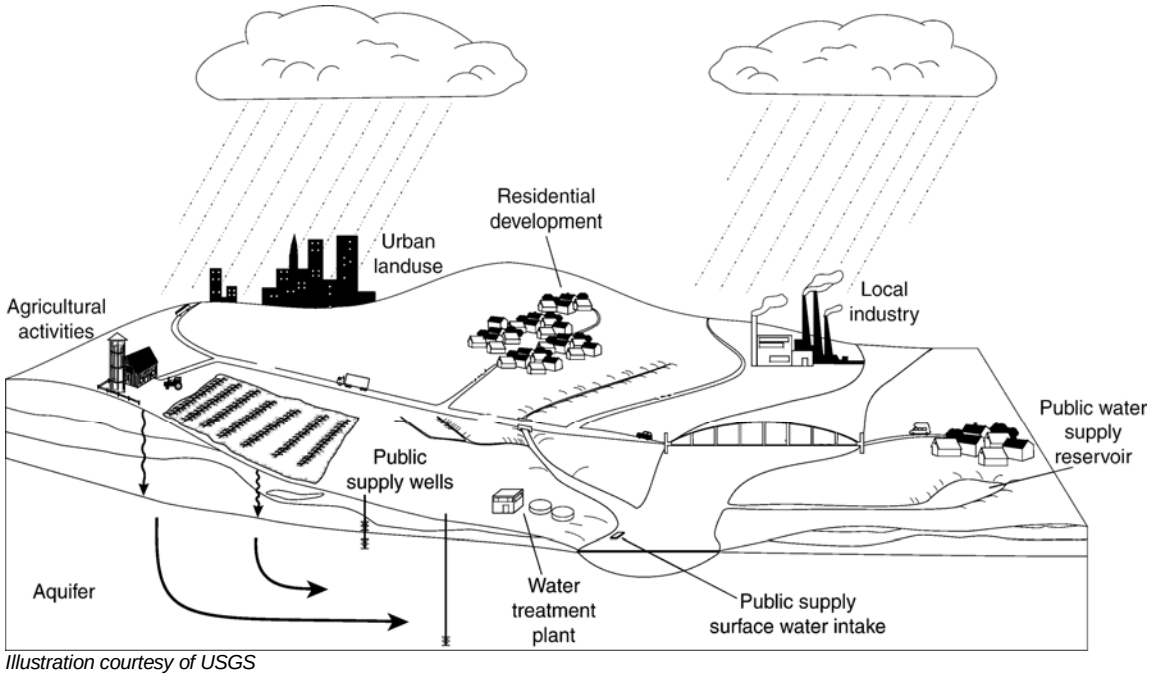

Illustration courtesy of USGS

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Specific Source Water Assessment Information for The Philadelphia Church Ministry

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Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

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	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
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High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for The Philadelphia Church Ministry's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 2 (Rear)	**L**	**L**	**L**	**H**	**M**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

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This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 2 (Rear) **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	33.41
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	36.54
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	36.54
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.21	% Impervious Surface, 1995	15.7
		% Commercial/Industrial Land Use, 1995	23.22
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = M			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	107.23
% Soil Clay	5.26	% Barren Land Use, 1995	15.32
Soil Hydraulic Conductivity	58.99	% Urban Land Use, 1970	52.5
Conceptual % Soil Organic Matter	0.21	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	235.8
		Length of railroads	0
		Population Density	107.23
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	71.87
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	71.8
Conceptual Soil Hydraulic Conductivity	58.99	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	5.26	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	145.75
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.21	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Town Tavern Country Inn

1615371

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

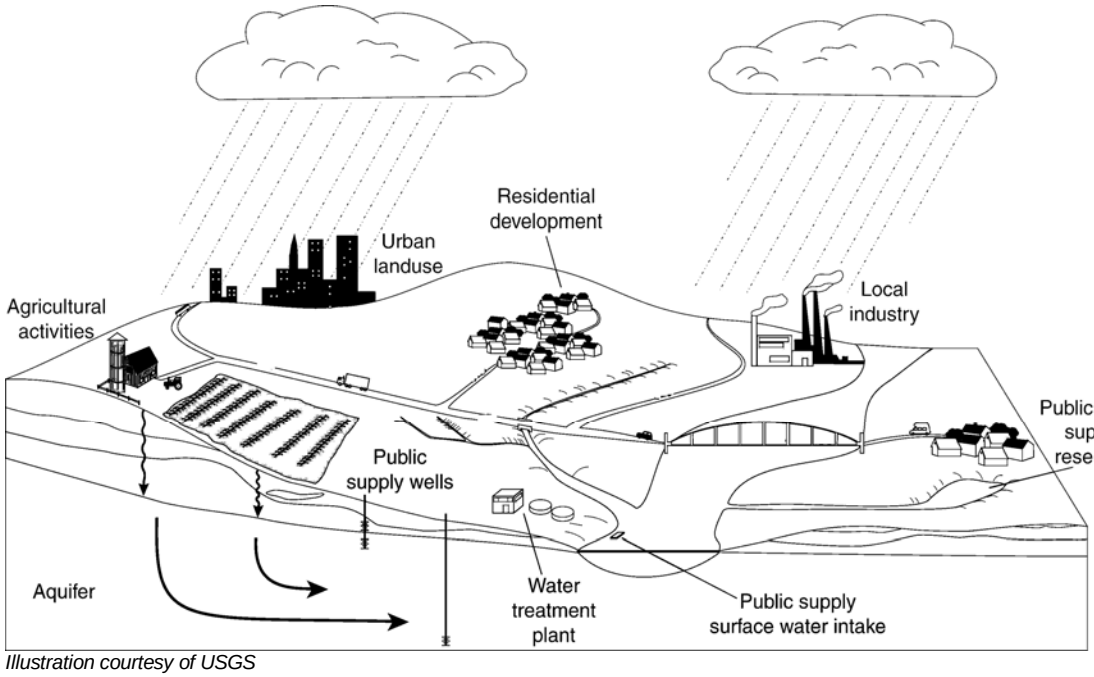

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Town Tavern Country Inn

Town Tavern Country Inn (PWID 1615371) at 673 Macopin Road, W Milford, NJ, is a public noncommunity water system that serves approximately 120 people (in 2003). Town Tavern Country Inn consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Town Tavern Country Inn's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 2	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 2 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	440.98
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	28.6
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	28.6
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.48	% Impervious Surface, 1995	7.6
		% Commercial/Industrial Land Use, 1995	6.3
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	10.63	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	6.76	% Urban Land Use, 1970	7.9
Conceptual % Soil Organic Matter	0.48	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	42.24
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	37.76
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	37.8
Conceptual Soil Hydraulic Conductivity	6.76	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.63	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	107.74
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.48	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Hot Diggity's Inc.

1615372

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
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- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

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Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

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Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

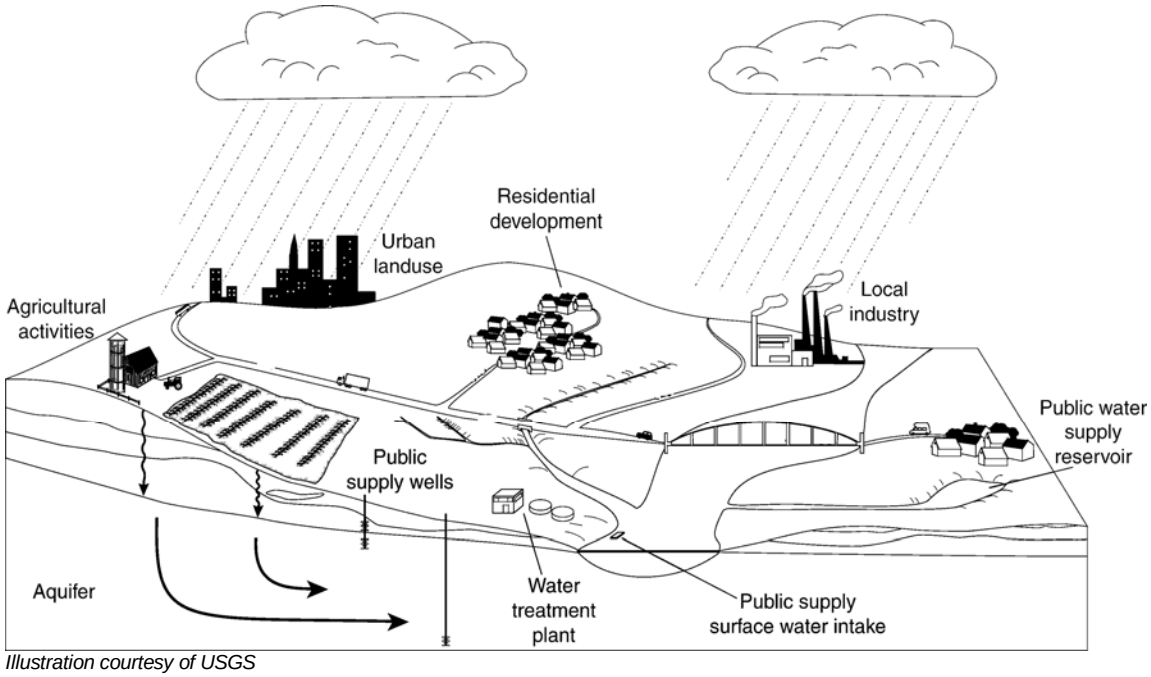

Illustration courtesy of USGS

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- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Hot Diggity's Inc.

Hot Diggity's Inc. (PWID 1615372) at 140 Oak Ridge Road, Oak Ridge, NJ, is a public noncommunity water system that serves approximately 150 people (in 2003). Hot Diggity's Inc. consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
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High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Hot Diggity's Inc.'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 3	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 3 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	441.03
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	28.63
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	28.63
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.48	% Impervious Surface, 1995	7.6
		% Commercial/Industrial Land Use, 1995	6.31
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	10.63	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	6.76	% Urban Land Use, 1970	7.81
Conceptual % Soil Organic Matter	0.48	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	41.6
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	37.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	37.8
Conceptual Soil Hydraulic Conductivity	6.76	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.63	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	107.02
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.48	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

West Milford Elks Lodge

1615373

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

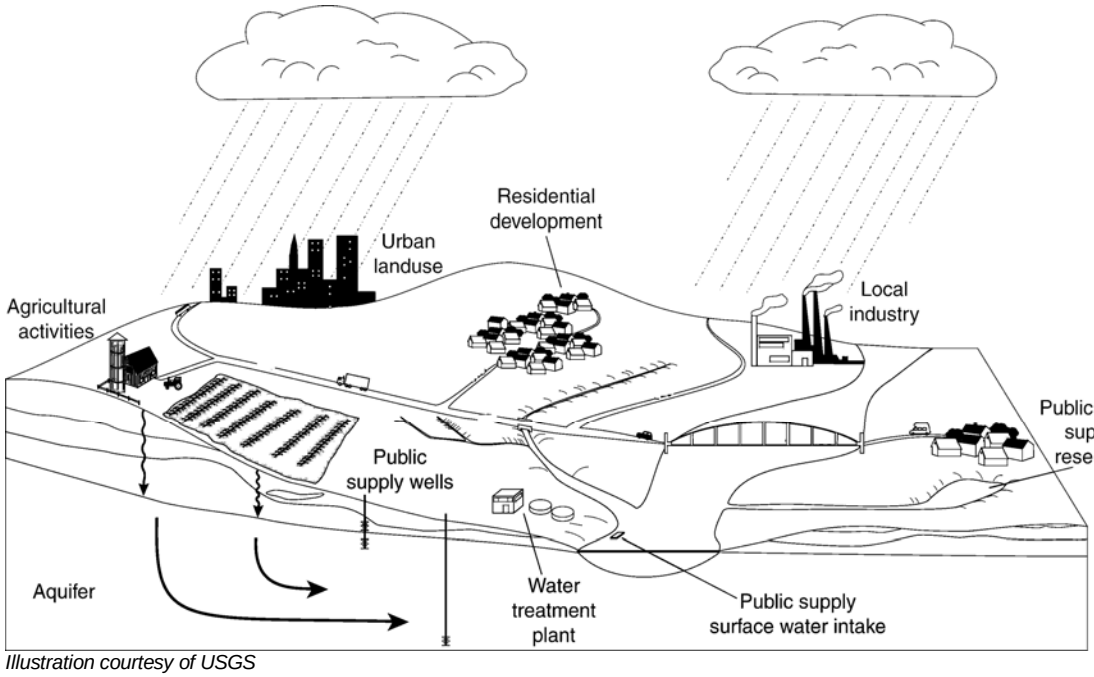

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for West Milford Elks Lodge

West Milford Elks Lodge (PWID 1615373) at 1860 Union Valley Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 50 people (in 2003). West Milford Elks Lodge consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for West Milford Elks Lodge's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**L**	**L**	**H**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	305
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	686.49
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	38.54
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	38.54
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.85	% Impervious Surface, 1995	14.1
		% Commercial/Industrial Land Use, 1995	14.51
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	1071.74
% Soil Clay	12.3	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	30.66	% Urban Land Use, 1970	59.24
Conceptual % Soil Organic Matter	0.85	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	33.03
		Length of railroads	0
		Population Density	909.53
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	40
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	40
Conceptual Soil Hydraulic Conductivity	30.66	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	12.3	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	208.89
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.85	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Paul's Place

1615374

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
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- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
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- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

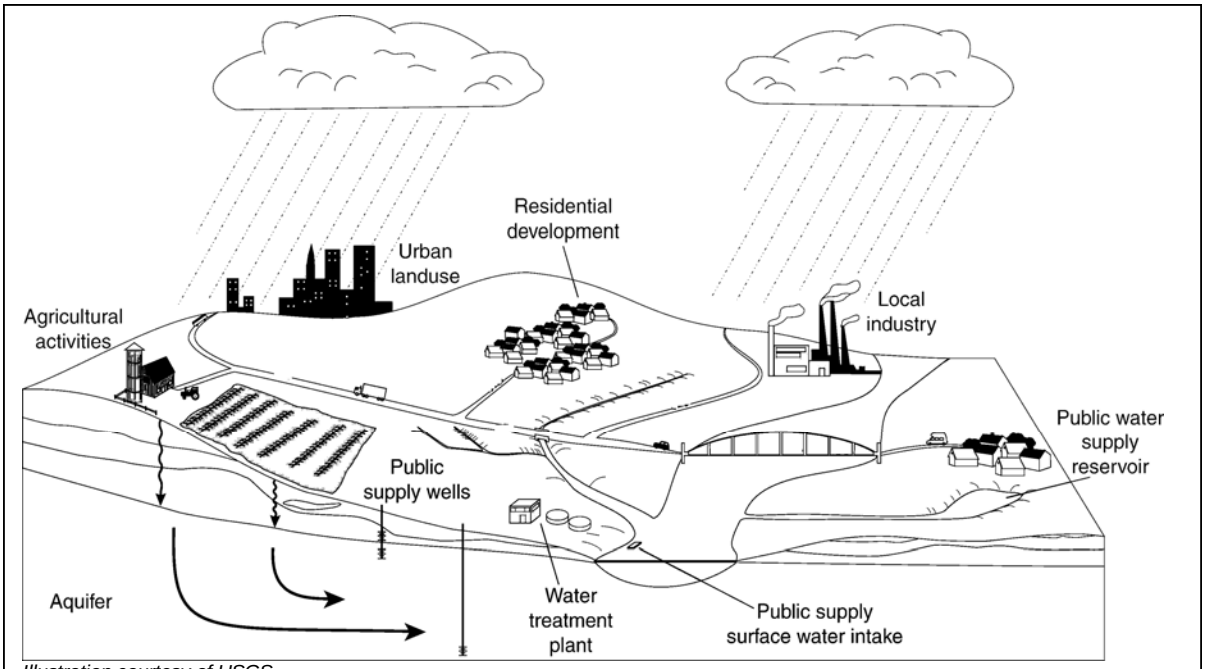

Illustration courtesy of USGS

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- Limit your use of fertilizer, pesticides, and herbicides.

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- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Paul's Place

Paul's Place (PWID 1615374) at 1849 Greenwood Lake Turnpike, Hewitt, NJ, is a public noncommunity water system that serves approximately 350 people (in 2003). Paul's Place consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Paul's Place's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	217.92
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	54.15
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	54.15
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.63	% Impervious Surface, 1995	25.4
		% Commercial/Industrial Land Use, 1995	21.98
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	727.06
% Soil Clay	13.78	% Barren Land Use, 1995	3.8
Soil Hydraulic Conductivity	5.25	% Urban Land Use, 1970	90.59
Conceptual % Soil Organic Matter	0.63	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	30.07
		Length of railroads	0
		Population Density	671.3
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	85.19
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	85.1
Conceptual Soil Hydraulic Conductivity	5.25	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.78	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	252.97
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.63	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Masons Mountainside Inn

1615377

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

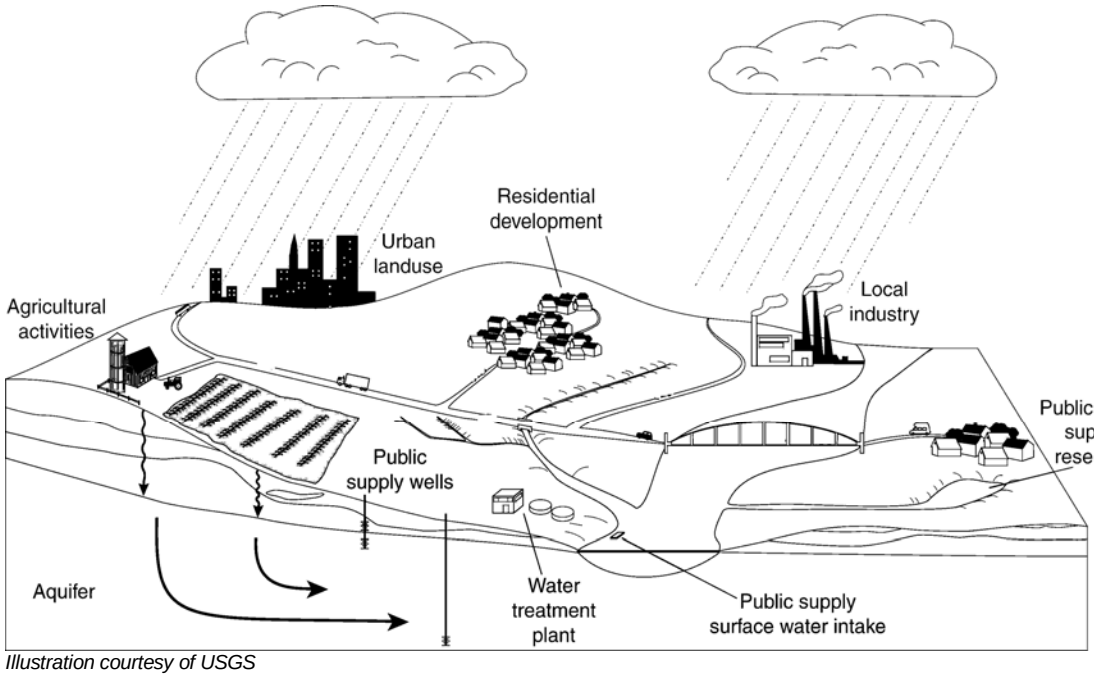

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Masons Mountainside Inn

Masons Mountainside Inn (PWID 1615377) at 165 Lakeside Dr, Hewitt, NJ, is a public noncommunity water system that serves approximately 25 people (in 2003). Masons Mountainside Inn consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Masons Mountainside Inn's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	140.87
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	31.23
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	31.23
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.41	% Impervious Surface, 1995	9.2
		% Commercial/Industrial Land Use, 1995	3.4
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	353.28
% Soil Clay	8.8	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	19.17	% Urban Land Use, 1970	57.86
Conceptual % Soil Organic Matter	0.41	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	74.9
		Length of railroads	0
		Population Density	337.22
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	52.35
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	52.3
Conceptual Soil Hydraulic Conductivity	19.17	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.8	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.41	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Lakeland Bank

