

A photograph of a person in waders and a hat, using a net to sample water in a river. The river is surrounded by dense green trees and vegetation. The water is turbulent, creating white foam. In the background, a small bridge is visible through the trees.

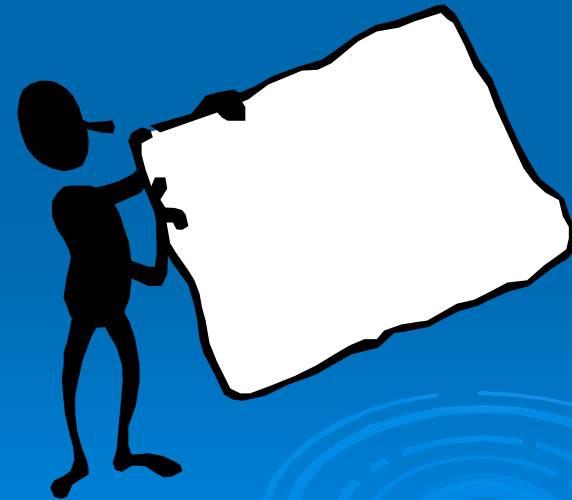
2010 Draft Integrated Water Quality Assessment

November 16, 2010

New Jersey Dept. of Environmental Protection
Water Monitoring and Standards
Bureau of Water Quality Standards and Assessment
PO Box 409
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www.nj.gov/dep/wms/bwqsa/

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Why Do We Assess Water Quality?

➤ Required under federal and state statutes:

- Section 305(b) of Federal Clean Water Act
- Section 303(d) of Federal Clean Water Act
- Water Quality Planning Act (N.J.S.A. 59:11A)

➤ Necessary to determine appropriate regulatory, preventive, and restorative actions:

- Permits
- Enforcement
- Research
- Funding (e.g., 319 grants for restoration)

“Water is the spring of life. It nurtures our bodies. It sustains our most precious natural resources.”



Integrated Water Quality Assessment

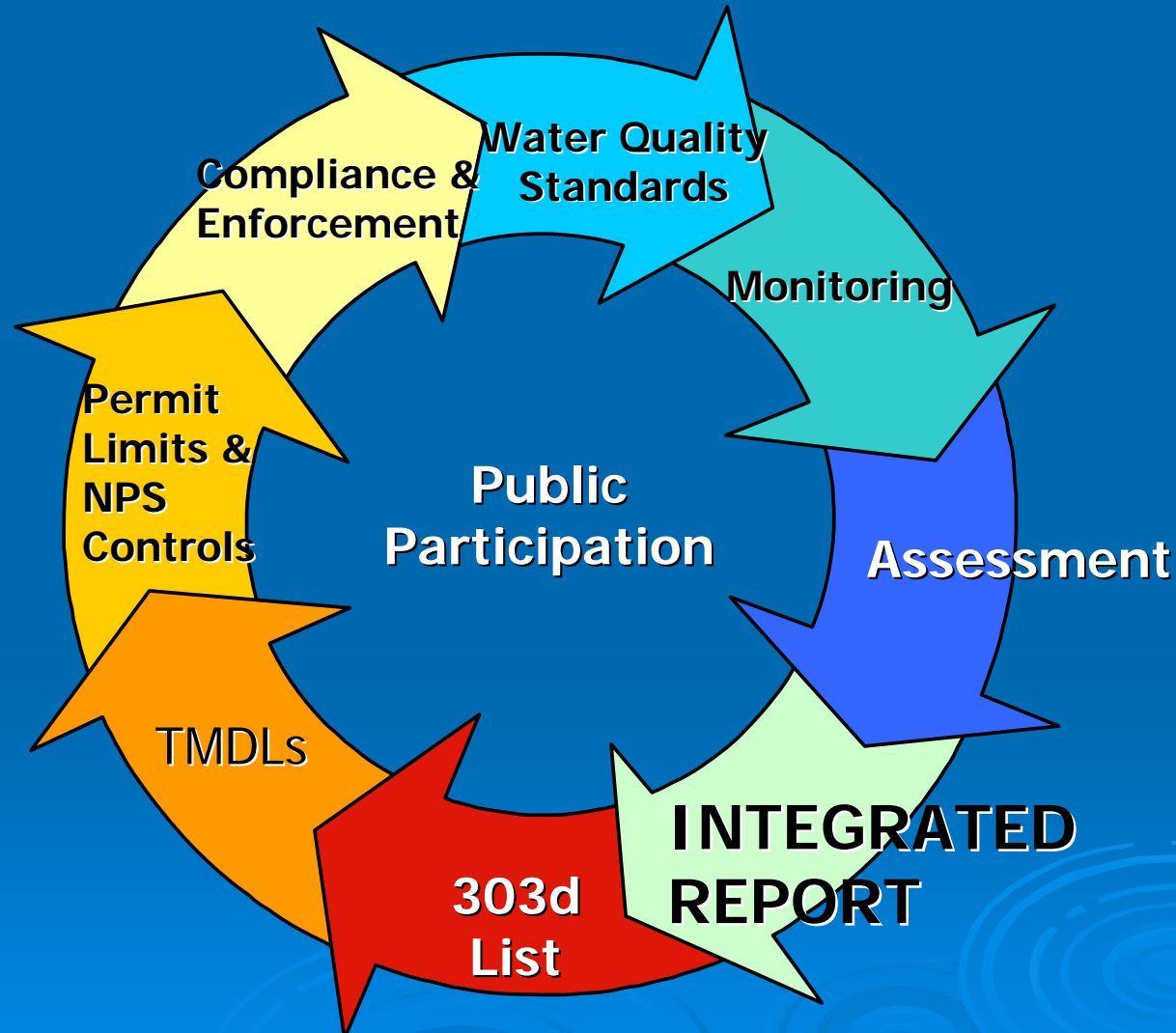
Statewide Water
Quality Report
(305(b) Report)