1615378

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

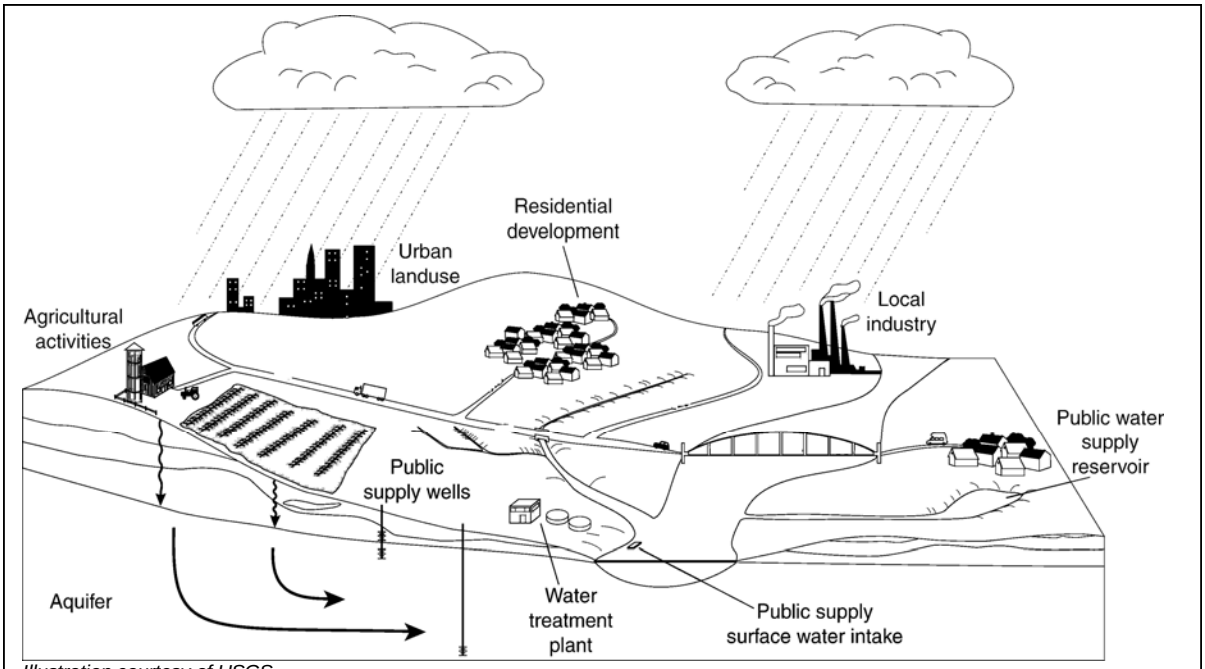

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Lakeland Bank

Lakeland Bank (PWID 1615378) at 250 Oakridge Rd, Oak Ridge, NJ, is a public noncommunity water system that serves approximately 150 people (in 2003). Lakeland Bank consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Lakeland Bank's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	33.41
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	26.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	26.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.23	% Impervious Surface, 1995	15.7
		% Commercial/Industrial Land Use, 1995	26.3
		Sq. Mi. of Urban Land Use, 1995	0.01
		Density of SWL, USTs, and KCSL	36.4
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	36.4
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	275	Population Density, Tier 1	107.23
% Soil Clay	4.88	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	60.86	% Urban Land Use, 1970	0.1
Conceptual % Soil Organic Matter	0.23	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	404
		Length of railroads	0
		Population Density	107.23
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	31.9
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	275	% Developed Land, Tier 1, 1995	31.9
Conceptual Soil Hydraulic Conductivity	60.86	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	4.88	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	382.6
Depth to Top of Open Interval	275		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.23	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Mountain Restaurant

1615379

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

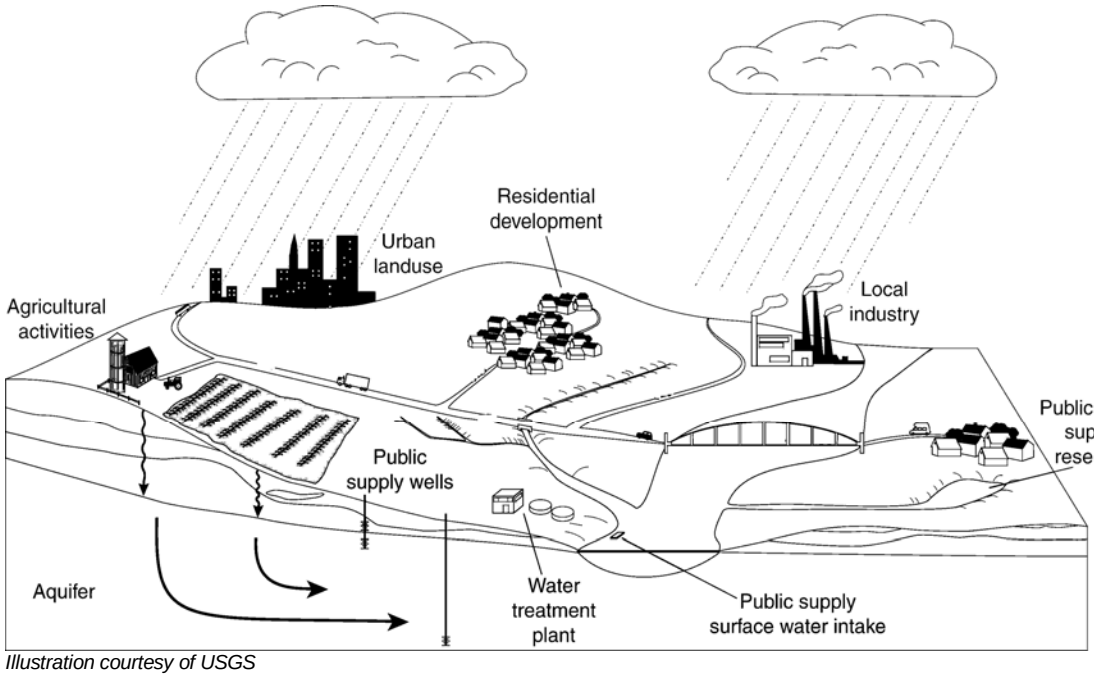

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Mountain Restaurant

Mountain Restaurant (PWID 1615379) at 17 Wooley Road, West Milford, NJ, is a public noncommunity water system that serves approximately 43 people (in 2003). Mountain Restaurant consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Mountain Restaurant's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	211.21
Depth to Top of Open Interval		Conceptual Septic Tank Density	101.48
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	25
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	3.68
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	25
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	3.68
		Distance to Agricultural Land Use, 1995	211.21
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.59	% Impervious Surface, 1995	5.2
		% Commercial/Industrial Land Use, 1995	10.6
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	211.21
Depth to Top of Open Interval	211	Population Density, Tier 1	489.61
% Soil Clay	14.67	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	4.13	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.59	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	105.88
		Length of railroads	0
		Population Density	570.34
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	48.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	211.21
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	54.4
Conceptual Soil Hydraulic Conductivity	4.13	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.67	% Agricultural Land Use, 1995	3.6
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	728.25
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.59	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Newfoundland Deli

1615380

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

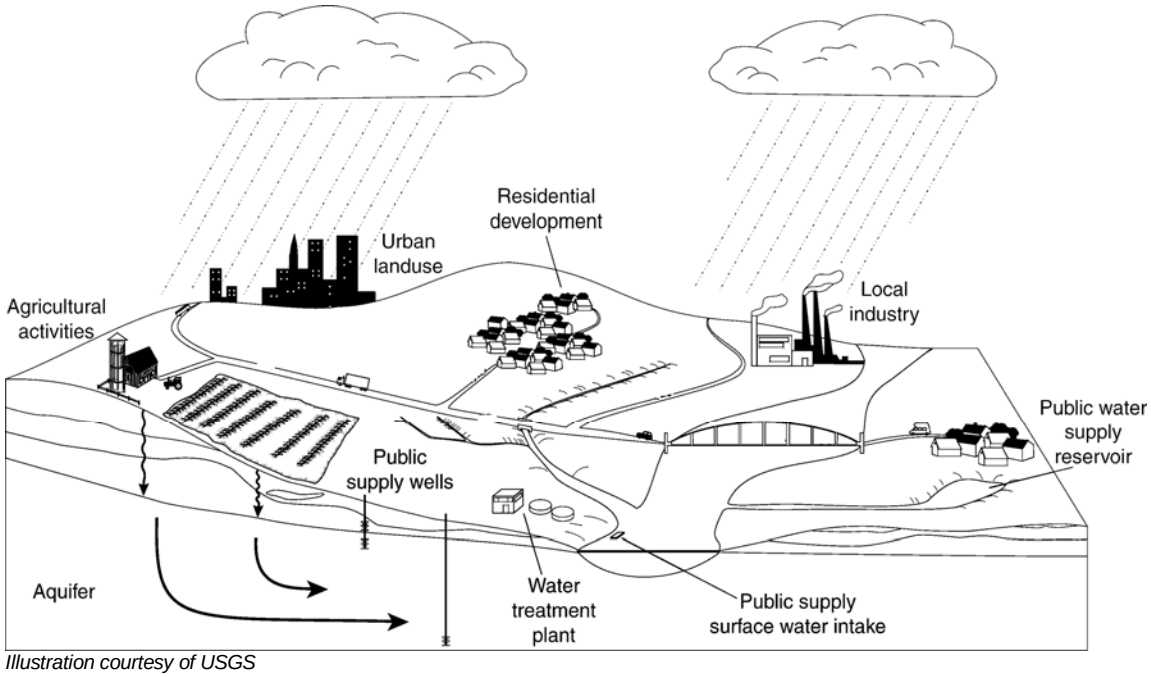

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Newfoundland Deli

Newfoundland Deli (PWID 1615380) at 52 Oak Ridge Road, New Foundland, NJ, is a public noncommunity water system that serves approximately 157 people (in 2003). Newfoundland Deli consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Newfoundland Deli's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	42.55
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	374.8
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	40.84
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	40.84
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.41	% Impervious Surface, 1995	17.4
		% Commercial/Industrial Land Use, 1995	32.8
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	128.8
% Soil Clay	8.7	% Barren Land Use, 1995	5.91
Soil Hydraulic Conductivity	58.91	% Urban Land Use, 1970	82.48
Conceptual % Soil Organic Matter	0.41	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	66.89
		Length of railroads	1306.24
		Population Density	133.7
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	68.07
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	68.01
Conceptual Soil Hydraulic Conductivity	58.91	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.7	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	105.48
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.41	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Country Roads Deli & Catering

1615381

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

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Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

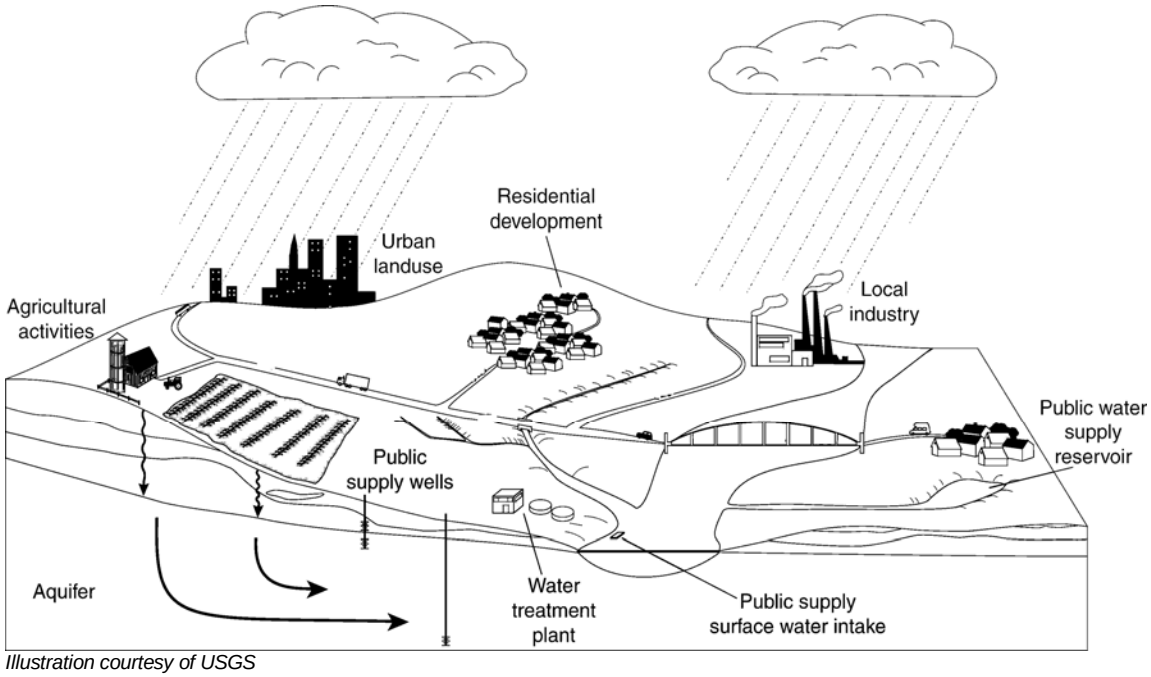

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Country Roads Deli & Catering

Country Roads Deli & Catering (PWID 1615381) at 1893 Union Valley Road, Hewitt, NJ, is a public noncommunity water system that serves approximately 600 people (in 2003). Country Roads Deli & Catering consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Country Roads Deli & Catering's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	200.7
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	679.71
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	57
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	57
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.73	% Impervious Surface, 1995	33.9
		% Commercial/Industrial Land Use, 1995	43.7
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	41.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	41.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	402.12
% Soil Clay	10.78	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	39.58	% Urban Land Use, 1970	56
Conceptual % Soil Organic Matter	0.73	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	41.17
		Length of railroads	0
		Population Density	537.19
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	67.33
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	67.4
Conceptual Soil Hydraulic Conductivity	39.58	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.78	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	116.34
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.73	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Fenners Deli West Milford Bar

1615382

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

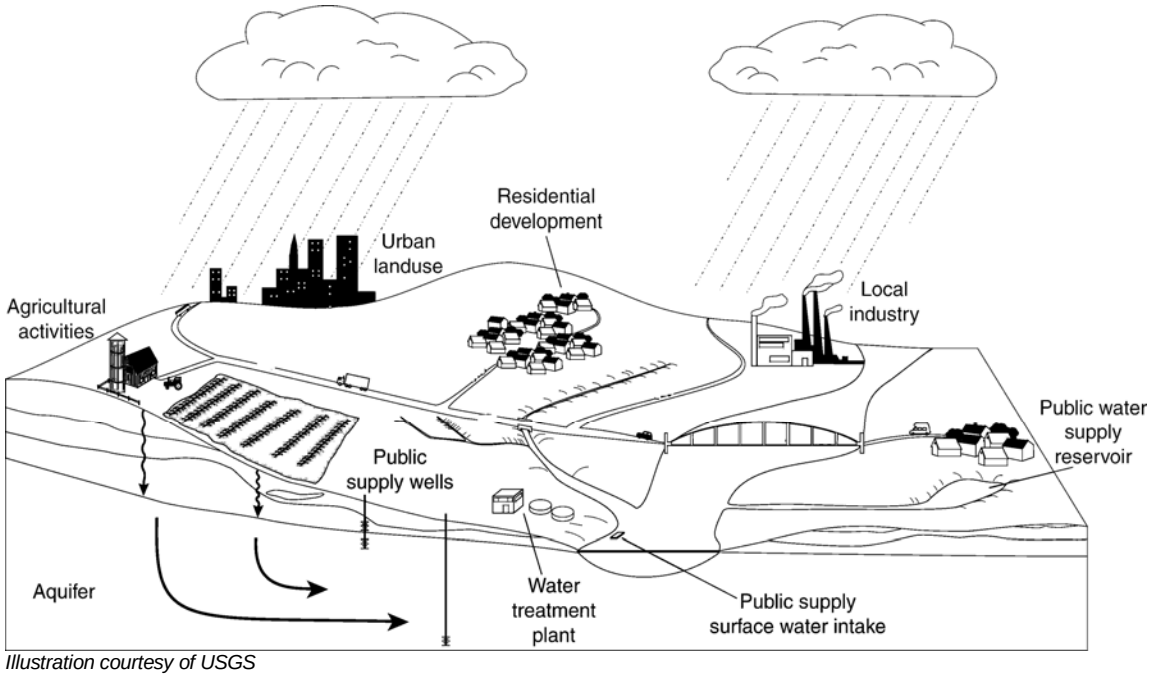

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Fenners Deli West Milford Bar

Fenners Deli West Milford Bar (PWID 1615382) at 717 Otherhole Road, W. Milford, NJ, is a public noncommunity water system that serves approximately 400 people (in 2003). Fenners Deli West Milford Bar consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Fenners Deli West Milford Bar's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.11	Distance to Agricultural Land Use, 1995	673.51
Depth to Top of Open Interval		Conceptual Septic Tank Density	133.54
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	536.97
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	31.43
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	3.21
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	31.43
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	3.21
		Distance to Agricultural Land Use, 1995	673.51
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.6	% Impervious Surface, 1995	7.9
		% Commercial/Industrial Land Use, 1995	5.21
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	673.51
Depth to Top of Open Interval	211	Population Density, Tier 1	656.51
% Soil Clay	15.12	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	12.62	% Urban Land Use, 1970	11.7
Conceptual % Soil Organic Matter	0.6	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	123.71
		Length of railroads	0
		Population Density	634.42
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	47.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	673.51
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	47.2
Conceptual Soil Hydraulic Conductivity	12.62	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15.12	% Agricultural Land Use, 1995	3
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	137.42
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.6	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.02
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

N & S Towne Centre Deli

1615383

Source Water Assessment Report

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DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
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- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

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Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

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The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

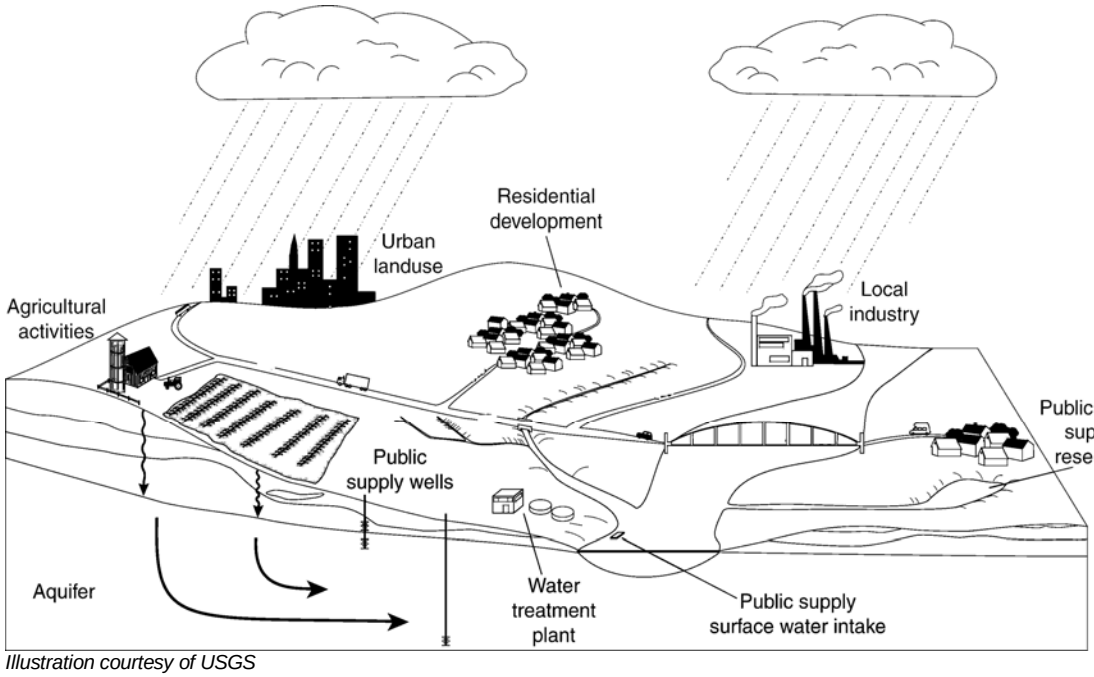

Illustration courtesy of USGS

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- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for N & S Towne Centre Deli

N & S Towne Centre Deli (PWID 1615383) at 1502 Union Valley Road, West Milford, NJ, is a public noncommunity water system that serves approximately 800 people (in 2003). N & S Towne Centre Deli consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for N & S Towne Centre Deli's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	174.18
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	94.1
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	94.1
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.27	% Impervious Surface, 1995	47.2
		% Commercial/Industrial Land Use, 1995	45.3
		Sq. Mi. of Urban Land Use, 1995	0.07
		Density of SWL, USTs, and KCSL	83.8
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	83.8
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	613.8
% Soil Clay	13.47	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	3.86	% Urban Land Use, 1970	96.9
Conceptual % Soil Organic Matter	0.27	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	49.59
		Length of railroads	0
		Population Density	604.43
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	93.39
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	93.3
Conceptual Soil Hydraulic Conductivity	3.86	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.47	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.27	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Bethel Ranch Boarding

1615384

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

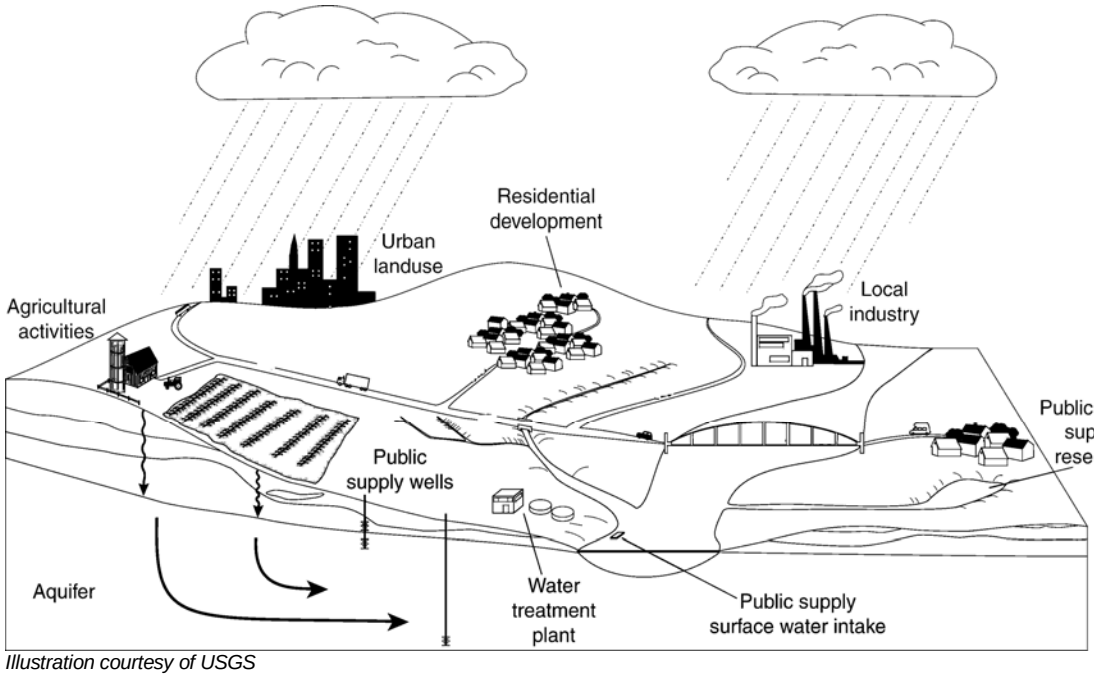

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Bethel Ranch Boarding

Bethel Ranch Boarding (PWID 1615384) at 1005 Union Valley Road, West Milford, NJ, is a public noncommunity water system that serves approximately 42 people (in 2003). Bethel Ranch Boarding consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Bethel Ranch Boarding's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well 1	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well 1 **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	162.13
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	73.72
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	17.15
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	73.72
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	17.15
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.63	% Impervious Surface, 1995	14.7
		% Commercial/Industrial Land Use, 1995	51.55
		Sq. Mi. of Urban Land Use, 1995	0.01
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	500	Population Density, Tier 1	582.49
% Soil Clay	13.78	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	4.76	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.63	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	90.43
		Length of railroads	0
		Population Density	582.49
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	72.6
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	500	% Developed Land, Tier 1, 1995	72.6
Conceptual Soil Hydraulic Conductivity	4.76	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.78	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	288.52
Depth to Top of Open Interval	500		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.63	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Countryside Mobile

1615385

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

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Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

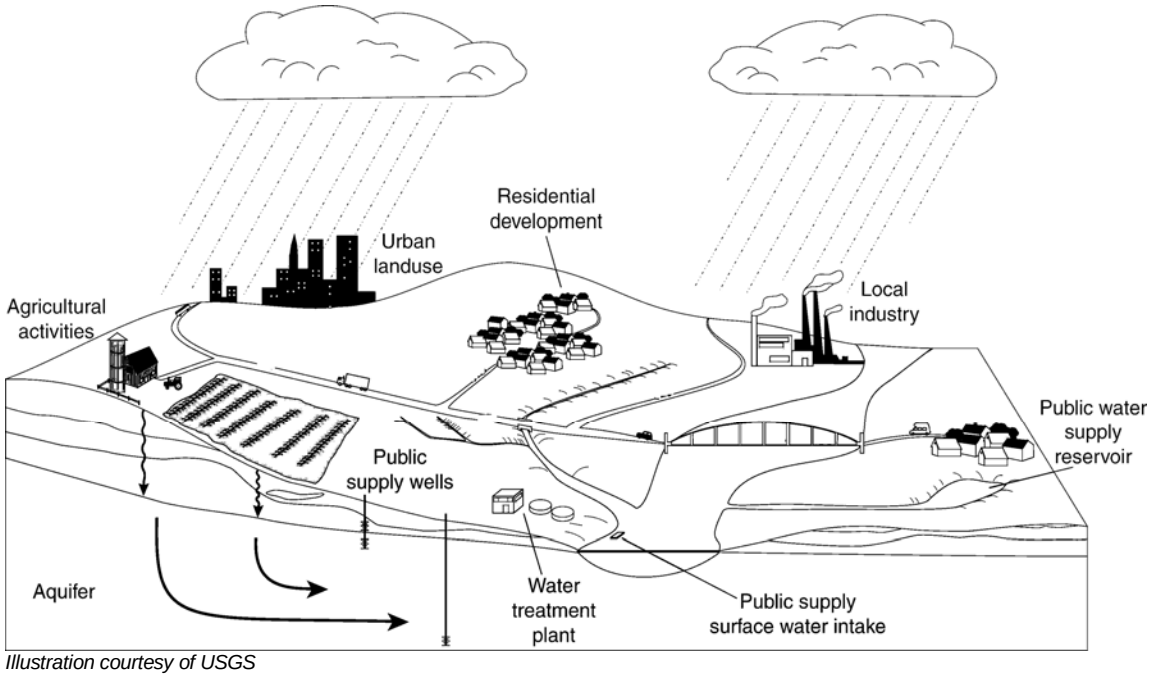

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Countryside Mobile

Countryside Mobile (PWID 1615385) at 1910 Union Valley Road, West Milford, NJ, is a public noncommunity water system that serves approximately 250 people (in 2003). Countryside Mobile consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Countryside Mobile's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	214.04
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	54.9
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	71.53
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	71.53
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.73	% Impervious Surface, 1995	46.6
		% Commercial/Industrial Land Use, 1995	55.84
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	69.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	69.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	449.55
% Soil Clay	10.5	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	43.63	% Urban Land Use, 1970	83.58
Conceptual % Soil Organic Matter	0.73	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	111.84
		Length of railroads	0
		Population Density	584.85
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	99.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	99.8
Conceptual Soil Hydraulic Conductivity	43.63	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.5	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	309.98
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.73	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Strength In Our Sisters

1615386

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

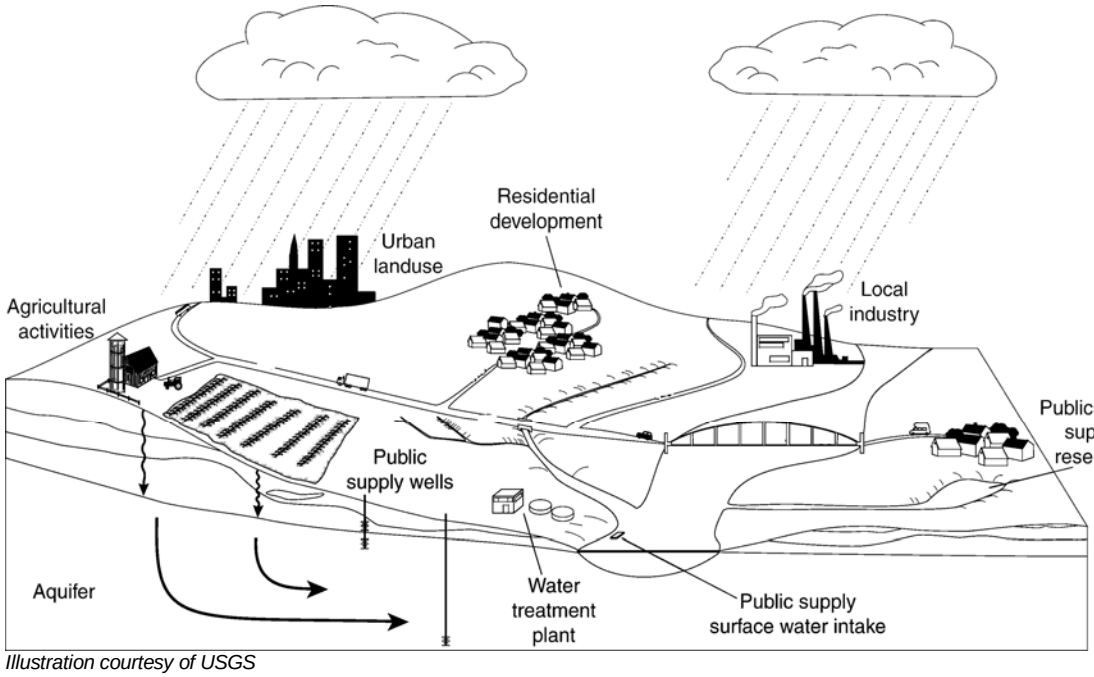

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

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- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Strength In Our Sisters

Strength In Our Sisters (PWID 1615386) at 1432 Union Valley Road, West Milford, NJ, is a public noncommunity water system that serves approximately 75 people (in 2003). Strength In Our Sisters consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Strength In Our Sisters's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.11	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	115.93
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	65.97
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	65.97
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.69	% Impervious Surface, 1995	23
		% Commercial/Industrial Land Use, 1995	33.23
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	533.77
% Soil Clay	15.46	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	11.93	% Urban Land Use, 1970	82.22
Conceptual % Soil Organic Matter	0.69	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	310.97
		Length of railroads	0
		Population Density	531.88
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	96.7
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	96.8
Conceptual Soil Hydraulic Conductivity	11.93	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15.46	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	357.56
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.69	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Momento

1615387

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

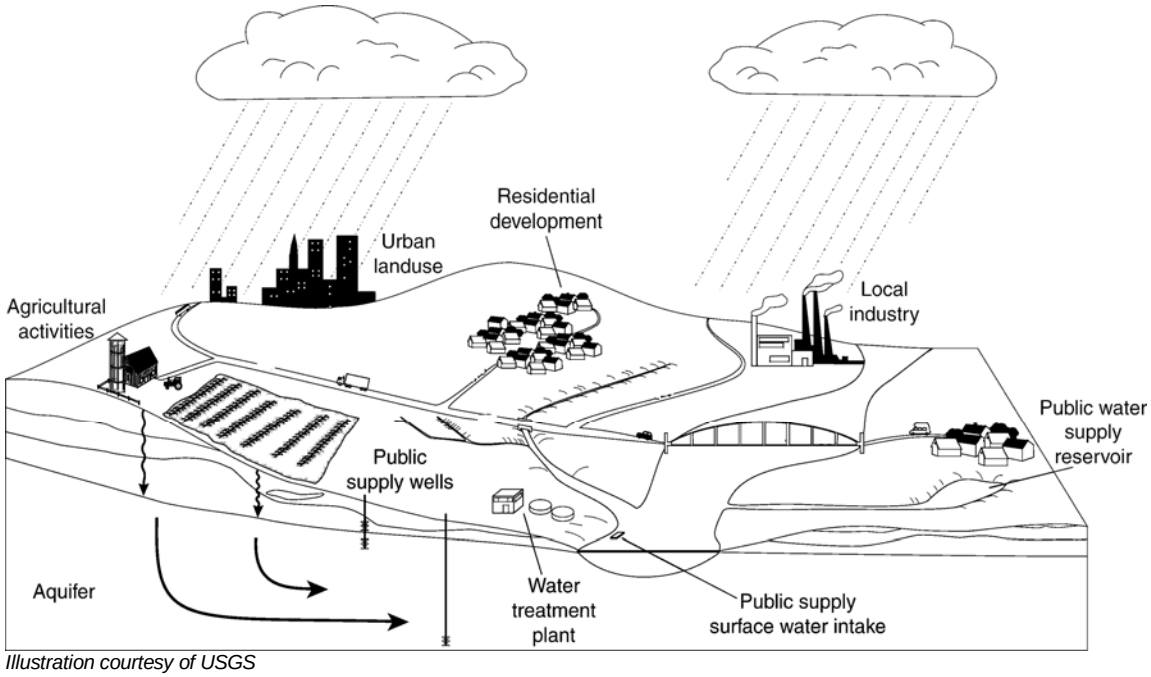

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Momento

Momento (PWID 1615387) at 374 Morsetown Road, West Milford, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). Momento consists of 2 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Momento's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**
Well	**L**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	86.25
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	40.19
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	14.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	14.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	1.03	% Impervious Surface, 1995	2.9
		% Commercial/Industrial Land Use, 1995	0.9
		Sq. Mi. of Urban Land Use, 1995	0.01
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	308.47
% Soil Clay	16.15	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	8.69	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	1.03	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	293.6
		Length of railroads	0
		Population Density	308.47
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	24.5
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	24.5
Conceptual Soil Hydraulic Conductivity	8.69	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	16.15	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	221.14
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	1.03	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.02
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	86.25
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	16.35
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	16.35
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	1.01	% Impervious Surface, 1995	3.1
		% Commercial/Industrial Land Use, 1995	0.9
		Sq. Mi. of Urban Land Use, 1995	0.01
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	308.47
% Soil Clay	15.97	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	8.55	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	1.01	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	236.42
		Length of railroads	0
		Population Density	308.47
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	33.13
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	33.1
Conceptual Soil Hydraulic Conductivity	8.55	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15.97	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	255.12
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	1.01	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Exxon USA 3-5472

1615388

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

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The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

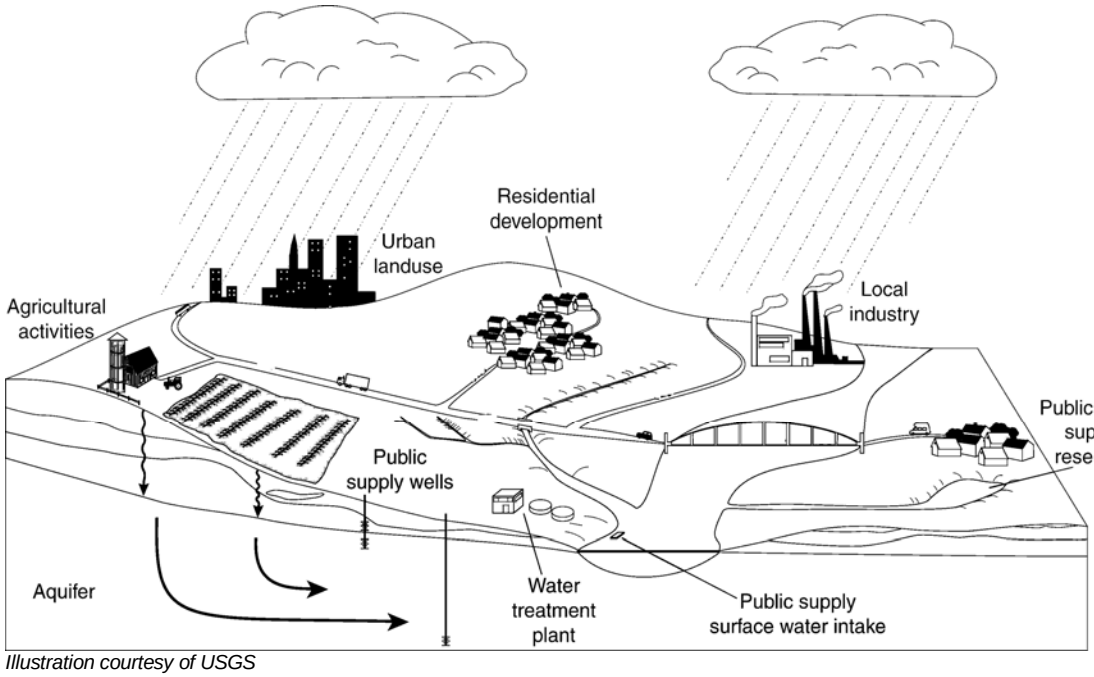

Illustration courtesy of USGS

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- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Exxon USA 3-5472

Exxon USA 3-5472 (PWID 1615388) at 2899 Rt 23, New Foundland, NJ, is a public noncommunity water system that serves approximately 120 people (in 2003). Exxon USA 3-5472 consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Exxon USA 3-5472's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	44.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	55.26
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	55.26
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.35	% Impervious Surface, 1995	23.5
		% Commercial/Industrial Land Use, 1995	34.13
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	55.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	125.87
% Soil Clay	9.17	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	44.36	% Urban Land Use, 1970	82.1
Conceptual % Soil Organic Matter	0.35	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	110.55
		Length of railroads	1316.52
		Population Density	138.46
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	86.81
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	86.9
Conceptual Soil Hydraulic Conductivity	44.36	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.17	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	252.81
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.35	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Mountain Jug Dairy Deli

1615389

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

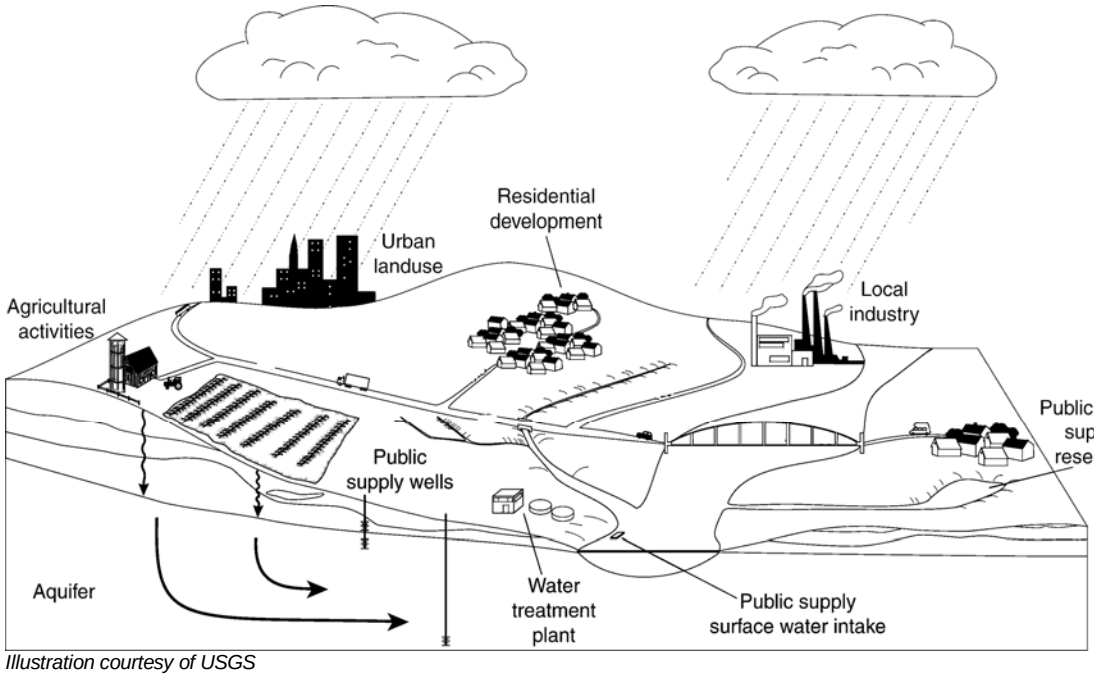

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Mountain Jug Dairy Deli

Mountain Jug Dairy Deli (PWID 1615389) at 665 Warwick Turnpike, W. Milford, NJ, is a public noncommunity water system that serves approximately 275 people (in 2003). Mountain Jug Dairy Deli consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Mountain Jug Dairy Deli's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	362.37
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	46.91
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	46.91
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	8.53	% Impervious Surface, 1995	14
		% Commercial/Industrial Land Use, 1995	3.69
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	836.67
% Soil Clay	5.27	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	16.39	% Urban Land Use, 1970	80.2
Conceptual % Soil Organic Matter	8.53	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	58.04
		Length of railroads	0
		Population Density	893.29
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	68.9
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	68.9
Conceptual Soil Hydraulic Conductivity	16.39	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	5.27	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	407.02
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	8.53	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

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Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
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- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

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Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

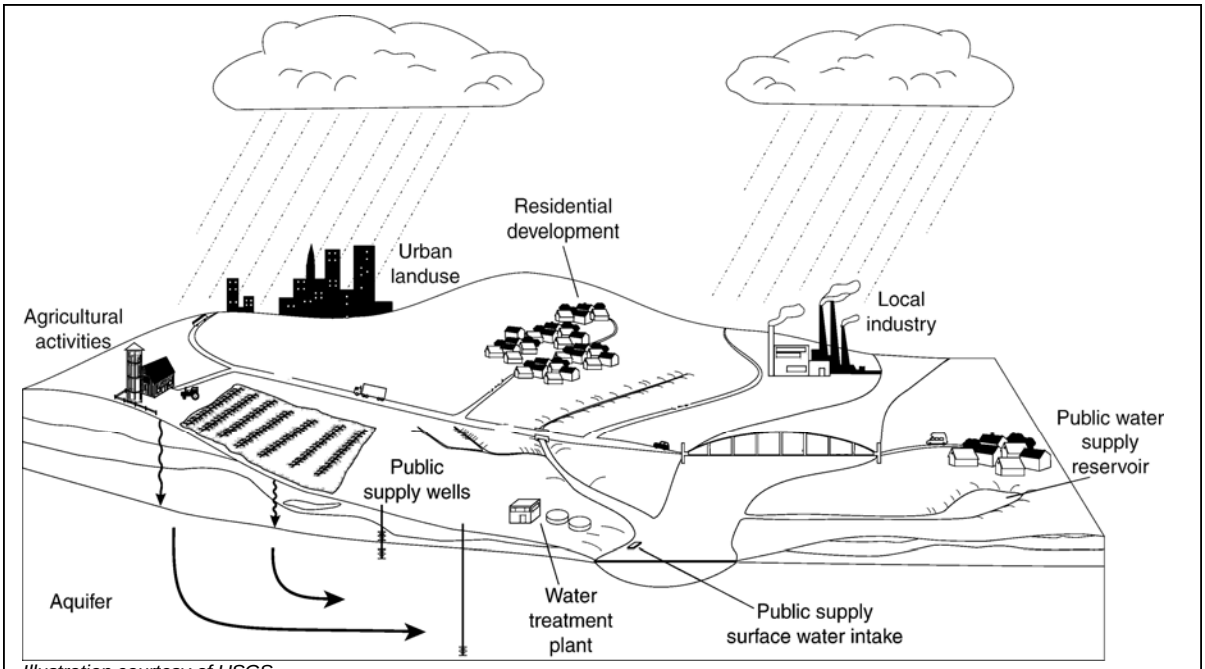

Illustration courtesy of USGS

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While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Pickles Pub