**Integrated
Assessment**

NJ - Since 2002

List of Water
Quality Limited
Waters
(303(d) List)

Role of Water Quality Assessment in Water Resource Management



How Do We Assess Water Quality?

- Compare Data Results to Surface Water Quality Standards (SWQS)
 - Develop Scientific Methods for Sample Collection and Data Analysis
 - Collect and Compile Water Quality Data
 - Evaluate Data Quality
- Evaluate Data Trends:
 - Improving or declining water quality
 - Threatened Waters



How Do We Assess Water Quality?

(cont'd)

➤ Surface Water Quality Standards

- Surface Water Classifications
- Designated Uses
- Surface Water Quality Criteria
 - Numeric Criteria
 - Narrative Criteria (and Translators)
- Policies, including:
 - Technical
 - Nutrients
 - Antidegradation



Use Designations and Waterbody Classifications

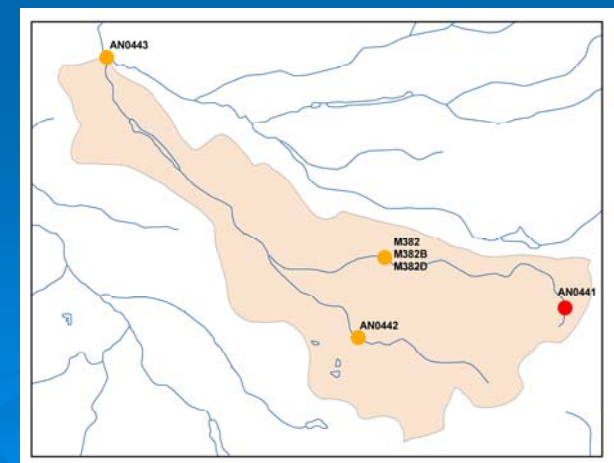
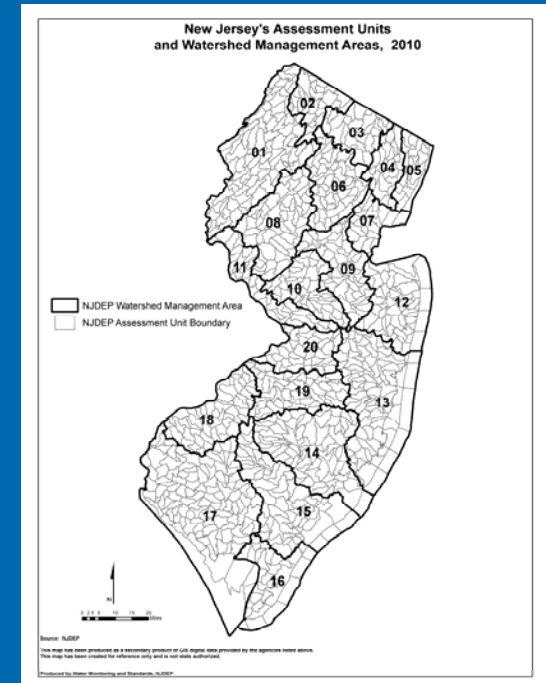
- Drinking Water Supply: FW2, PL
- Recreation:
 - Primary Contact: FW1&2, PL, SC, SE1)
 - Secondary Contact: SE2 and SE3)
- Aquatic Life:
 - General: All Waters (FW 1 & 2, PL, SC, SE1, 2 & 3)
 - Trout: FW1&2
- Shellfish Harvest for Consumption: SC, SE1
- Fish Consumption: All Waters (FW 1 & 2, PL, SC, SE1, 2 & 3)

How Do We Assess All Waters of the State?