Pickles Pub (PWID 1615390) at 551 Warwick Turnpike, West Milford, NJ, is a public noncommunity water system that serves approximately 200 people (in 2003). Pickles Pub consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Pickles Pub's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.12	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	215.25
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	25.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	25.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	9.1	% Impervious Surface, 1995	7.6
		% Commercial/Industrial Land Use, 1995	6
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	470.06
% Soil Clay	9.26	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	27	% Urban Land Use, 1970	4.2
Conceptual % Soil Organic Matter	9.1	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	116.89
		Length of railroads	0
		Population Density	492.41
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	28.17
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	28.2
Conceptual Soil Hydraulic Conductivity	27	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.26	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	216.06
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	9.1	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.03
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

West Milford Realty Shoprite

1615391

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

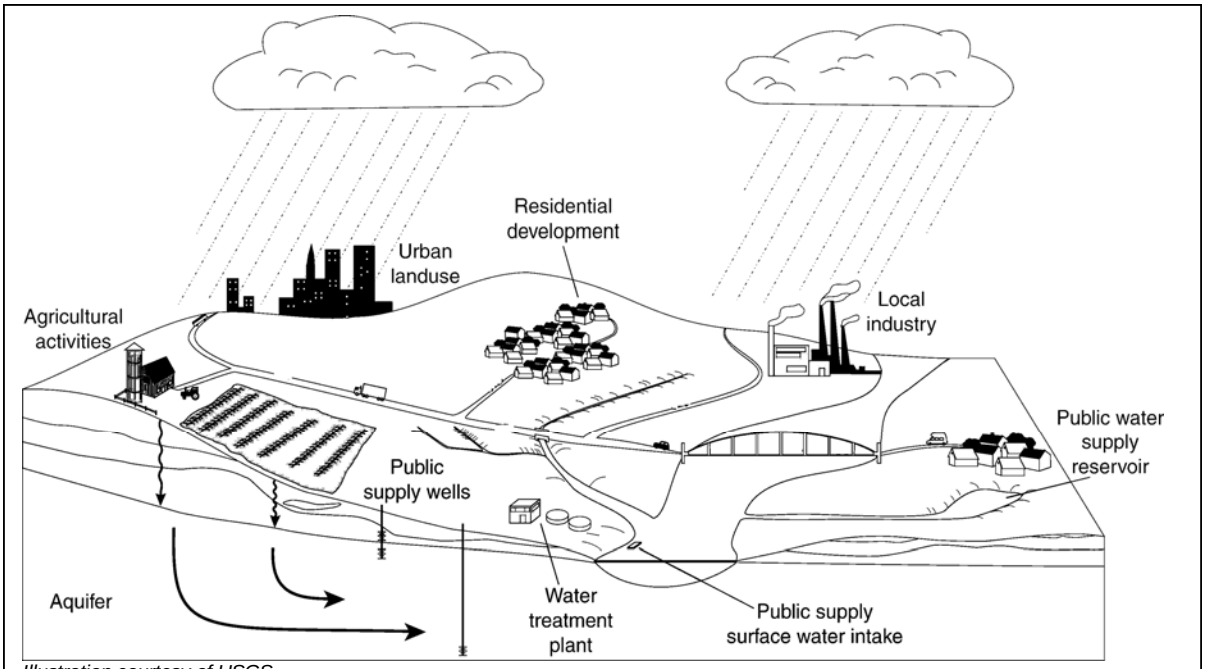

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for West Milford Realty Shoprite

West Milford Realty Shoprite (PWID 1615391) at Marshall Hill Road, West Milford, NJ, is a public noncommunity water system that serves approximately 50 people (in 2003). West Milford Realty Shoprite consists of 2 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for West Milford Realty Shoprite's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Theater Well	**M**	**M**	**M**	**L**	**L**	**M**	**M**	**M**
Shoprite Well	**L**	**M**	**M**	**H**	**L**	**H**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Theater Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	338.28
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	499.22
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	70
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	70
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.57	% Impervious Surface, 1995	39.2
		% Commercial/Industrial Land Use, 1995	36.7
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	1071.74
% Soil Clay	15.02	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	10.13	% Urban Land Use, 1970	90.71
Conceptual % Soil Organic Matter	0.57	Distance to STP	384.09
Physiographic Province	NEW ENGLAND	STP Density	13.97
		Distance to DOT roads	191.25
		Length of railroads	0
		Population Density	1036.62
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	79.4
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	79.4
Conceptual Soil Hydraulic Conductivity	10.13	% Agricultural Land Use, 1970	9.29
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15.02	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	200.86
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.57	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Shoprite Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	508.69
Depth to Top of Open Interval		Conceptual Septic Tank Density	286.48
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	91.91
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	6.29
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	91.91
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	6.29
		Distance to Agricultural Land Use, 1995	508.69
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.32	% Impervious Surface, 1995	59
		% Commercial/Industrial Land Use, 1995	49.15
		Sq. Mi. of Urban Land Use, 1995	0.07
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	508.69
Depth to Top of Open Interval	211	Population Density, Tier 1	1011.08
% Soil Clay	12.55	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	11.25	% Urban Land Use, 1970	100
Conceptual % Soil Organic Matter	0.32	Distance to STP	791.06
Physiographic Province	NEW ENGLAND	STP Density	13.97
		Distance to DOT roads	248.57
		Length of railroads	0
		Population Density	905.57
Radionuclides Explanatory Variables – Source Rating = H			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	100
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	508.69
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	100
Conceptual Soil Hydraulic Conductivity	11.25	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	12.55	% Agricultural Land Use, 1995	6.89
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	708.83
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.32	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

A.N.N Gas Mart

1615393

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

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- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

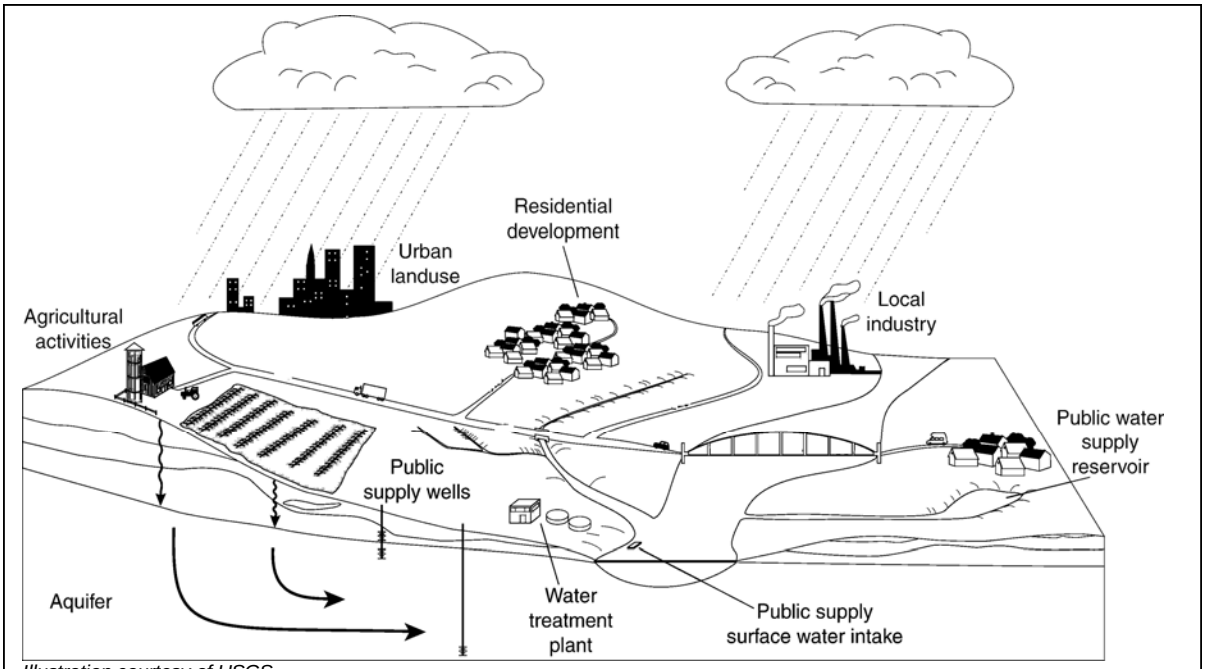

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for A.N.N Gas Mart

A.N.N Gas Mart (PWID 1615393) at 2048 Rt 23 North, West Milford, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). A.N.N Gas Mart consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for A.N.N Gas Mart's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	114.32
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	619.57
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	5.39
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	5.39
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.38	% Impervious Surface, 1995	4.7
		% Commercial/Industrial Land Use, 1995	5.39
		Sq. Mi. of Urban Land Use, 1995	0
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	8.89	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	10.89	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.38	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	66.62
		Length of railroads	753.34
		Population Density	322.07
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	17.1
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	17.1
Conceptual Soil Hydraulic Conductivity	10.89	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.89	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	277
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.38	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

The Towne Commons

1615395

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

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The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

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Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

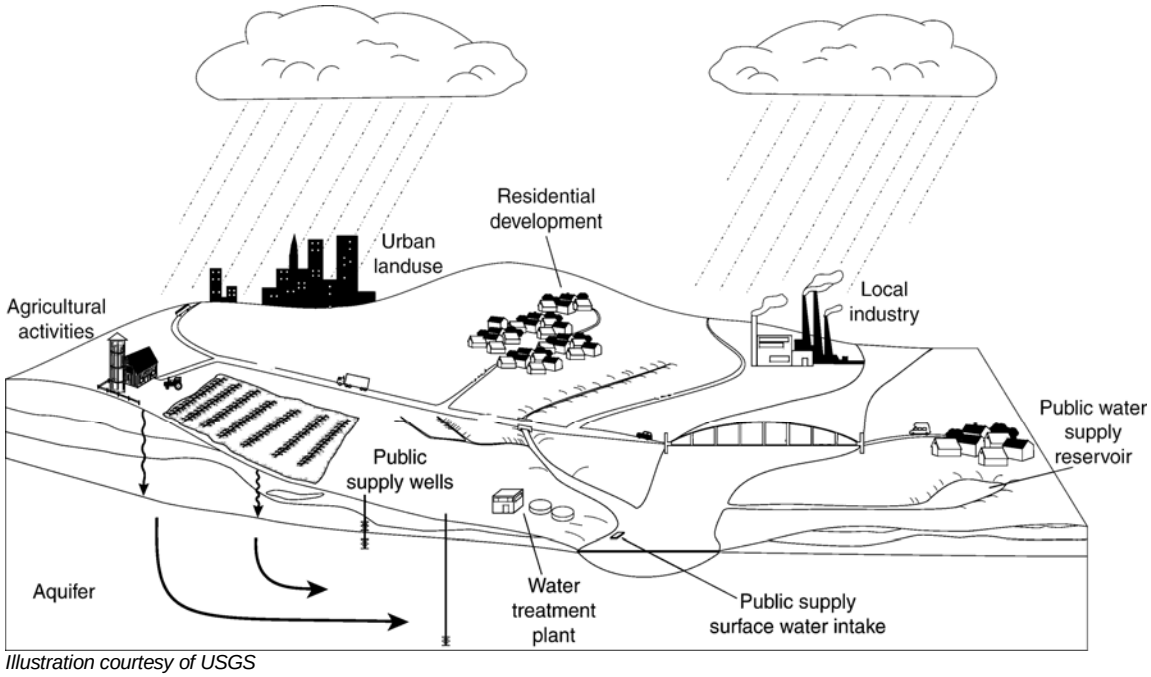

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

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What can you and others do to help?

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- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for The Towne Commons

The Towne Commons (PWID 1615395) at 1441 Union Valley Rd., West Milford, NJ, is a public noncommunity water system that serves approximately 34 people (in 2003). The Towne Commons consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for The Towne Commons's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.11	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	142.24
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	89.59
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	89.59
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.62	% Impervious Surface, 1995	31.7
		% Commercial/Industrial Land Use, 1995	35.44
		Sq. Mi. of Urban Land Use, 1995	0.06
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	41.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	582.49
% Soil Clay	15.72	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	5.98	% Urban Land Use, 1970	96
Conceptual % Soil Organic Matter	0.62	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	48.82
		Length of railroads	0
		Population Density	560.71
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	100
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	100
Conceptual Soil Hydraulic Conductivity	5.98	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	15.72	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	559.2
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.62	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

1-A RANCH

1615397

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

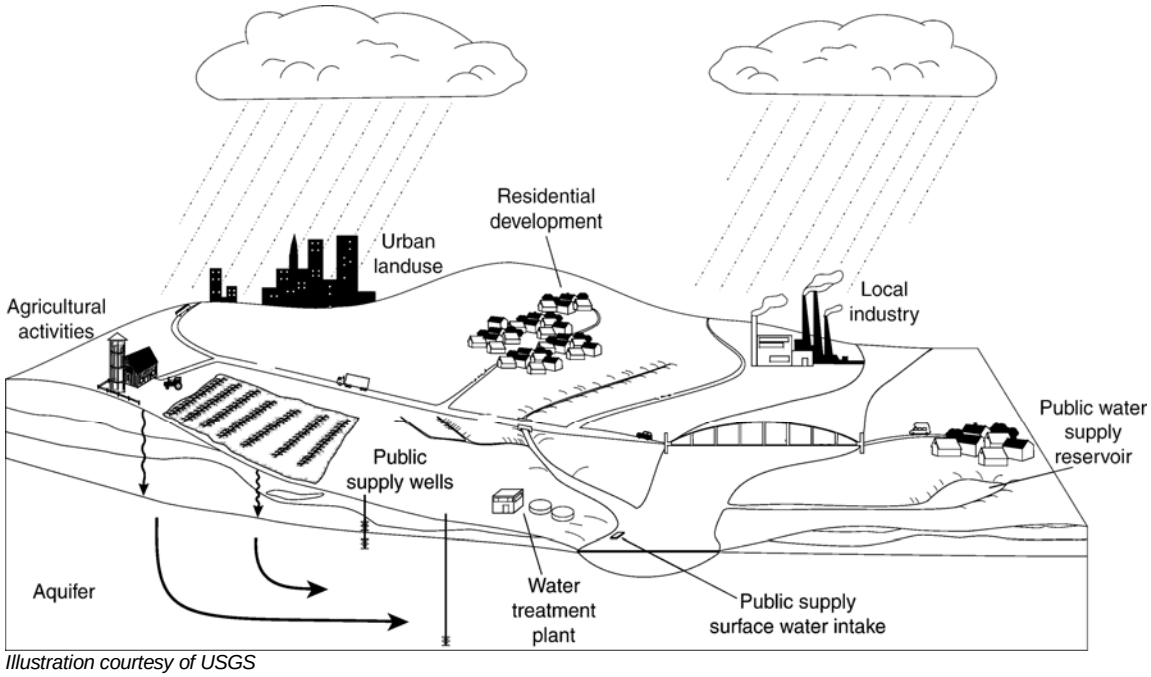

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for 1-A RANCH

1-A RANCH (PWID 1615397) at 1555 Greenwood Lake Tpke, West Milford, NJ, is a public noncommunity water system that serves approximately 60 people (in 2003). 1-A RANCH consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for 1-A RANCH's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	57.71
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	889.1
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	26.37
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	26.37
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.63	% Impervious Surface, 1995	8.2
		% Commercial/Industrial Land Use, 1995	11.39
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	168.63
% Soil Clay	11.42	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	11.95	% Urban Land Use, 1970	18.22
Conceptual % Soil Organic Matter	0.63	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	83.38
		Length of railroads	0
		Population Density	196.01
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	45.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	45.2
Conceptual Soil Hydraulic Conductivity	11.95	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	11.42	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	129.76
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.63	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Cafe Amore

1615398

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

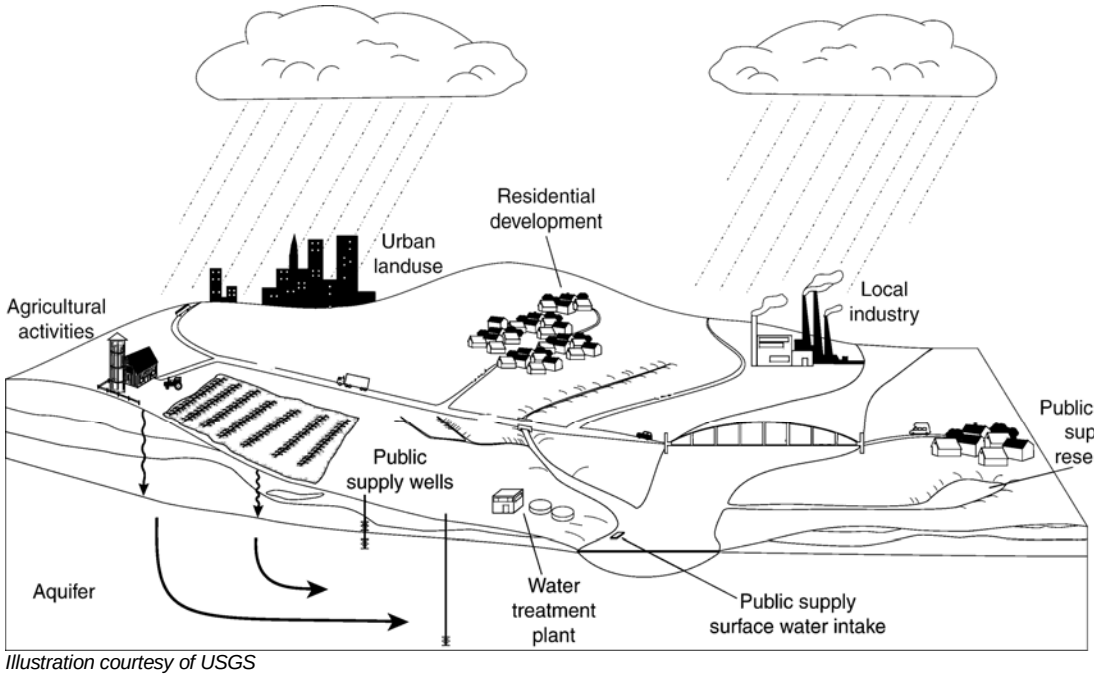

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Cafe Amore

Cafe Amore (PWID 1615398) at 736 Warwick Tpk, Hewitt, NJ, is a public noncommunity water system that serves approximately 36 people (in 2003). Cafe Amore consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Cafe Amore's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**M**	**M**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.13	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	510.54
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	71.64
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	71.64
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	6.55	% Impervious Surface, 1995	21.9
		% Commercial/Industrial Land Use, 1995	0
		Sq. Mi. of Urban Land Use, 1995	0.05
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	1549.93
% Soil Clay	10.85	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	17.71	% Urban Land Use, 1970	86
Conceptual % Soil Organic Matter	6.55	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	56.98
		Length of railroads	0
		Population Density	1317.66
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	94.09
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	94
Conceptual Soil Hydraulic Conductivity	17.71	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.85	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	315.76
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	6.55	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Lakeside Market & Pizzeria Inc.

1615399

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

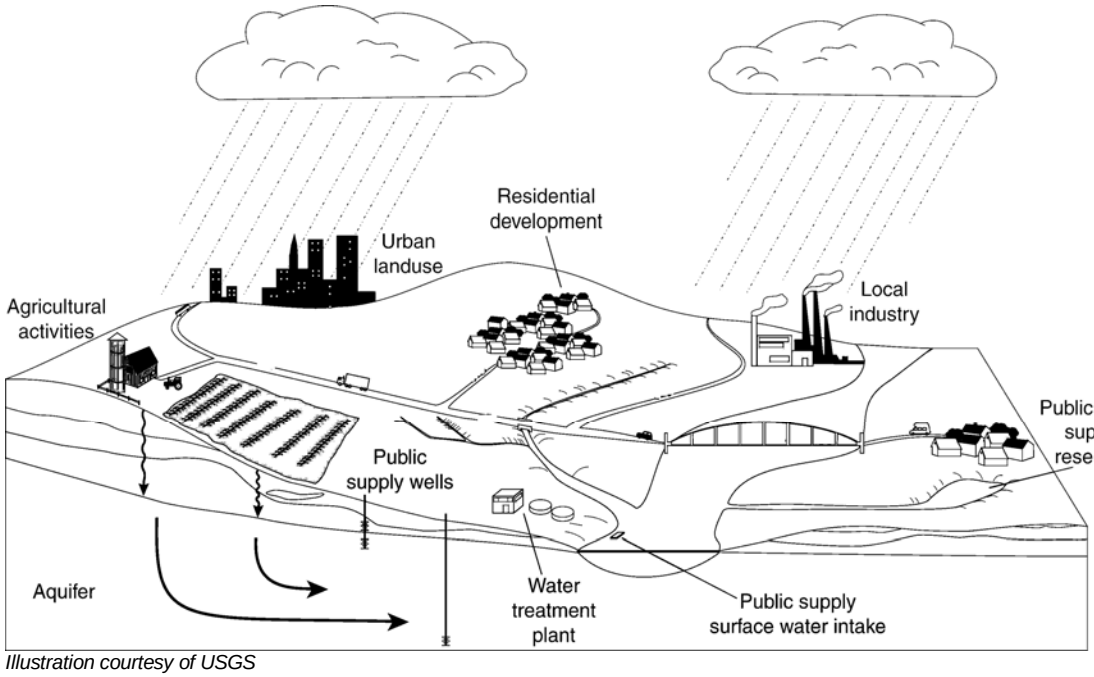

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Lakeside Market & Pizzeria Inc.