- Data From Over 5,000 Monitoring Stations:
- Agency-conducted (DEP and/or USGS) Monitoring Programs
 - Statewide, Regional, and Waterbody-specific
 - Chemical/physical Water Quality
 - Biological (macroinvertebrates, fish tissue)
- External Monitoring and Data Sources
 - USEPA, USGS
 - Counties
 - Volunteers and Other Monitoring Partners
 - Regulated Community (wastewater and water supply)

How Do We Assess All Waters of the State? (cont'd)

- Establishment of Assessment Unit Scale and Boundaries
 - USGS HUC 14 Subwatersheds (revised January 2009): 960 Assessment Units
- Extrapolation of Station Data Results to Entire Assessment Unit



New for 2010

- Data submitted electronically via NJ Water Quality Data Exchange System (WQDE)
- Assessment results stored in and reported via USEPA Assessment Database (ADB)
- New Format for Integrated List of Waters
- New HUC 14 Boundaries
- New SWQS criteria and/or assessment methods for:
 - Nutrients
 - Temperature
 - pH
 - Fish Consumption (fish tissue)

NJ Water Quality Data Exchange System (WQDE)

- Data computation program requires unified format for all data types
- Similar data types must be combined (e.g. all biological data together)
- Data must be in a common format (e.g., metals reported as either Total, Total Recoverable, or Dissolved)

Old Format of Integrated List (“Appendix A”)

Assessment Unit ID	Assessment Unit Name	Aquatic Life (general)	Aquatic Life (trout)	Recreation	Drinking Water Supply	Agricultural Water Supply	Industrial Water Supply	Shellfish Harvest	Fish Consumption
02040302020030-01	Absecon Creek (AC Reservoirs) (gage to SB)	Sublist 2	N/A	Sublist 2	Sublist 5	Sublist 2	Sublist 3	N/A	Sublist 5
02040302020040-01	Absecon Creek (below gage)	Sublist 5	N/A	Sublist 3	N/A	N/A	N/A	Sublist 2	Sublist 5
02040302020010-01	Absecon Creek NB	Sublist 5	N/A	Sublist 3	Sublist 3	Sublist 3	N/A	N/A	Sublist 5
02040302020020-01	Absecon Creek SB	Sublist 2	N/A	Sublist 2	Sublist 5	Sublist 2	N/A	N/A	Sublist 5
02040301160110-01	Albertson Brook / Gun Branch	Sublist 5	N/A	Sublist 3	Sublist 2	Sublist 2	N/A	N/A	Sublist 3
02040105210010-01	Alexauken Creek (above 74d 55m)	Sublist 2	Sublist 5	Sublist 3	Sublist 2	Sublist 2	Sublist 2	N/A	Sublist 3
02040105210020-01	Alexauken Creek (below 74d 55m to 11BA06)	Sublist 2	Sublist 5	Sublist 3	Sublist 2	Sublist 2	Sublist 2	N/A	Sublist 3
02040206060020-01	Alloway Creek (above Alloway-Woodstown Rd)	Sublist 5	N/A	Sublist 3	Sublist 5	Sublist 2	Sublist 5	N/A	Sublist 3
02040206060090-01	Alloway Creek (below Hancocks Bridge to Salem R)	Sublist 2	N/A	Sublist 3	N/A	N/A	N/A	Sublist 2	Sublist 5
02040206060080-01	Alloway Creek (Hancocks Bridge to New Bridge)	Sublist 2	N/A	Sublist 3	N/A	N/A	N/A	Sublist 2	Sublist 5

New Format: "Status of Designated Uses by Subwatershed"

Assessment Unit Summary List

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Assessment Unit Summary List

State: NJ		10/15/2010		Cycle: 2010		
02020007000010						
AU ID	AU Name	Water Type	Size	Location Description		
NJ02020007000010-01	Rutgers Creek tribs	RIVER	11.55445 MILES	HUC14: 02020007000010		
Use	Attainment	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural Water Supply	Insufficient Information	N				
Aquatic Life	Insufficient Information	N				
Fish Consumption	Insufficient Information	N				
Industrial Water Supply	Insufficient Information	N				
Primary Contact Recreation	Insufficient Information	N				
Public Water Supply	Insufficient Information	N				
02020007010010						
AU ID	AU Name	Water Type	Size	Location Description		
NJ02020007010010-01	Walkkill R/Lake Mohawk(above Sparta Sta)	FRESHWATER LAKE	828.944491 ACRES	01367625Walkill A		
		RIVER	19.047587 MILES			
Use	Attainment	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural Water Supply	Fully Supporting	N				• Urban Runoff/Storm Sewers
Aquatic Life	Fully Supporting	N				
Aquatic Life - Trout	Fully Supporting	N				
Fish Consumption	Insufficient Information	N				
Industrial Water Supply	Fully Supporting	N				
Primary Contact Recreation	Not Supporting	N	Fecal Coliform	2006	Completed	

2010 Status of Designated Uses by Subwatershed

- Replaces Integrated List of Waters (305(b) report)
- New ADB Report Format
- Individual Assessment Unit Summary:
 - Use assessment results for all applicable uses
 - Pollutant causing non-support for each use
 - Cycle first listed (for each pollutant cause)
 - TMDL Status
 - Source of pollutant cause (if known)