Lakeside Market & Pizzeria Inc. (PWID 1615399) at 396 Lakeshore Drive, Hewitt, NJ, is a public noncommunity water system that serves approximately 35 people (in 2003). Lakeside Market & Pizzeria Inc. consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Lakeside Market & Pizzeria Inc.'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**M**	**M**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.12	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	369.7
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	251.78
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	52.55
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	52.55
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	11.02	% Impervious Surface, 1995	15.1
		% Commercial/Industrial Land Use, 1995	5.99
		Sq. Mi. of Urban Land Use, 1995	0.04
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	835.53
% Soil Clay	10.16	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	17.65	% Urban Land Use, 1970	85.6
Conceptual % Soil Organic Matter	11.02	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	23.12
		Length of railroads	0
		Population Density	899.38
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	74.1
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	74.1
Conceptual Soil Hydraulic Conductivity	17.65	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	10.16	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	226.34
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	11.02	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Lakeview Pub & Liquors

1615400

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
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- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

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Where does drinking water come from?

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Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

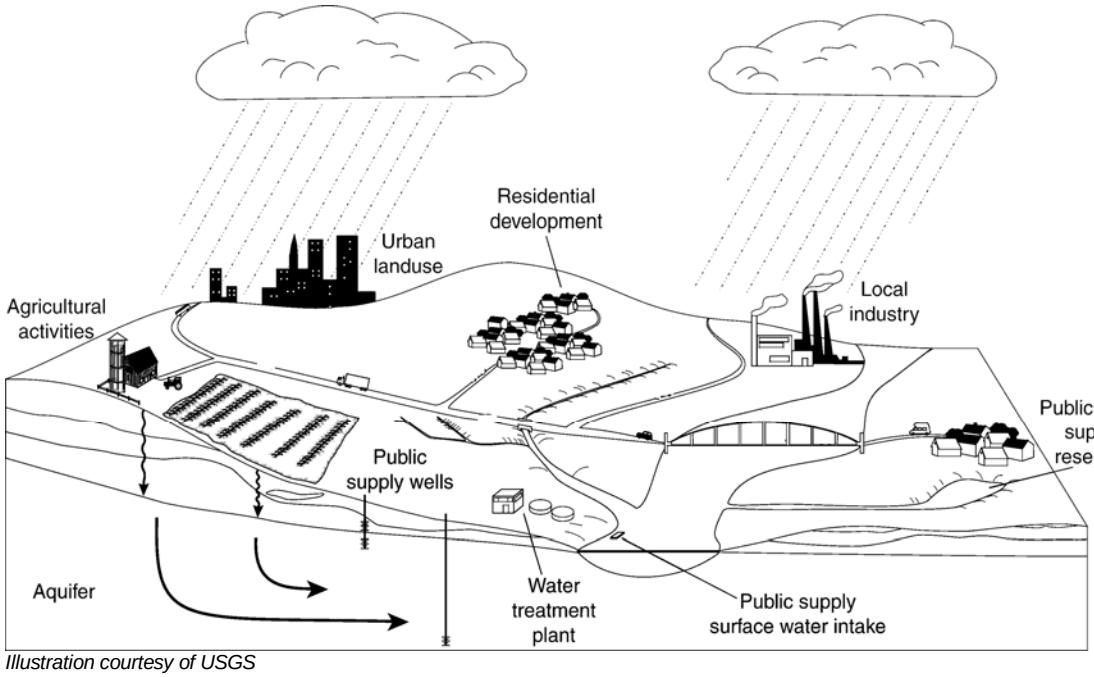

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Lakeview Pub & Liquors

Lakeview Pub & Liquors (PWID 1615400) at 1934 Greenwood Lake Tpk, Hewitt, NJ, is a public noncommunity water system that serves approximately 200 people (in 2003). Lakeview Pub & Liquors consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Lakeview Pub & Liquors's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	207.95
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	45.64
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	45.64
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.39	% Impervious Surface, 1995	17.7
		% Commercial/Industrial Land Use, 1995	15.35
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	706.94
% Soil Clay	14.51	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	2.73	% Urban Land Use, 1970	71.97
Conceptual % Soil Organic Matter	0.39	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	45.3
		Length of railroads	0
		Population Density	641.13
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	84.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	84.2
Conceptual Soil Hydraulic Conductivity	2.73	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.51	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.39	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Oakridge Crossing Shopping Center

1615402

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

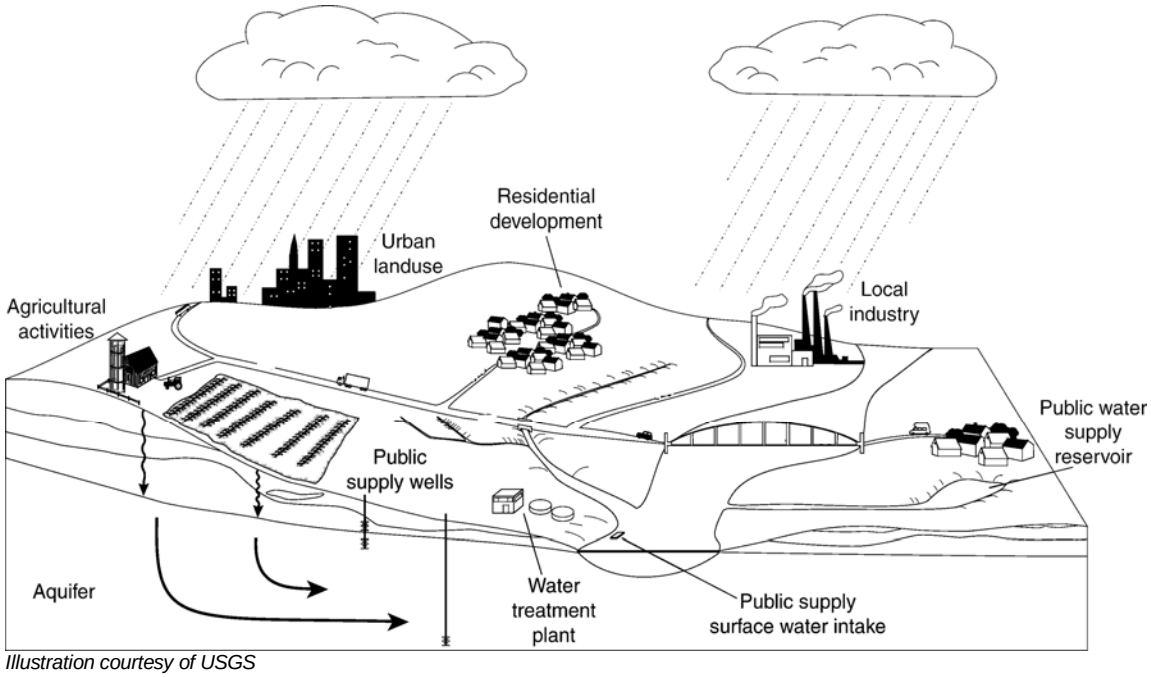

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Oakridge Crossing Shopping Center

Oakridge Crossing Shopping Center (PWID 1615402) at 2950 Rt 23, New Foundland, NJ, is a public noncommunity water system that serves approximately 25 people (in 2003). Oakridge Crossing Shopping Center consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Oakridge Crossing Shopping Center's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	39.63
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	72.37
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	72.37
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.24	% Impervious Surface, 1995	26.8
		% Commercial/Industrial Land Use, 1995	40.54
		Sq. Mi. of Urban Land Use, 1995	0.07
		Density of SWL, USTs, and KCSL	9.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	9.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	150	Population Density, Tier 1	125.87
% Soil Clay	7.76	% Barren Land Use, 1995	2
Soil Hydraulic Conductivity	40.87	% Urban Land Use, 1970	96
Conceptual % Soil Organic Matter	0.24	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	288.29
		Length of railroads	0
		Population Density	125.87
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	61.36
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	150	% Developed Land, Tier 1, 1995	61.3
Conceptual Soil Hydraulic Conductivity	40.87	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	7.76	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	691.58
Depth to Top of Open Interval	150		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.24	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Newfoundland Amoco

1615405

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

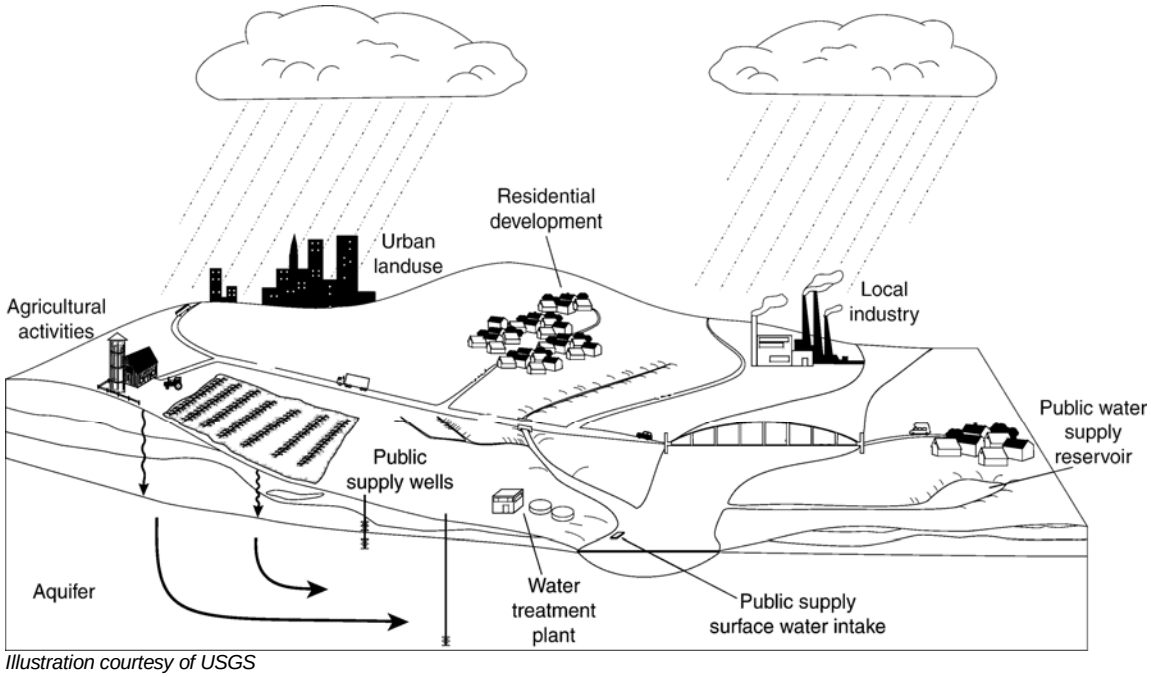

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Newfoundland Amoco

Newfoundland Amoco (PWID 1615405) at 2950 Rt 23 South, New Foundland, NJ, is a public noncommunity water system that serves approximately 40 people (in 2003). Newfoundland Amoco consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Newfoundland Amoco's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	47.22
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	646.74
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	39.56
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	39.56
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.41	% Impervious Surface, 1995	19.3
		% Commercial/Industrial Land Use, 1995	31.27
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	55.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	55.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	140.33
% Soil Clay	9.69	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	41.43	% Urban Land Use, 1970	66.3
Conceptual % Soil Organic Matter	0.41	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	75.32
		Length of railroads	1528.5
		Population Density	146.8
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	54.95
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	55
Conceptual Soil Hydraulic Conductivity	41.43	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.69	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	25.13
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.41	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Macopin Pizza

1615411

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

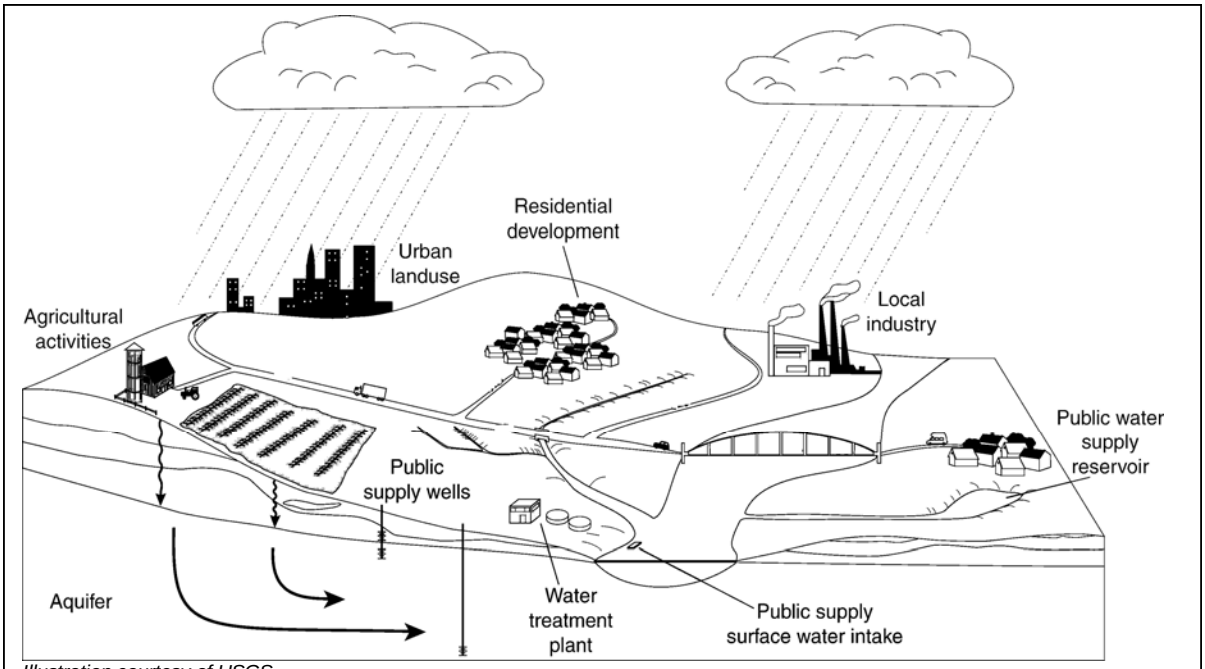

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Macopin Pizza

Macopin Pizza (PWID 1615411) at 707 Macopin Road, West Milford, NJ, is a public noncommunity water system that serves approximately 75 people (in 2003). Macopin Pizza consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Macopin Pizza's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	151.05
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	16.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	16.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.45	% Impervious Surface, 1995	4
		% Commercial/Industrial Land Use, 1995	2.4
		Sq. Mi. of Urban Land Use, 1995	0.01
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	407.1
% Soil Clay	9.58	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	6.49	% Urban Land Use, 1970	39.66
Conceptual % Soil Organic Matter	0.45	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	41.66
		Length of railroads	0
		Population Density	412.85
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	42.8
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	42.8
Conceptual Soil Hydraulic Conductivity	6.49	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.58	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	113.7
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.45	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Connie's Cafe

1615412

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

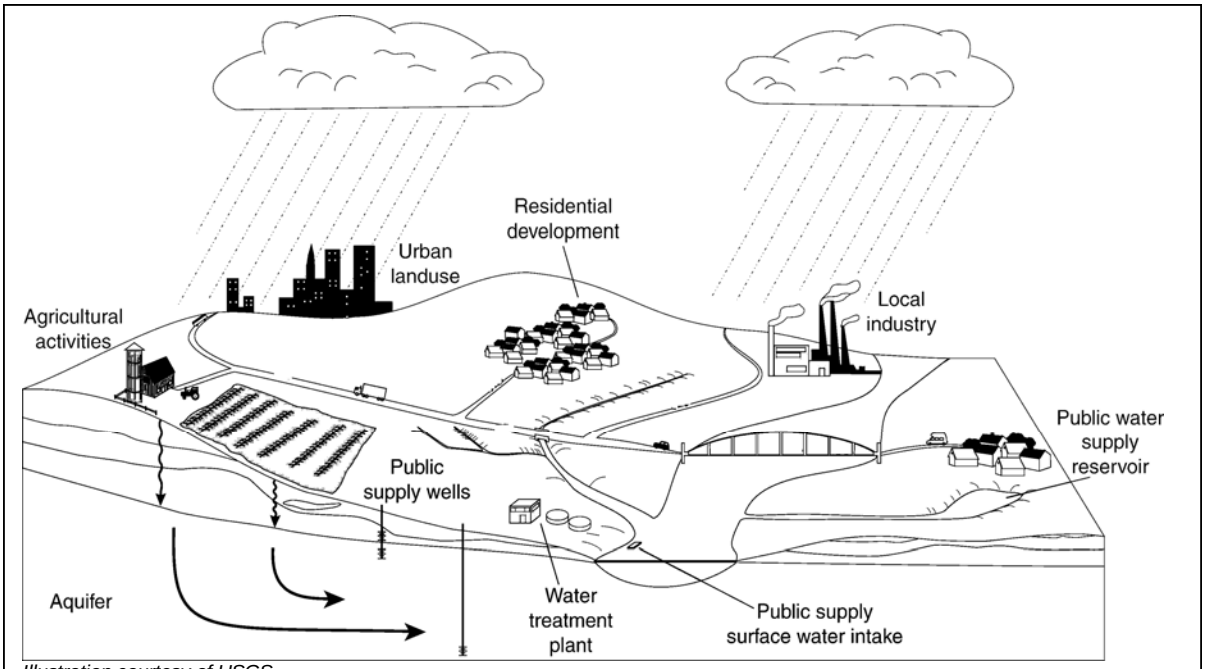

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Connie's Cafe

Connie's Cafe (PWID 1615412) at 126 Airport Road, West Milford, NJ, is a public noncommunity water system that serves approximately 25 people (in 2003). Connie's Cafe consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Connie's Cafe's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	86.25
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	46.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	46.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.66	% Impervious Surface, 1995	24.5
		% Commercial/Industrial Land Use, 1995	46.7
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	308.47
% Soil Clay	14.76	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	5.6	% Urban Land Use, 1970	98.6
Conceptual % Soil Organic Matter	0.66	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	82.92
		Length of railroads	0
		Population Density	308.47
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	57.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	57.2
Conceptual Soil Hydraulic Conductivity	5.6	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.76	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.66	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Dairy Queen

1615415

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

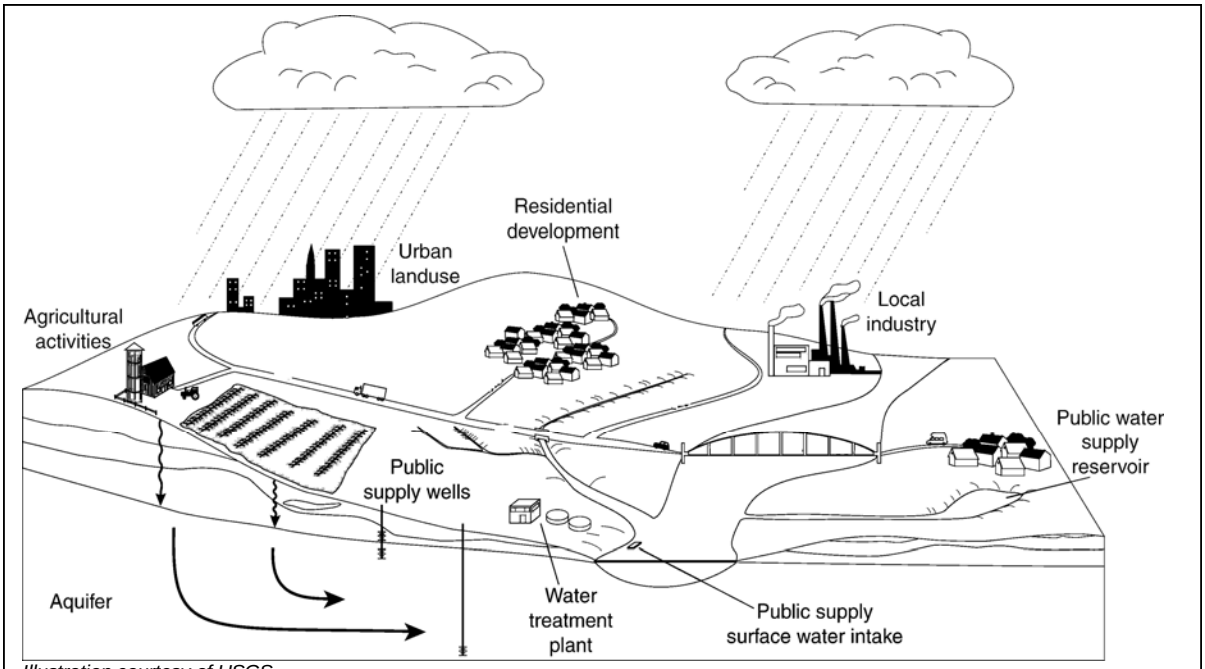

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Dairy Queen

Dairy Queen (PWID 1615415) at 259 Marshall Hill Road, West Milforde, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). Dairy Queen consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Dairy Queen's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**L**	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	318.7
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	38.82
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	38.82
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.62	% Impervious Surface, 1995	14.3
		% Commercial/Industrial Land Use, 1995	36.53
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	1071.74
% Soil Clay	14.73	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	4.44	% Urban Land Use, 1970	43.24
Conceptual % Soil Organic Matter	0.62	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	126.92
		Length of railroads	0
		Population Density	980.06
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	46.6
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	46.6
Conceptual Soil Hydraulic Conductivity	4.44	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.73	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	624.38
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.62	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Oak Ridge Pub & Liquors

1615416

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

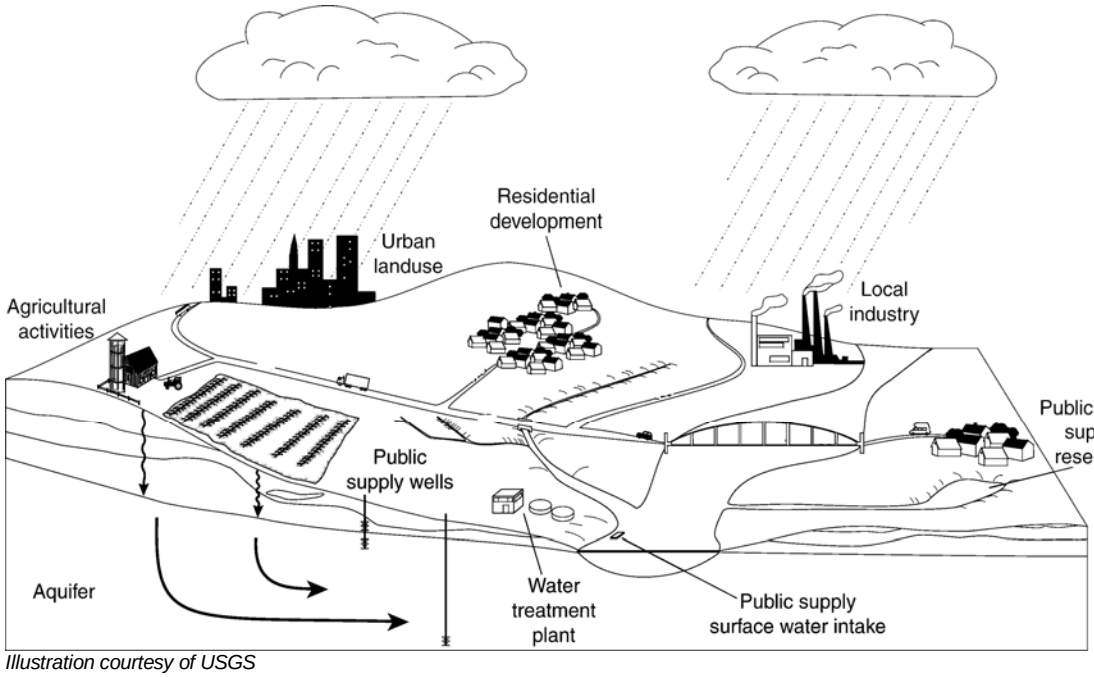

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Oak Ridge Pub & Liquors

Oak Ridge Pub & Liquors (PWID 1615416) at 62 Oak Ridge Road, Newfoundland, NJ, is a public noncommunity water system that serves approximately 300 people (in 2003). Oak Ridge Pub & Liquors consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Oak Ridge Pub & Liquors's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Well	**M**	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Well **Status:** P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	41.05
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	223.66
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	39.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	39.7
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.41	% Impervious Surface, 1995	17.1
		% Commercial/Industrial Land Use, 1995	34.7
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	124.42
% Soil Clay	8.82	% Barren Land Use, 1995	4
Soil Hydraulic Conductivity	59.05	% Urban Land Use, 1970	77.68
Conceptual % Soil Organic Matter	0.41	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	97.72
		Length of railroads	1298.83
		Population Density	129.32
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	68.6
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	68.6
Conceptual Soil Hydraulic Conductivity	59.05	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.82	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	134.46
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.41	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

West Milford Shopping Center

1615417

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

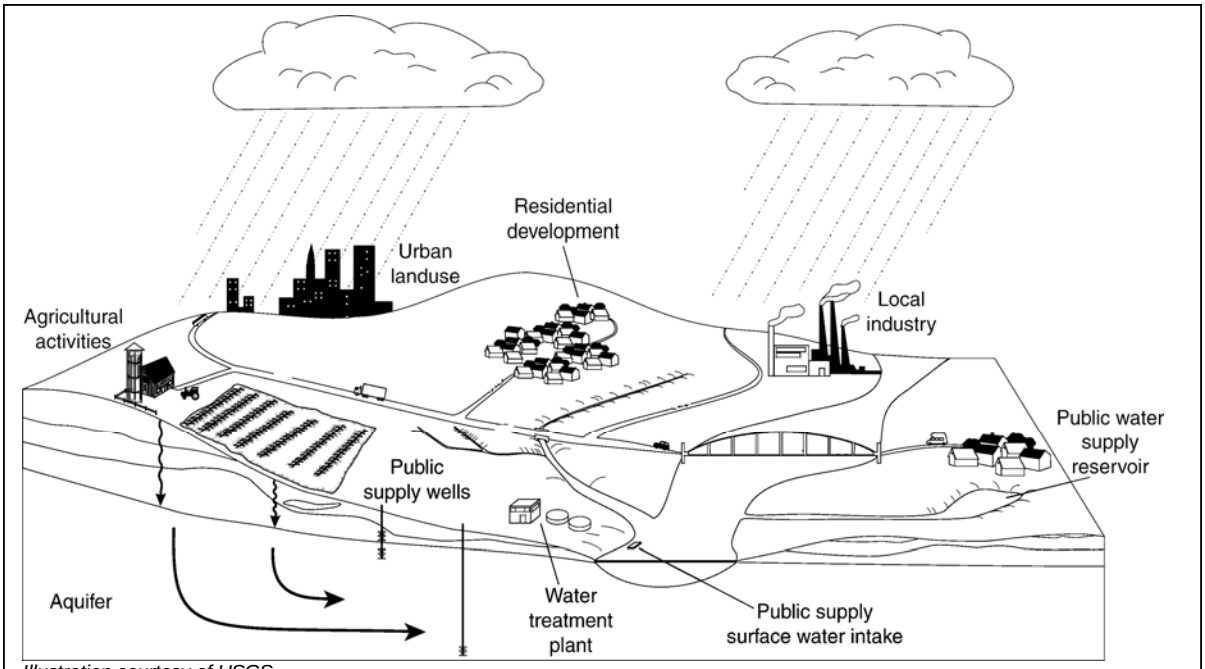

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for West Milford Shopping Center

West Milford Shopping Center (PWID 1615417) at Marshall Hill Road, West Milford, NJ, is a public noncommunity water system that serves approximately 75 people (in 2003). West Milford Shopping Center consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for West Milford Shopping Center's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	L	**M**	**M**	**H**	**L**	**H**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	511.21
Depth to Top of Open Interval		Conceptual Septic Tank Density	286.22
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	92
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	6.1
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	92
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	6.1
		Distance to Agricultural Land Use, 1995	511.21
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.32	% Impervious Surface, 1995	59
		% Commercial/Industrial Land Use, 1995	49.2
		Sq. Mi. of Urban Land Use, 1995	0.07
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	511.21
Depth to Top of Open Interval	211	Population Density, Tier 1	1009.61
% Soil Clay	12.55	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	11.21	% Urban Land Use, 1970	100
Conceptual % Soil Organic Matter	0.32	Distance to STP	793.55
Physiographic Province	NEW ENGLAND	STP Density	13.97
		Distance to DOT roads	246.8
		Length of railroads	0
		Population Density	904.92
Radionuclides Explanatory Variables – Source Rating = H			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	100
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	511.21
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	100
Conceptual Soil Hydraulic Conductivity	11.21	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	12.55	% Agricultural Land Use, 1995	6.7
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	712
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.32	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	1
pH of water-quality sample			

Montclair YMCA Day Camp

1615418

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

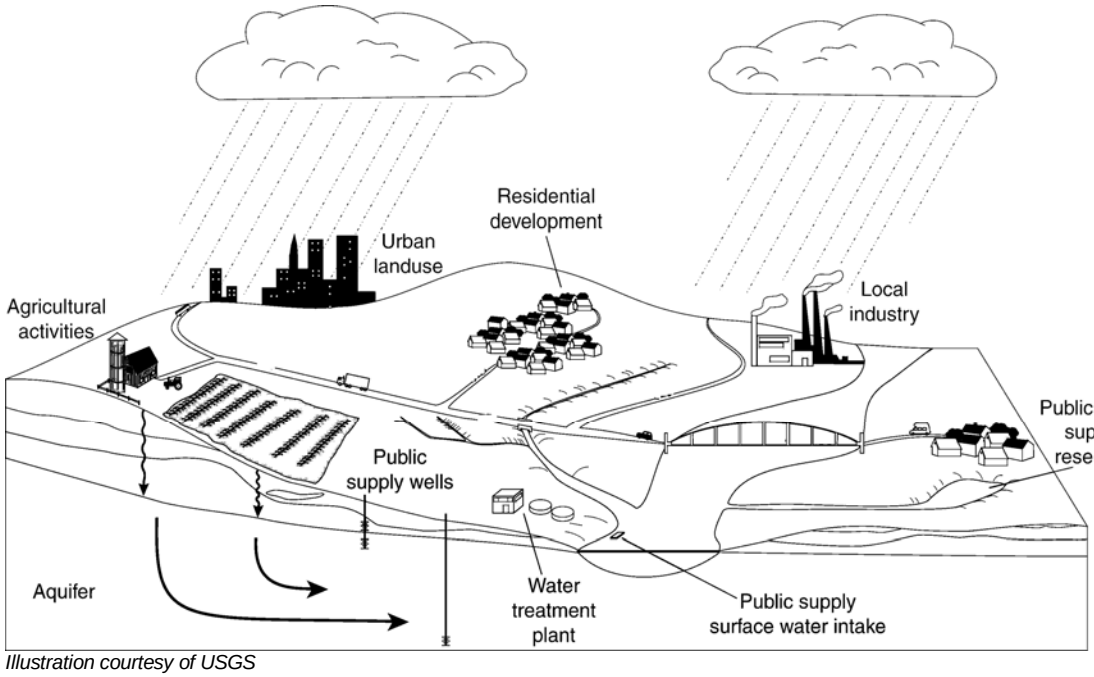

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Montclair YMCA Day Camp

Montclair YMCA Day Camp (PWID 1615418) at 131 Germantown Road, West Milford, NJ, is a public noncommunity water system that serves approximately 300 people (in 2003). Montclair YMCA Day Camp consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Montclair YMCA Day Camp's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	M	**M**	**M**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	605.27
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	450.25
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	44.46
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	5.49
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	44.46
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	5.49
		Distance to Agricultural Land Use, 1995	605.27
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.27	% Impervious Surface, 1995	6.5
		% Commercial/Industrial Land Use, 1995	0
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	605.27
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	8.82	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	17.23	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.27	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	27.52
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	40
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	605.27
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	40
Conceptual Soil Hydraulic Conductivity	17.23	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.82	% Agricultural Land Use, 1995	1.6
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	589.86
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.27	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Montclair YMCA Day Camp (Lower)

1615419

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

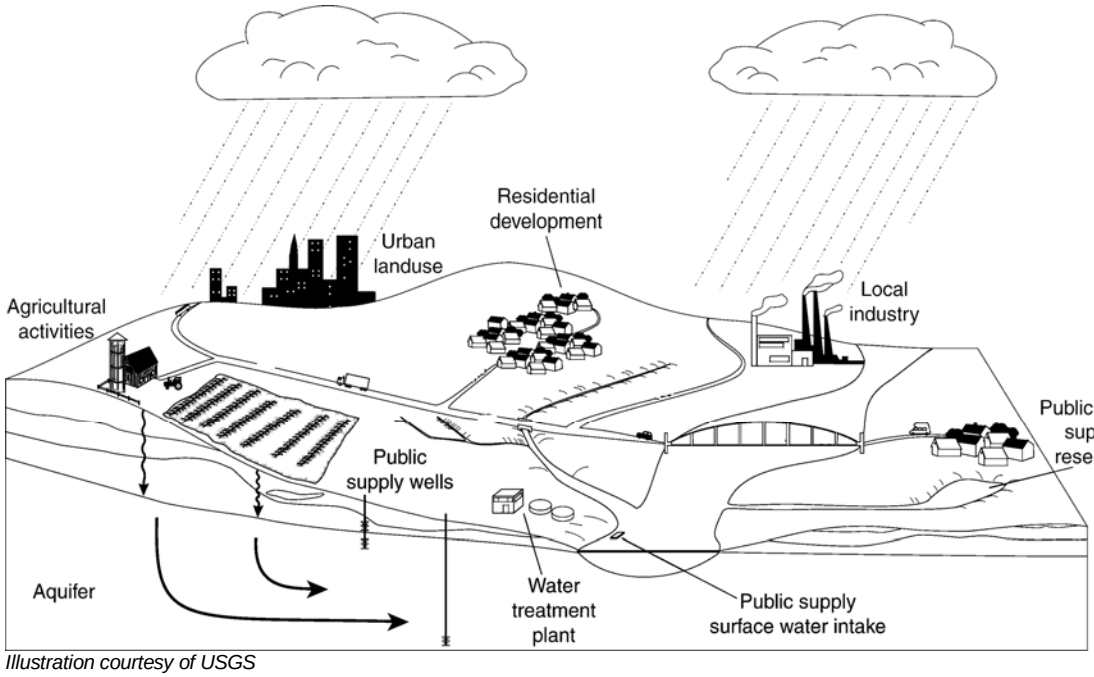

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Montclair YMCA Day Camp (Lower)

Montclair YMCA Day Camp (Lower) (PWID 1615419) at 131 Germantown Road, West Milford, NJ, is a public noncommunity water system that serves approximately 300 people (in 2003). Montclair YMCA Day Camp (Lower) consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Montclair YMCA Day Camp (Lower)'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	M	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	537.57
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	27.53
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	3.9
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	27.53
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	3.9
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.27	% Impervious Surface, 1995	3.5
		% Commercial/Industrial Land Use, 1995	0
		Sq. Mi. of Urban Land Use, 1995	0.02
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	7.78	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	18.26	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.27	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	247.53
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	61.5
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	61.5
Conceptual Soil Hydraulic Conductivity	18.26	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	7.78	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	363.88
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.27	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Montclair YMCA Day Camp (Upper)

1615420

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

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The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

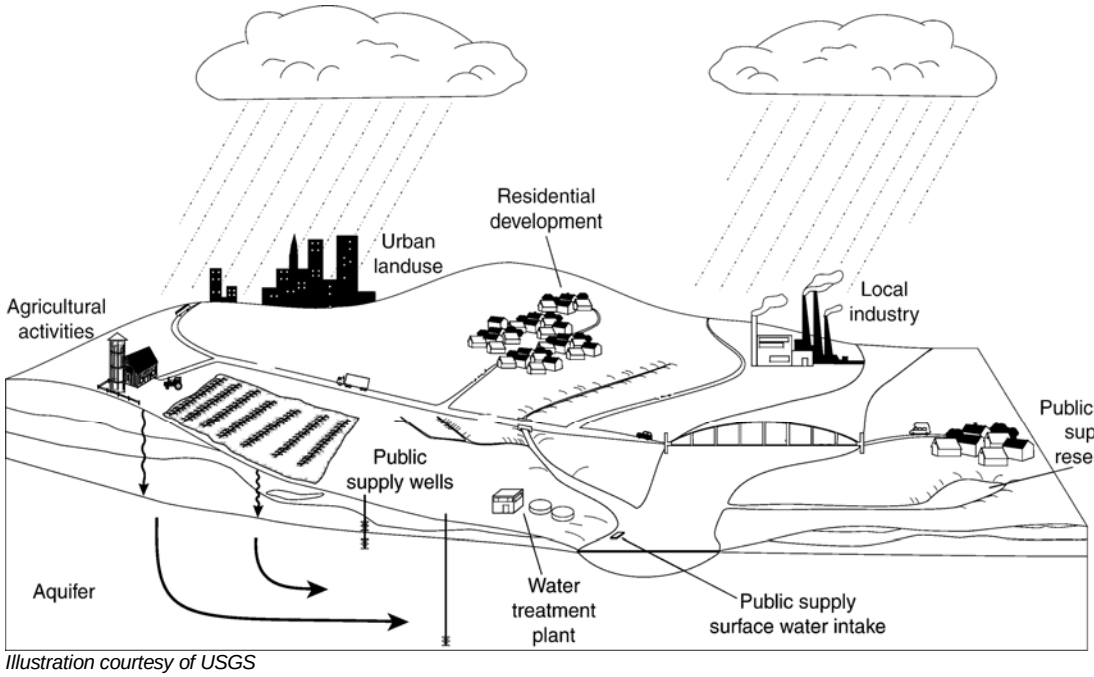

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

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- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Montclair YMCA Day Camp (Upper)

Montclair YMCA Day Camp (Upper) (PWID 1615420) at 131 Germantown Road, West Milford, NJ, is a public noncommunity water system that serves approximately 300 people (in 2003). Montclair YMCA Day Camp (Upper) consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

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Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Montclair YMCA Day Camp (Upper)'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	M	**M**	**M**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.05	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	121.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	515.99
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	40.2
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	1.4
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	40.2
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	1.4
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.26	% Impervious Surface, 1995	4.2
		% Commercial/Industrial Land Use, 1995	0
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	340.58
% Soil Clay	6.76	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	13.31	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.26	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	342.63
		Length of railroads	0
		Population Density	340.58
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	39.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	39.2
Conceptual Soil Hydraulic Conductivity	13.31	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	6.76	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.26	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Quality Time Preschool

1615423

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

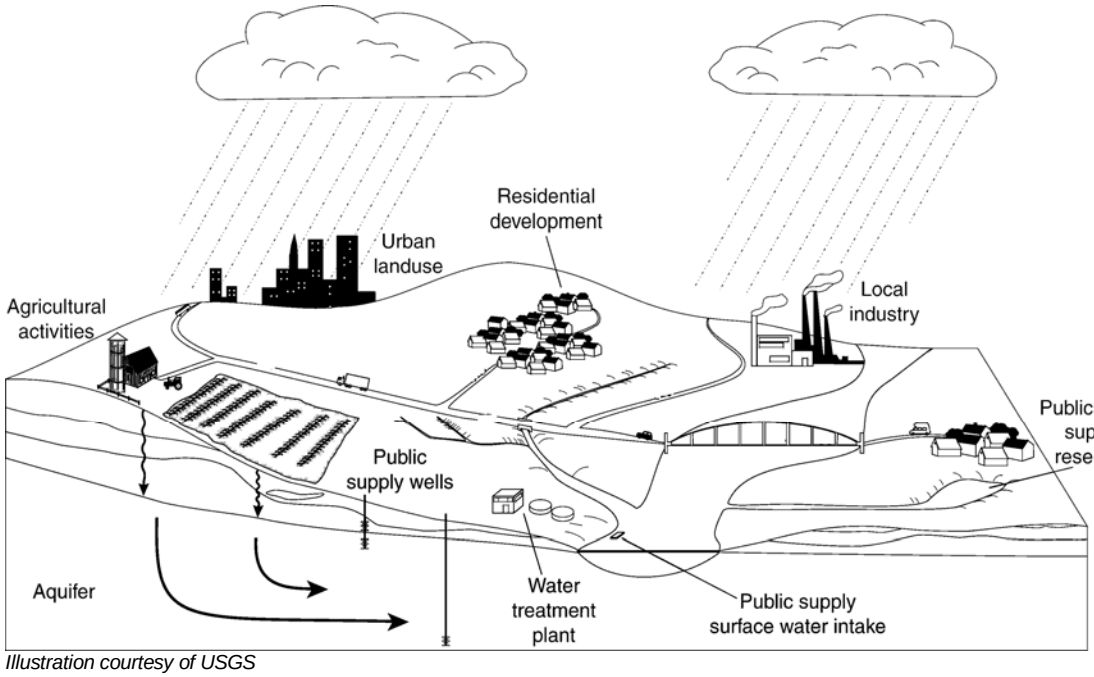

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Quality Time Preschool

Quality Time Preschool (PWID 1615423) at 74 Oak Ridge Road, Oak Ridge, NJ, is a public noncommunity water system that serves approximately 34 people (in 2003). Quality Time Preschool consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Quality Time Preschool's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	M	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	40.71
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	449.31
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	35.46
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	35.46
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	1.42	% Impervious Surface, 1995	15.1
		% Commercial/Industrial Land Use, 1995	29.88
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	14
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	14
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	116.91
% Soil Clay	8.05	% Barren Land Use, 1995	2.79
Soil Hydraulic Conductivity	68.15	% Urban Land Use, 1970	55.94
Conceptual % Soil Organic Matter	1.42	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	23.9
		Length of railroads	1425.57
		Population Density	128.2
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	63.44
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	63.5
Conceptual Soil Hydraulic Conductivity	68.15	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	8.05	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	128.88
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	1.42	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Holy Faith Lutheran Church

1615424

Source Water Assessment Report

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DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

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- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

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Source Water Assessment Program Goals

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1. Protect sources of drinking water.