2010 Status of Designated Uses by Subwatershed

Assessment Unit ID

Assessment Unit Name

Publication Date of Draft Report

Year that report was submitted to USEPA

Assessment Unit Summary List

State: NJ		10/15/2010		Cycle: 2010	
02020007000010					
AU ID	AU Name	Water Type	Size	Location Description	
NJ02020007000010-01	Rutgers Creek tribs	RIVER	11.55445 MILES	HUC14: 02020007000010	
Designation	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural Water Supply	Insufficient Information	N			
Aquatic Life	Insufficient Information	N			

2010 Status of Designated Uses by Subwatershed

Use Assessment Results

Waterbody Information

02020007010020						
AU ID	AU Name	Water Type	Size	Location Description		
NJ02020007010020-01	Wallkill R (Ogdensburg to SpartaStation)	FRESHWATER LAKE	105.93483 ACRES	01367625Wallkill A		
		RIVER	20.661804 MILES			
Use	Attainment	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural Water Supply	Fully Supporting	N				<ul style="list-style-type: none"> Upstream Impoundments (e.g., PI-566 NRCS Structures) Urban Runoff/Storm Sewers
Aquatic Life	Not Supporting	N	Cause Unknown	2007		
Aquatic Life - Trout	Not Supporting	N	Temperature, water	2006		
Fish Consumption	Insufficient Information	N				
Industrial Water Supply	Fully Supporting	N				
Primary Contact Recreation	Not Supporting	N	Fecal Coliform	2006	Completed	
Public Water Supply	Fully Supporting	N				

2010 Status of Designated Uses by Subwatershed

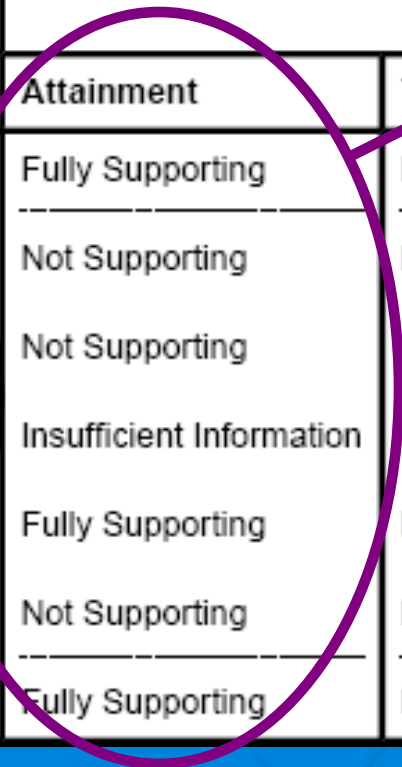
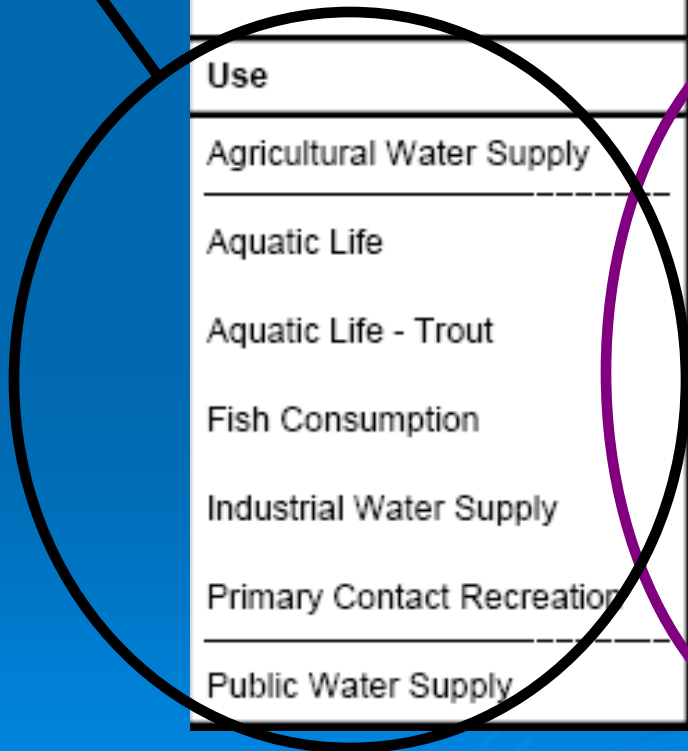
Applicable Designated Uses

Use Assessment Results:

“Fully Supporting”

“Not Supporting”

“Insufficient Information”
(Not Assessed)



AU ID	AU Name	
NJ02020007010020-01	Walkill R (Ogdensburg to SpartaStation)	
Use	Attainment	Threatened
Agricultural Water Supply	Fully Supporting	N
Aquatic Life	Not Supporting	N
Aquatic Life - Trout	Not Supporting	N
Fish Consumption	Insufficient Information	N
Industrial Water Supply	Fully Supporting	N
Primary Contact Recreation	Not Supporting	N
Public Water Supply	Fully Supporting	N

2010 Status of Designated Uses by Subwatershed

Parameter(s)
causing non-support
of the associated use

First time on
303(d) List

If delisted
for TMDL:

Potential
source of
parameter(s) ,
if known

Water Type	Size	Location	
FRESHWATER	105.9353 MILES	0136762	
RIVER	20.661804 MILES		
Cause	Cycle First Listed	TMDL Status	Source
Cause Unknown	2007		<ul style="list-style-type: none"> ● Upstream Impoundments (e.g., PI-566 NRCS Structures) ● Urban Runoff/Storm Sewers
Temperature, water	2006		
Fecal Coliform	2006	Completed	

First Use of Nutrient Impact Assessment

- New assessment method to evaluate nutrient impairment of wadeable streams
- Based on response indicators using a “weight of evidence” approach to determine if phosphorus is the cause of aquatic life use impairment.
- Requires biological and continuous monitoring data collected during the same summer season
- If this data is not available, assessment is based on compliance with the existing numeric SWQS criteria for phosphorus.

New Jersey's Nutrient Criteria

- Two Components:
 - Narrative Component
 - Numeric Component
- Prior assessments prioritized numeric criterion over narrative and focused on in-stream total phosphorus concentrations
 - Narrative nutrient policies not always evaluated
 - Exceedance of the numeric criterion = Aquatic Life Use Not Supported

New Nutrient Assessment Methods

- Now Based Using Multiple Line Of Evidence
- Both Physical/Chemical and Biological Data Required
 - Biological index (macroinvertebrates)
 - Dissolved Oxygen
 - Evaluated against SWQS criteria (minimum DO level)
 - Diurnal DO flux (>3mg/l indicative of photosynthesis)
 - Periphyton Chlorophyll *a* data (seasonal average)

New Response Thresholds

- Diurnal DO Swing > 3mg/l
 - Indicator of Photosynthetic Activity
- Periphyton Chlorophyll *a* (seasonal average)
 - Indicator of Primary Productivity
- Not New SWQS Criteria!!!

New Data Requirements

- DO data needs to be continuous and collected in same year as biological data
- DO, biological & Chl *a* data **MUST ALL BE CO-LOCATED**, spatially & in time.
- Lack of sufficient co-location currently limits the data available for the new assessment method

New Assessment Method Outcomes

No Biological Impairment:

Scenario 1:

- TP exceeds numeric SWQS criterion
- DO meets SWQS criterion
 - Narrative nutrient criteria are met
 - Aquatic Life Use is fully supported
 - Phosphorus is not placed on the 2010 303(d) List

Scenario 2: Same as 1 except DO exceeds criteria:

- Aquatic Life Use is Not Supported; DO is the cause
- DO (not TP) is placed on the 303(d) List (unless it is determined to be a transient or natural condition)

Biology is Impaired

Dissolved Oxygen:	Assessment Outcome:
No exceedances of criteria; No excessive swing (≤ 3 mg/l)	<ul style="list-style-type: none"> • Total Phosphorus (TP) not a cause • Place “Cause Unknown” on 303(d)
No exceedances of criteria; Excessive swing present (> 3 mg/l)	<ul style="list-style-type: none"> • Inconclusive → Evaluate periphyton Chlorophyll <i>a</i> • If Seasonal avg. > 150 mg/sq. meter: <ul style="list-style-type: none"> • TP confirmed as cause • Place/retain TP on 303(d)
Exceedances of criteria; No excessive swing	<ul style="list-style-type: none"> • TP not a cause; • Place DO on 303(d)
Exceedances of criteria; Excessive swing present	<ul style="list-style-type: none"> • TP confirmed as cause • Place/retain TP on 303(d)

Nutrient Assessment Results for 2010

- Applied new assessment method to 37 assessment units (AUs)
 - On 2008 303(d) List for TP
 - Both macroinvertebrate and DO data were available
- 3 were inconclusive and required Chl *a* evaluation.
- 4 proposed for delisting* based on the new method

*Freshwaters previously assessed as not supporting the aquatic life use based on exceedances of the numeric phosphorus criteria are delisted only if sufficient data is available which shows that the narrative nutrient criteria are met for the entire assessment unit (HUC 14).

New Fish Consumption Use Assessment Method

- New fish tissue threshold for mercury.
- Threshold changed from 0.08 ppm to 0.18 ppm as tissue concentration of methyl mercury to account for “natural environment” sources that cannot be controlled or reduced.
- Threshold established as water quality target in Statewide Mercury TMDL.
- Three assessment units (HUC 14s) were delisted for meeting the new mercury target. Others were delisted because the TMDL was adopted (moved to Sublist 4A).