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What factors may affect the quality of your drinking water source?

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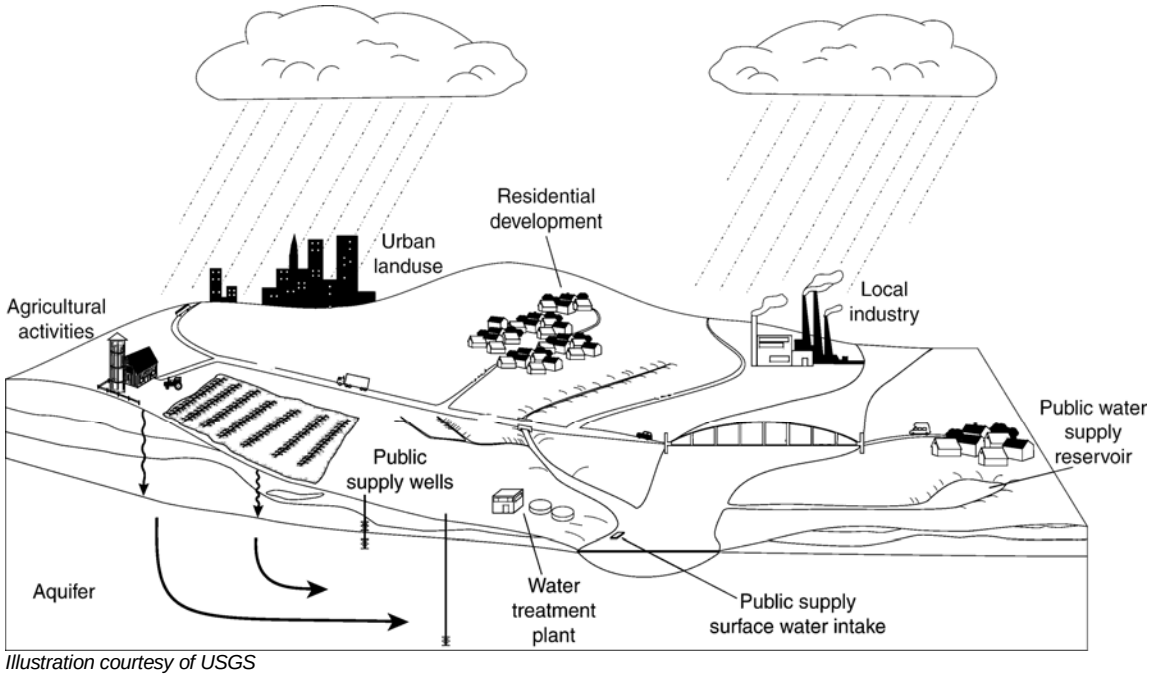

Illustration courtesy of USGS

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- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Holy Faith Lutheran Church

Holy Faith Lutheran Church (PWID 1615424) at 104 Paradise Road, West Milford, NJ, is a public noncommunity water system that serves approximately 100 people (in 2003). Holy Faith Lutheran Church consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

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	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
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Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Holy Faith Lutheran Church's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	L	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

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This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.07	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	36.52
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	42.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	42.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.41	% Impervious Surface, 1995	12.3
		% Commercial/Industrial Land Use, 1995	14.2
		Sq. Mi. of Urban Land Use, 1995	0.2
		Density of SWL, USTs, and KCSL	12.8
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	12.8
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	210	Population Density, Tier 1	116.45
% Soil Clay	12.22	% Barren Land Use, 1995	0.3
Soil Hydraulic Conductivity	10.86	% Urban Land Use, 1970	45.45
Conceptual % Soil Organic Matter	0.41	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	199.69
		Length of railroads	0
		Population Density	116.58
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	58.2
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	210	% Developed Land, Tier 1, 1995	58.2
Conceptual Soil Hydraulic Conductivity	10.86	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	12.22	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	918.24
Depth to Top of Open Interval	210		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.41	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Apple Montessori School

1615425

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

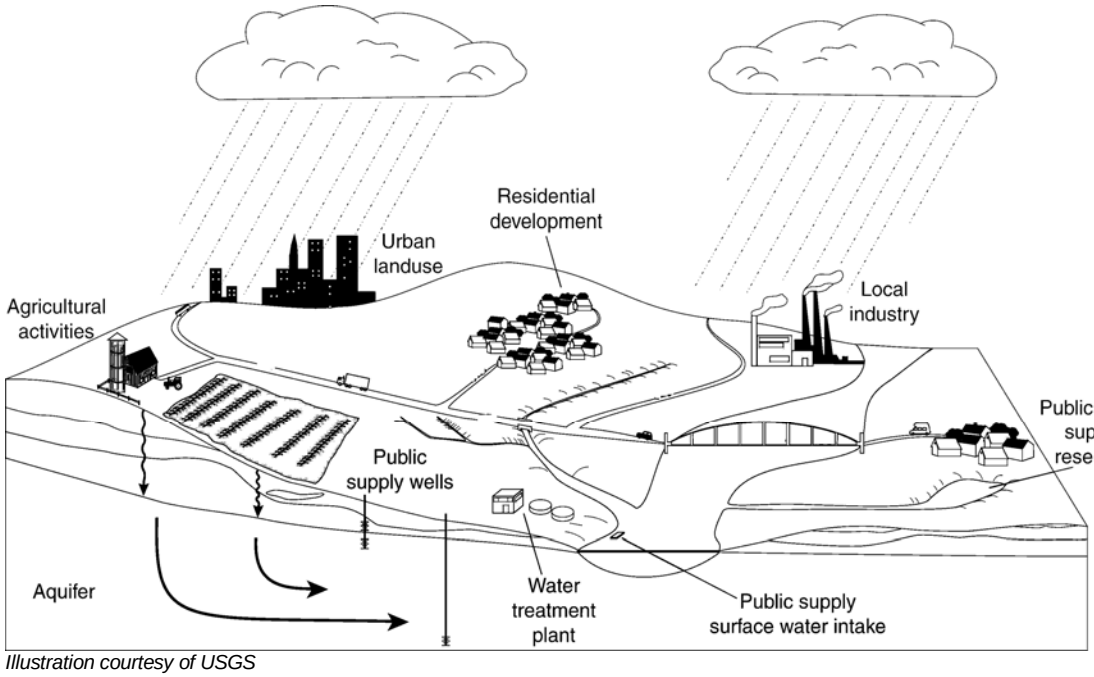

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Apple Montessori School

Apple Montessori School (PWID 1615425) at 836 Macopin, West Milford, NJ, is a public noncommunity water system that serves approximately 28 people (in 2003). Apple Montessori School consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Apple Montessori School's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	L	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	168.89
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	45.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	45.4
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.44	% Impervious Surface, 1995	12.1
		% Commercial/Industrial Land Use, 1995	0
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	470.81
% Soil Clay	9.52	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	13.19	% Urban Land Use, 1970	73.13
Conceptual % Soil Organic Matter	0.44	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	55.88
		Length of railroads	0
		Population Density	456.1
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	60.44
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	60.5
Conceptual Soil Hydraulic Conductivity	13.19	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.52	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	448.7
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.44	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Island of Spirits

1615426

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

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DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

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Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

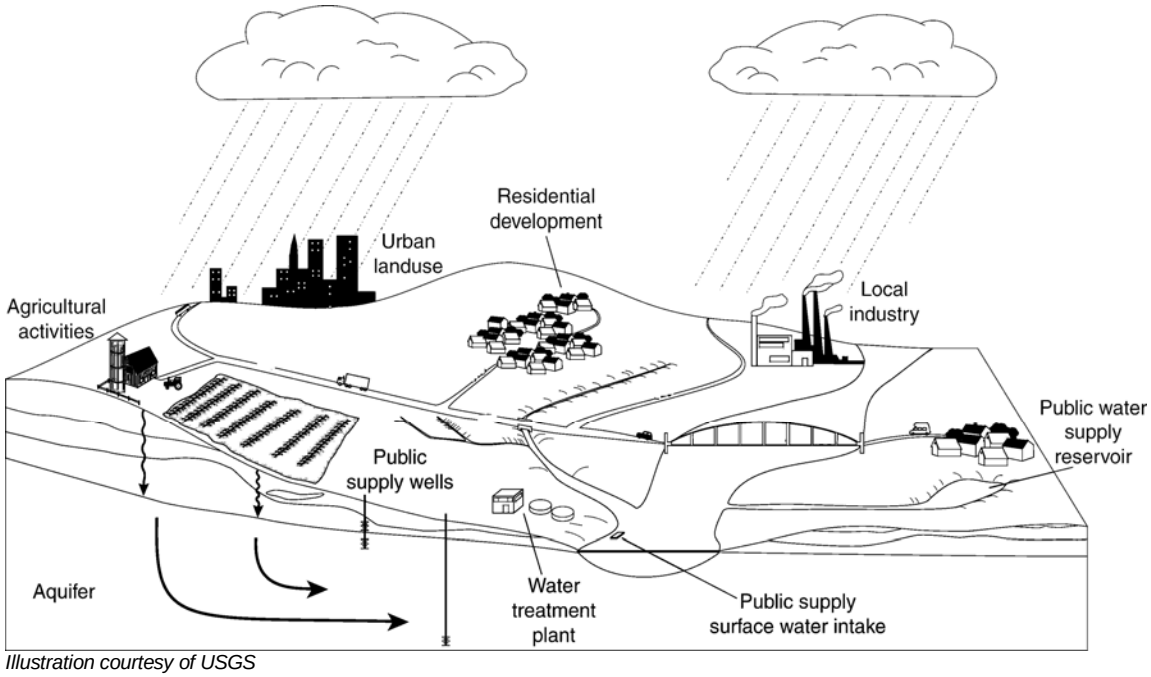

Illustration courtesy of USGS

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- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Island of Spirits

Island of Spirits (PWID 1615426) at 3025 Route 23, West Mildford, NJ, is a public noncommunity water system that serves approximately 75 people (in 2003). Island of Spirits consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Island of Spirits's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	L	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.05	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	34.21
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	92.01
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	92.01
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.23	% Impervious Surface, 1995	28.5
		% Commercial/Industrial Land Use, 1995	42.96
		Sq. Mi. of Urban Land Use, 1995	0.07
		Density of SWL, USTs, and KCSL	41.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	41.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	107.23
% Soil Clay	13.16	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	4.29	% Urban Land Use, 1970	88.4
Conceptual % Soil Organic Matter	0.23	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	70.2
		Length of railroads	0
		Population Density	109.61
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	100
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	100
Conceptual Soil Hydraulic Conductivity	4.29	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.16	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	730.24
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.23	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Selling Precision Inc.

1615427

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

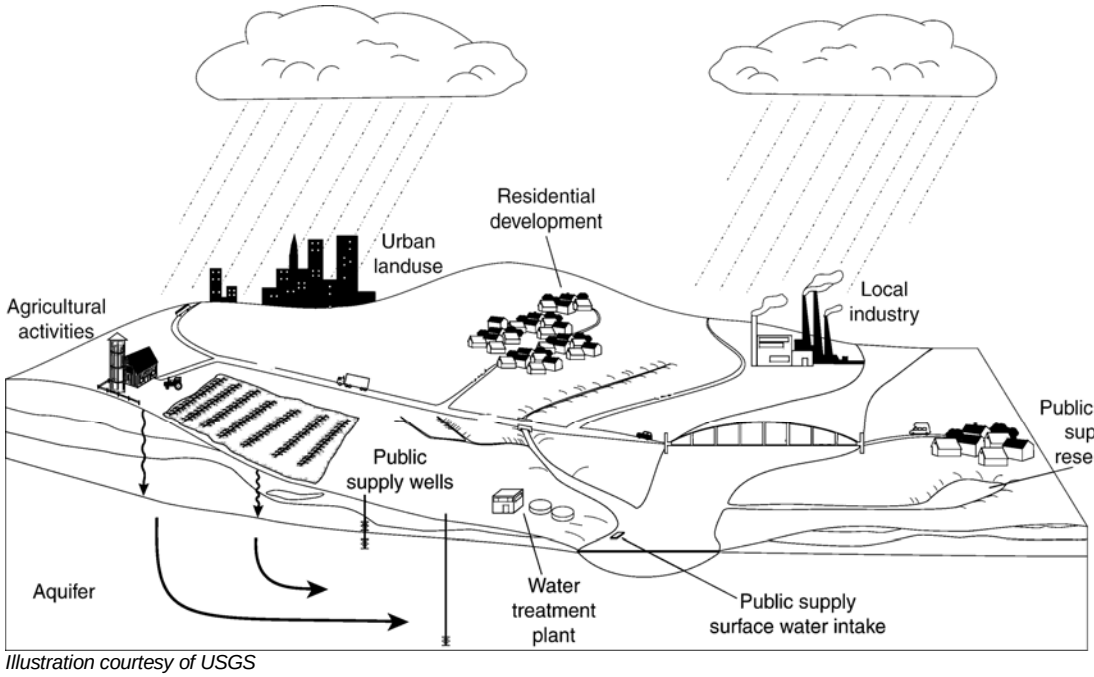

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Selling Precision Inc.

Selling Precision Inc. (PWID 1615427) at 264 Marshall Hill Rd, West Milford, NJ, is a public noncommunity water system that serves approximately 25 people (in 2003). Selling Precision Inc. consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Selling Precision Inc.'s Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	L	**L**	**L**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.09	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	245.56
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	48.65
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	48.65
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.65	% Impervious Surface, 1995	14.3
		% Commercial/Industrial Land Use, 1995	48.65
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	69.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	69.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	878.63
% Soil Clay	14.74	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	4.77	% Urban Land Use, 1970	55.56
Conceptual % Soil Organic Matter	0.65	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	94.82
		Length of railroads	0
		Population Density	768.71
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	70
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	70
Conceptual Soil Hydraulic Conductivity	4.77	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	14.74	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	741.2
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.65	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Dunkin Donuts

1615428

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

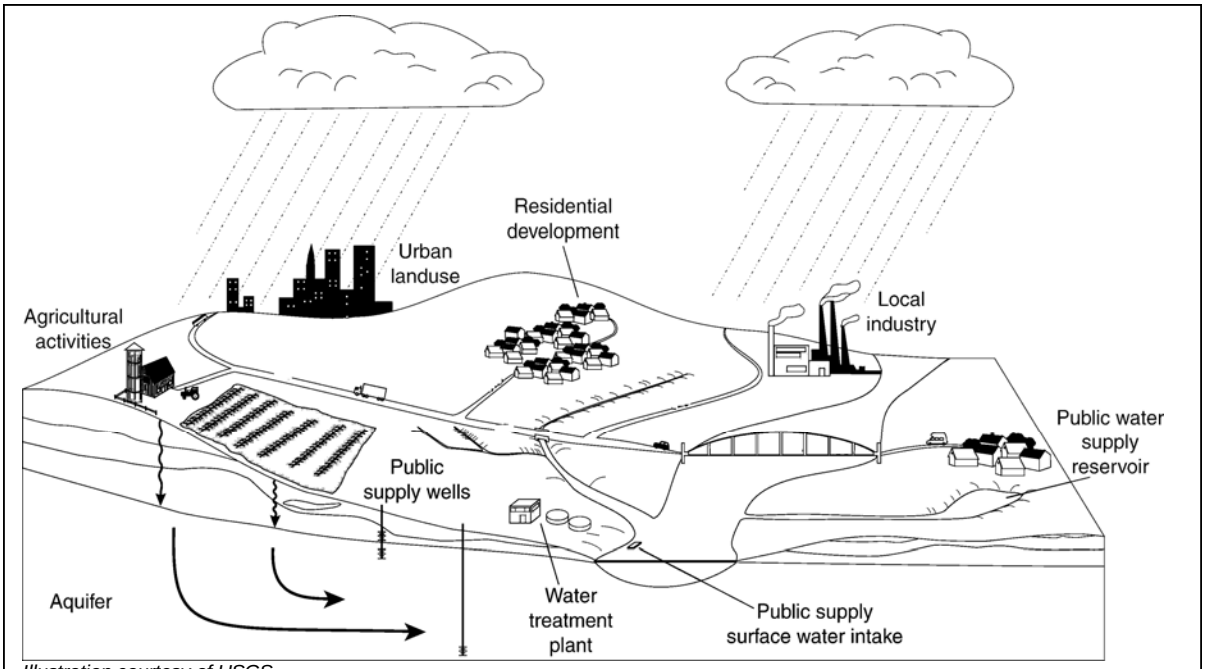

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Dunkin Donuts

Dunkin Donuts (PWID 1615428) at 1521 Union Valley Road, West Milford, NJ, is a public noncommunity water system that serves approximately 800 people (in 2003). Dunkin Donuts consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Dunkin Donuts's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	L	**M**	**M**	**H**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = L			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	208.96
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	96.11
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	96.11
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = H			
% Soil Organic Matter	0.21	% Impervious Surface, 1995	54.3
		% Commercial/Industrial Land Use, 1995	45.81
		Sq. Mi. of Urban Land Use, 1995	0.07
		Density of SWL, USTs, and KCSL	27.9
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	27.9
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	595.21
% Soil Clay	13.23	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	3.12	% Urban Land Use, 1970	95.4
Conceptual % Soil Organic Matter	0.21	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	147.47
		Length of railroads	0
		Population Density	702.02
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	83.4
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	83.4
Conceptual Soil Hydraulic Conductivity	3.12	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.23	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.21	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

West Milford Township Police Athletic League

1615430

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

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Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

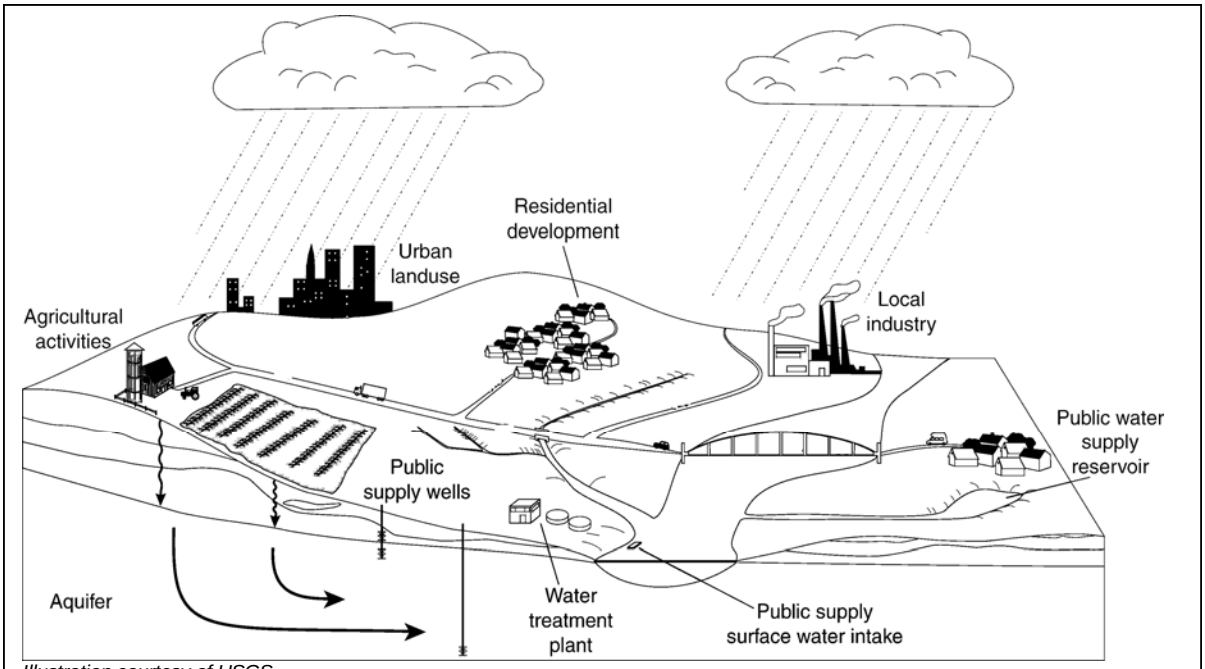

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for West Milford Township Police Athletic League

West Milford Township Police Athletic League (PWID 1615430) at 1 Pal Drive, West Milford, NJ, is a public noncommunity water system that serves approximately 500 people (in 2003). West Milford Township Police Athletic League consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for West Milford Township Police Athletic League's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	M	**L**	**L**	**L**	**L**	**L**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.08	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	68.61
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	489.95
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	20.6
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	20.6
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.72	% Impervious Surface, 1995	2.1
		% Commercial/Industrial Land Use, 1995	5.1
		Sq. Mi. of Urban Land Use, 1995	0.01
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	478.37
% Soil Clay	13.45	% Barren Land Use, 1995	7.4
Soil Hydraulic Conductivity	6.5	% Urban Land Use, 1970	0
Conceptual % Soil Organic Matter	0.72	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	448.86
		Length of railroads	0
		Population Density	464.78
Radionuclides Explanatory Variables – Source Rating = L			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	0
Conceptual Soil Hydraulic Conductivity	6.5	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	13.45	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	265.74
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.72	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.01
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Higgins Optical Building

1615431

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

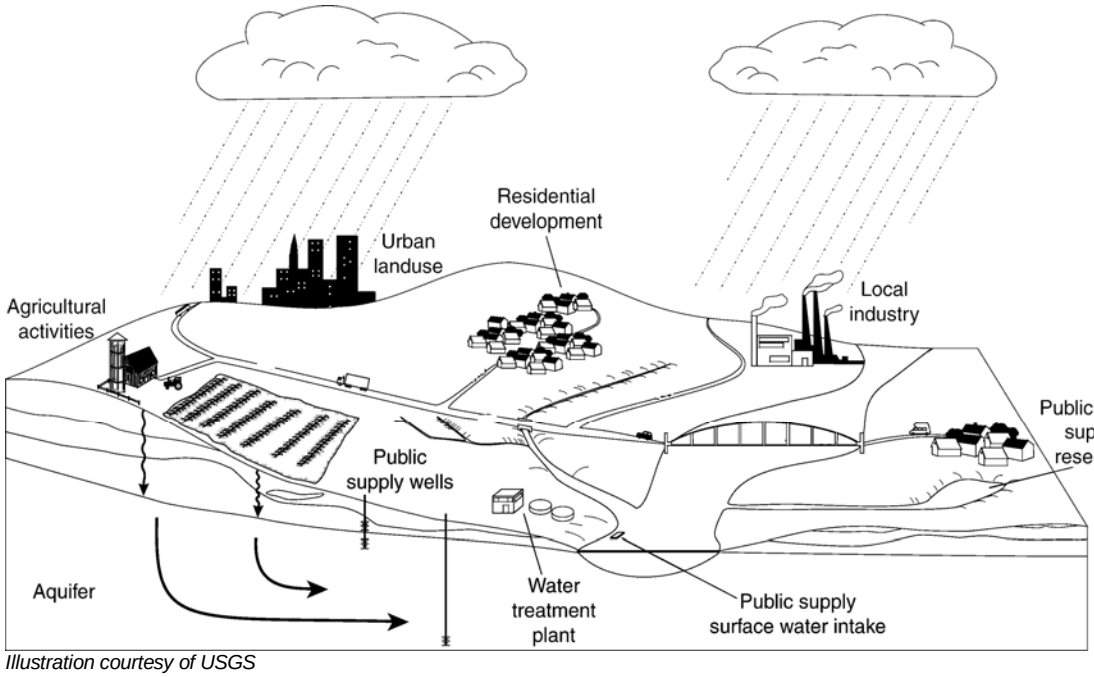

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

While government at the state and local levels can do their part, there are actions you and your neighbors can take now to help protect our precious and shared natural resource.

Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Higgins Optical Building

Higgins Optical Building (PWID 1615431) at 2850 Route 23 North, Newfoundland, NJ, is a public noncommunity water system that serves approximately 57 people (in 2003). Higgins Optical Building consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Higgins Optical Building's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	M	**L**	**L**	**L**	**L**	**M**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.06	Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval		Conceptual Septic Tank Density	45.89
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	285.6
Nutrients Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	38.78
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
Pesticides Explanatory Variables – Source Rating = L			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	38.78
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	0
		Distance to Agricultural Land Use, 1995	
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.28	% Impervious Surface, 1995	16.7
		% Commercial/Industrial Land Use, 1995	29.86
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	0
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	0
pH of water-quality sample		Distance to Agricultural Land Use, 1995	
Depth to Top of Open Interval	211	Population Density, Tier 1	131.05
% Soil Clay	6.22	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	65.67	% Urban Land Use, 1970	40.74
Conceptual % Soil Organic Matter	0.28	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	50.52
		Length of railroads	469.4
		Population Density	143.1
Radionuclides Explanatory Variables – Source Rating = M			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	72.17
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	
Conceptual Depth of Well	211	% Developed Land, Tier 1, 1995	72.1
Conceptual Soil Hydraulic Conductivity	65.67	% Agricultural Land Use, 1970	1.6
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	6.22	% Agricultural Land Use, 1995	0
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	300.32
Depth to Top of Open Interval	211		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.28	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0.02
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			

Evergreen Farms

1615433

Source Water Assessment Report

A State Assessment of Your Drinking Water Source's Vulnerability

As a requirement of the 1996 Amendments to the Federal Safe Drinking Water Act, New Jersey Department of Environmental Protection (DEP) performed a source water assessment of each source of public drinking water and determined each source's susceptibility to contamination. Susceptibility is a measure of the potential exposure of a drinking water source to contamination; actual (if any) contamination is not measured.

DEP, in conjunction with the United States Geological Survey (USGS), performed the following steps to determine the drinking water source's susceptibility.

- Identifying the area (known as the source water assessment area) that supplies water to your public drinking water system;
- Inventorying any significant potential sources of contamination in the area; and
- Analyzing how susceptible the drinking water source is to the potential sources of contamination.

DEP evaluated the susceptibility of all public water system sources to eight categories of contaminants.

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides**: Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to http://www.nj.gov/dep/rpp/radon/index.htm or call (800) 648-0394.
- **Disinfection Byproduct Precursors**: A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

To determine a source's susceptibility to these contaminants, the USGS, with DEP assistance, developed statistical models based on extensive analysis of existing well sample data and surface water intake data. The statistical models determined the relationship between environmental factors and the probability for contamination to occur. These models identified factors, such as land use or geology, found to be significantly "linked" to a public water system source's potential to become contaminated by one or more categories of contaminants. DEP and USGS looked at factors that might affect the quality of drinking water sources and separated them into two categories.

- How “sensitive” the water supply is to contamination. For example, a shallow well or surface water source, like a reservoir, would be more exposed to contamination from the surface or above ground than a confined well.
- How frequently a contaminant is used or exists near the source. This is known as “intensity of use.” For example, the number and/or types of activities (such as industry or agriculture) surrounding the source.

The specific sensitivity and intensity of use factors and their values within each source water assessment area for your source(s) are provided on page 7 of this report.

Using the susceptibility factors, the statistical models provided a numerical score for each source of drinking water for each contaminant category. These were then converted into high (H), medium (M), or low (L) susceptibility ratings.

The Safe Drinking Water Standards or Maximum Contaminant Levels (MCLs) were used to define the three susceptibility ratings (H, M, and L). These standards are developed based health effects, analytical and treatment factors on either acute or long-term impacts related to drinking water exposure. A low susceptibility rating means a potential contaminant level was predicted to be less than 10 percent of the MCL for that contaminant category. A medium rating means the potential contaminant level was predicted to be equal to or greater than 10 percent and less than 50 percent of the MCL. A high rating was assigned to those sources that were predicted to have potential contaminant levels equal to or greater than 50 percent of the MCL. Sources with high susceptibility ratings are still likely to have contaminant concentrations below the MCL.

The susceptibility ratings of your sources to each of the contaminant categories are provided on page 6 of this report.

Source Water Assessment Program Goals

The information obtained from the source water assessments may be used to achieve the following goals:

1. Protect sources of drinking water.

Source water protection focuses on preserving and protecting the public drinking water source. The source water assessment results may be used by DEP, purveyors, and local planning officials to lay the groundwork for advancing drinking water protection efforts. State and local agencies, as well as the regulated community, have made significant strides to protect the quality of our water resources. Major water quality improvements have been made as a result of water quality and drinking water standards and programs (both regulatory and nonregulatory) designed to ensure standards are met. Waste management and clean up programs have had success in controlling releases and ensuring actions are taken to achieve standards if releases occur. Recent measures to control non-point sources have expanded the DEP’s water quality protection programs by recognizing the link between land use change and water resource impacts. The Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets drinking water standards. In addition to these programs, major initiatives such as the Highlands Water Protection and Planning Act, Surface Water Quality Standards and Category One Designation, and Stormwater Management Rules have recently been accomplished. Despite this success, the DEP recognizes the ongoing importance of using new information such as that from the source water assessments to evaluate the need for additional protection measures of drinking water sources. The DEP is currently reviewing the source water assessments to identify any necessary additional source water protection measures.

2. Public education of SWAP information.
DEP incorporated public education throughout the development and implementation of the Source Water Assessment Program. During the source water assessment process, DEP met with interested parties, beginning with the development of the SWAP Plan, published articles, wrote two newsletters, and developed a SWAP web site. The SWAP web site contains information on the program, technical resources, frequently asked questions, source water assessment results, and links to additional sites of interest. Upon completion of the source water assessments, DEP generated a source water assessment report for each public water system to report the susceptibility ratings of public drinking water sources to potential contamination.

The goal of the public education efforts is to raise public awareness of the source of their drinking water and the potential contaminants that could impair the water's quality. To continue fulfilling the education goal, DEP will conduct training sessions following the release of the Source Water Assessment Reports.

3. Establish a customized monitoring schedule for each public water system.
The source water assessments will assist DEP in improving current monitoring requirements for individual public water systems. Currently, the Environmental Protection Agency (EPA) and the DEP have mandatory monitoring schedules that depend on a variety of factors that can include the source of the water (ground water or surface water) and the surrounding land use. These schedules may be customized based on the susceptibility of the sources of drinking water.

Where does drinking water come from?

There are two basic sources of drinking water: ground water and surface water.

Ground water is water found beneath the Earth's surface. Ground water comes from rain and snow seeping into rock and soil. Ground water is stored in underground areas called aquifers. Aquifers supply wells and springs. Wells in New Jersey range from about 15 feet to 2,000 feet deep.

Surface water is the water naturally open to the atmosphere, such as rivers, lakes, streams and reservoirs. Precipitation that does not infiltrate the ground or evaporate into the sky runs off into surface water bodies.

Ground water can seep into a stream, river or other surface water body, recharging surface water bodies. Likewise, under some circumstances, surface water can seep into an adjacent aquifer.

A water system obtains its water from 1) wells drilled into the ground that pump out ground water; 2) devices called surface water intakes placed on a river, stream, or reservoir; or 3) both.

What factors may affect the quality of your drinking water source?

A variety of conditions and activities may affect the quality of drinking water source. These include geology (rock and soil types); depth of a well or location of a surface water intake; how the land surrounding the source is used (for industry, agriculture or development); the use of pesticides and fertilizers; and the presence of contaminated sites, leaking underground storage tanks, and landfills. Please refer to pages 6 and 7 of this report for specific potential contaminant source information.

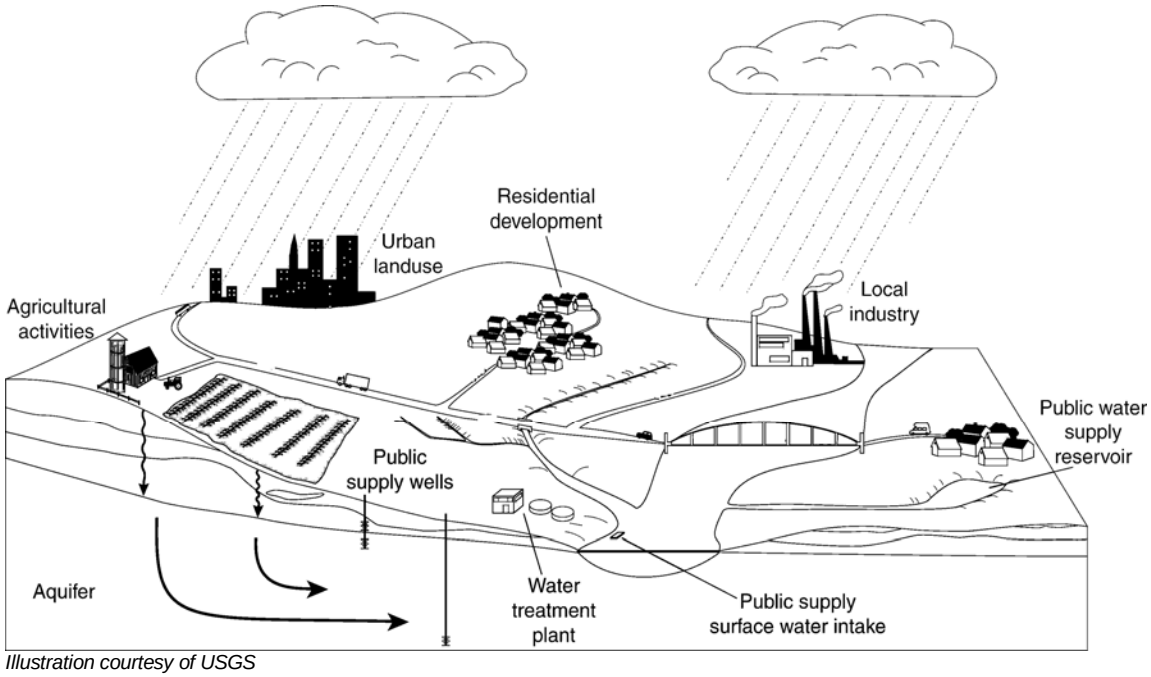

Illustration courtesy of USGS

What steps are being taken now to ensure my drinking water quality?

The DEP has numerous programs in place to maintain and protect the quality of our State's water resources. For example, the Safe Drinking Water Program is designed to ensure that water delivered for human consumption meets DEP's stringent health-based drinking water standards. Additionally, DEP has permitting, waste management, and clean up programs in place to avoid and control potential contamination. Key DEP drinking water protection initiatives will be phased-in over time in source water assessment areas to advance existing program protections.

What can you and others do to help?

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Here's just a few ways you and others can help ensure clean and plentiful water for New Jersey – now and in the future. Join us today for a clean water future.

- Dispose of waste properly. Some materials such as motor oil, paint, flea collars, and household cleaners have the potential to contaminate source water. Contact your local Department of Public Works for proper household hazardous waste disposal.
- Limit your use of fertilizer, pesticides, and herbicides.

Here are some actions that municipal and county officials/local and county planners can take and you can help encourage and support.

- Manage and work with owners of existing potential contaminant sources to minimize potential contamination.
- Establish regulations prohibiting or restricting certain activities or land uses within the source water assessment area. Take appropriate enforcement action when necessary.
- Update municipal master plans to ensure greater protection.
- Purchase lands or create conservation easements within the source water assessment area.

Specific Source Water Assessment Information for Evergreen Farms

Evergreen Farms (PWID 1615433) at 1750 Union Valley Road, West Milford Twp., NJ, is a public noncommunity water system that serves approximately 75 people (in 2003). Evergreen Farms consists of 1 active well(s) and 0 surface water intake(s).

Susceptibility Ratings

Table 1 below illustrates the percentage of noncommunity water system sources in New Jersey that rated high, medium, and low for each of the eight contaminant categories. This table is separated by source type: ground water and surface water. Table 2 illustrates the susceptibility ratings for **each source in your system** to each of the contaminant categories.

For the purpose of the Source Water Assessment Program, radionuclides were considered more of a ground water concern than a surface water issue. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating. DEP considered all surface water highly susceptible to pathogens; therefore all intakes received a high rating for the pathogen category.

Table 1: Summary of Statewide Susceptibility Ratings for Noncommunity Water System Sources (Percent)

	Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
Ground Water 3480 Total Wells								
High	2	0	0	32	19	69	17	3
Medium	18	66	66	0	42	28	72	97
Low	80	34	34	68	39	3	11	0
Surface Water 3 Total Intakes								
High	100	33	0	0	100	0	0	100
Medium	0	67	67	33	0	0	0	0
Low	0	0	33	67	0	100	100	0

Statewide, 85 percent of the noncommunity water system sources (ground water and surface water) rated high for at least one of the contaminant categories.

For surface water, the three contaminant categories in which all of the noncommunity water system surface water intakes (three total) received a high susceptibility rating were inorganics, disinfection byproduct precursors, and pathogens (all assumed to be highly susceptible to pathogens).

For ground water, the three contaminant categories in which the highest percentage of sources received a high susceptibility rating are radionuclides (69%), volatile organic compounds (32%), and inorganics (19%).

Table 2: Susceptibility Ratings for Evergreen Farms's Sources

Sources	Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radionuclides	Radon	Disinfection Byproduct Precursors
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
	M	**M**	**M**	**L**	**L**	**H**	**M**	**M**

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels.

Which Sensitivity and Intensity Factors Determine a Source's Susceptibility?

The susceptibility models determined source water susceptibility is based on the well or intake's location and sensitivity and intensity factors (also known as explanatory variables). An explanatory variable can be used to predict the presence of or the potential presence of a contaminant in ground water or surface water.

Some explanatory variables are considered conceptual. A conceptual variable is one that has been shown in a previous scientific investigation to be related to, or is expected to have an effect on, the concentrations of a constituent. Conceptual variables that did not produce significant univariate statistical relations may however, produce a significant relation when used with other variables in multivariate statistical tests.

The following page contains an Individual Explanatory Variable Inventory, which provides the values of each explanatory variable within your source water assessment area. **This is not the entire potential contaminant source inventory for this system's source(s)**.

If the variable value is shown as zero, then attributes or land activities are not present in the source water assessment area. If a value is not shown, this represents either unavailable data, or in the case of "Distance to" variables land activities of that type are not present in the source water assessment area.

This information, used in conjunction with USGS's susceptibility rating scheme, calculates the susceptibility rating for each source to each contaminant category. If you are interested in USGS's rating schemes please refer to the "Contaminant Category Scoring System for Noncommunity Water Systems Appendix A – Attachment 2" available in the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County or on the Source Water Assessment Program website at http://www.state.nj.us/dep/swap/.

Following the Individual Explanatory Variable Inventory for your system is a source water assessment map illustrating the source water assessment areas for systems with in West Milford Twp.

For more information please refer to the Noncommunity Source Water Assessment Report for West Milford Twp, Passaic County, available on the Source Water Assessment Program website. You may also contact the Bureau of Safe Drinking Water at 609-292-5550.

Individual Explanatory Variable Groundwater Susceptibility Models			
Source: Status: P **Source Type:** G			
Sensitivity Variable Inventory		**Intensity Variable Inventory**	
Pathogens Explanatory Variables - Source Rating = M			
Conceptual-Soil Available Water Capacity	0.1	Distance to Agricultural Land Use, 1995	0
Depth to Top of Open Interval		Conceptual Septic Tank Density	301.66
Conceptual - GWUDI		Conceptual – Presence of Streams, Tier 1	0
Nutrients Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	28.79
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	32.6
Pesticides Explanatory Variables – Source Rating = M			
Conceptual – Depth to Top of Open Interval		% Urban Land Use, 1995	28.79
Conceptual – Length of Open Interval		% Agricultural Land Use, 1986	32.6
		Distance to Agricultural Land Use, 1995	0
		Conceptual – Distance to golf course	
VOCs Explanatory Variables – Source Rating = L			
% Soil Organic Matter	0.7	% Impervious Surface, 1995	3.4
		% Commercial/Industrial Land Use, 1995	1.1
		Sq. Mi. of Urban Land Use, 1995	0.03
		Density of SWL, USTs, and KCSL	10.7
Inorganics Explanatory Variables – Source Rating = L			
Dissolved Oxygen of water-quality sample		Density of KCSL, SWL, NJPDES GW/SW/Storm, Compost Facilities, SWRRF, SWTF200011, Class B Recycling, DPCC, UST	10.7
pH of water-quality sample		Distance to Agricultural Land Use, 1995	0
Depth to Top of Open Interval	162	Population Density, Tier 1	1059.03
% Soil Clay	9.23	% Barren Land Use, 1995	0
Soil Hydraulic Conductivity	47.2	% Urban Land Use, 1970	42.6
Conceptual % Soil Organic Matter	0.7	Distance to STP	
Physiographic Province	NEW ENGLAND	STP Density	0
		Distance to DOT roads	28.2
		Length of railroads	0
		Population Density	945.01
Radionuclides Explanatory Variables – Source Rating = H			
pH of water-quality sample		% Urban Land Use, Tier 1, 1995	28.63
Physiographic Province	NEW ENGLAND	Conceptual Distance to Agricultural Land Use, 1995	0
Conceptual Depth of Well	162	% Developed Land, Tier 1, 1995	93.2
Conceptual Soil Hydraulic Conductivity	47.2	% Agricultural Land Use, 1970	0
Radon Explanatory Variables – Source Rating = M			
Conceptual % Soil Clay	9.23	% Agricultural Land Use, 1995	32.6
Physiographic Province	NEW ENGLAND	Conceptual Distance to Wetlands Land Use, 1995	635.35
Depth to Top of Open Interval	162		
DBPs Explanatory Variables – Source Rating = M			
Conceptual – % Soil Organic Matter	0.7	Conceptual – Sq. Mi. of Wetlands Land Use, 1995	0
Conceptual NJGS Hydrologic Unit (aquifer)		Number of NJPDES SW/GW/Storm, Compost, SWWRF, SWTF200011, Class B Recycling, and DPCC	0
pH of water-quality sample			