Mercury Target for TMDL

Advisories For High Risk Population

Mercury Concentration In Fish Tissue (x):	Fish Consumption Advisory:
$x > 0.54 \mu\text{g/g}$ (ppm)	Do Not Eat
$0.54 > x > 0.18 \mu\text{g/g}$ (ppm)	One Meal Per Month
$0.18 > x > 0.08 \mu\text{g/g}$ (ppm)	One Meal Per Week
$x < 0.08 \mu\text{g/g}$ (ppm)	Unlimited Consumption*

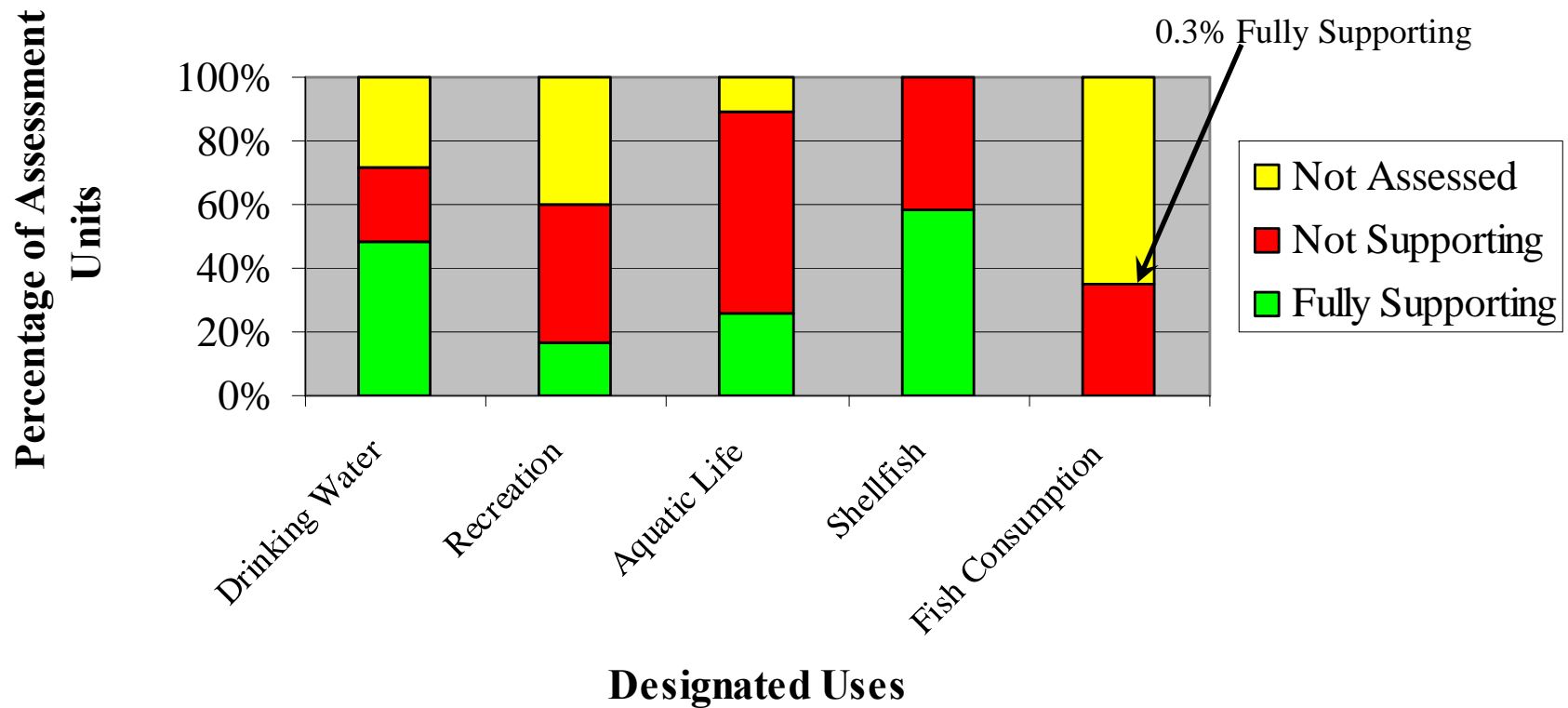
*USEPA criterion for unlimited consumption for general population is 0.34 ug/g (ppm)

Draft 2010 Water Quality Assessment Results



2010 Draft Use Assessment Results

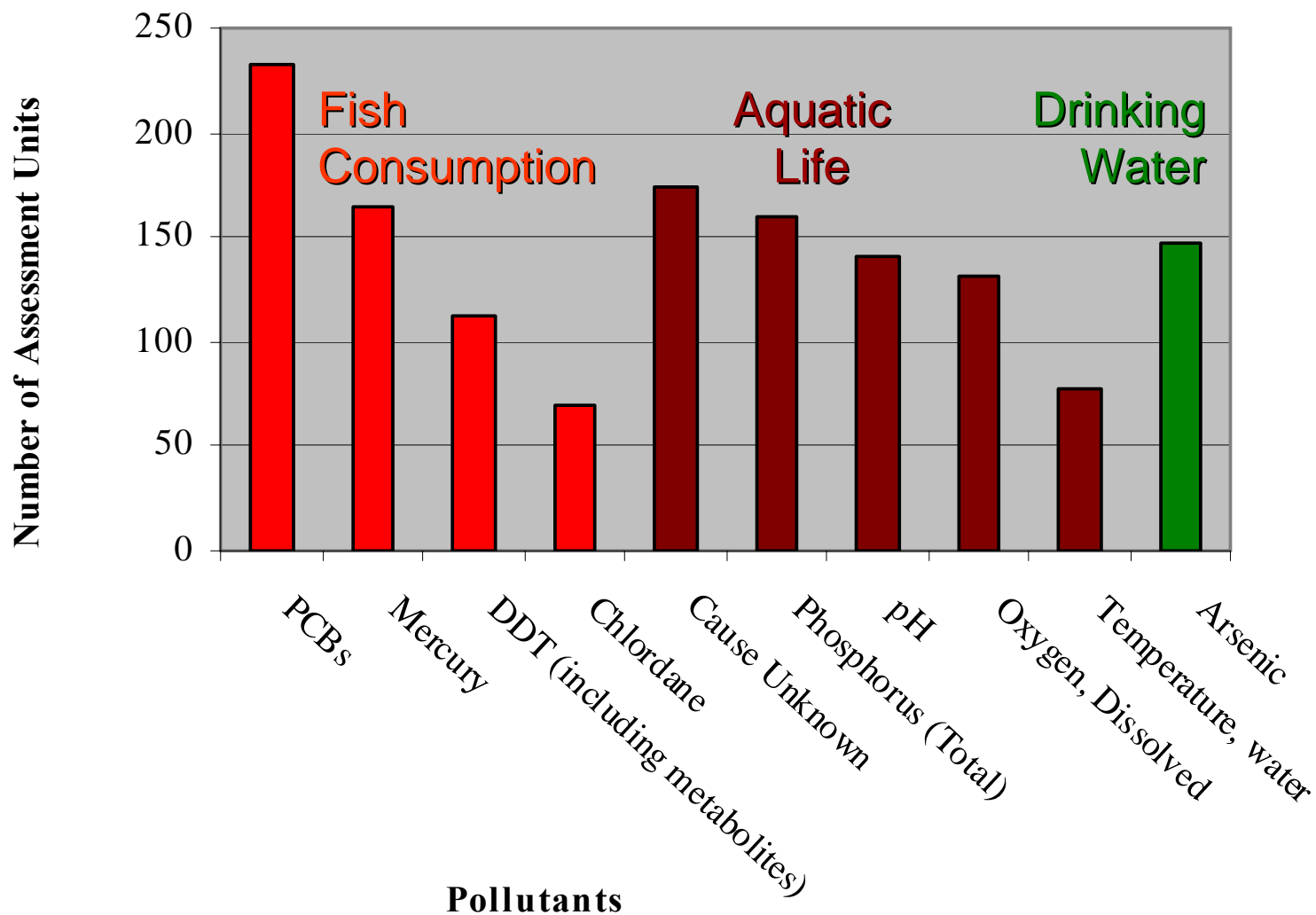
Figure 1: Draft Use Assessment Results 2010



2010 303(d) List

- This regulatory component of the Integrated Report:
 - Identifies AUs that do not support designated uses along with the pollutant cause and priority ranking for TMDL development
- 38 pollutants and 1848 AU/pollutant combinations
 - 53 new listings (on 2010 List but not 2008)
 - 235 delistings (on 2008 List but not 2010)
 - 182 net decrease in 303(d) Listings from 2008

Draft Top Ten Pollutants on The 2010 303(d) List



Cause Unknown

- Aquatic Life Uses may be impaired due to factors other than chemical pollutants, e.g., erosion and loss of habitat
- When biological data indicate impairment but chemical data is not available or does not demonstrate exceedance of numeric criteria = Cause Unknown
- Additional study is needed to determine the cause of aquatic life use non-attainment where a specific pollutant is not identified.

What Does This Mean To Me?



Use Assessment Results

➤ Drinking Water Supply:

- 49% fully supporting
- 23% not supporting*
- 29% insufficient info

*Most of the waters that do not support this use do not contain potable water intakes and are not used for drinking water purposes.



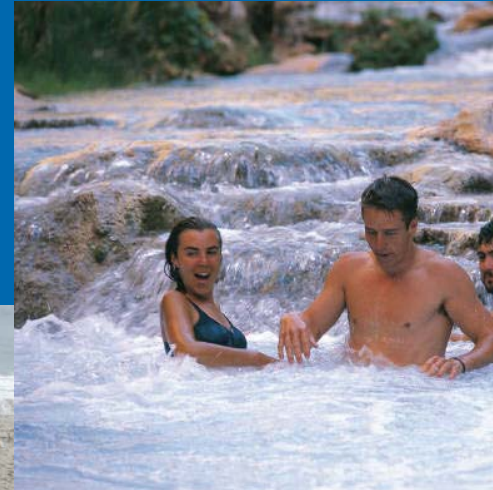
Use Assessment Results

➤ Recreation:

- 17% fully supporting*
- 43% not supporting**
- 40% insufficient info

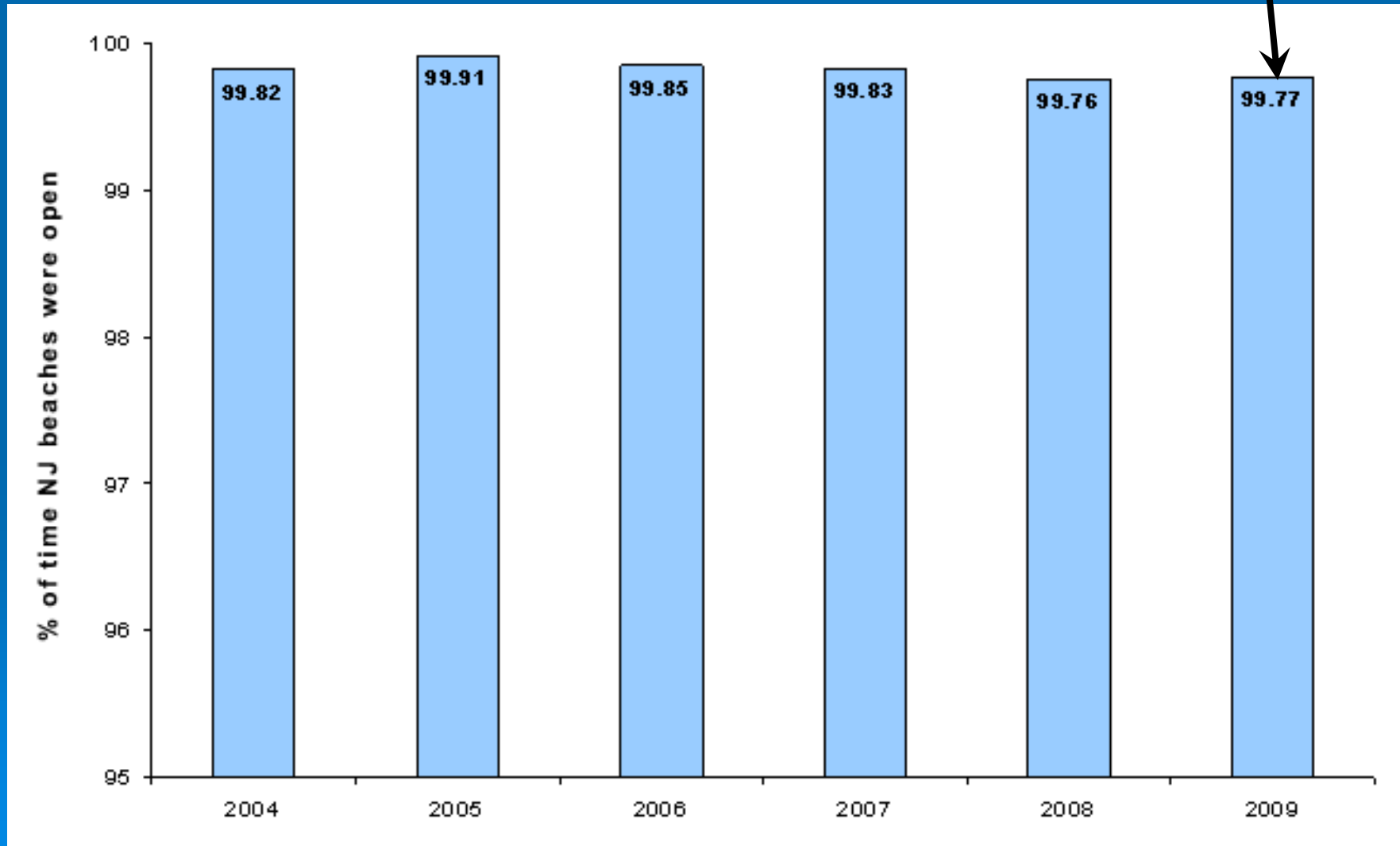
*Over 99% of ocean beaches are fully swimmable.

**TMDLs have been completed for 80% of waters impaired for pathogens (fecal coliform, *E. Coli*).



Beaches Open 2004-2009

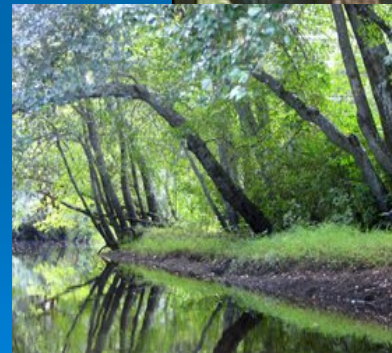
**99.77%
open**



Use Assessment Results

➤ Aquatic Life (including trout):

- 26% fully supporting
- 63% not supporting
- 11% insufficient info



Use Assessment Results

➤ Shellfish Harvest for Consumption

- 58% fully supporting*
- 42% not supporting**

*Only waters classified as “Approved, no restrictions” are considered by USEPA to fully support the use.

**TMDLs have been developed for 75% of shellfish waters not supporting the use

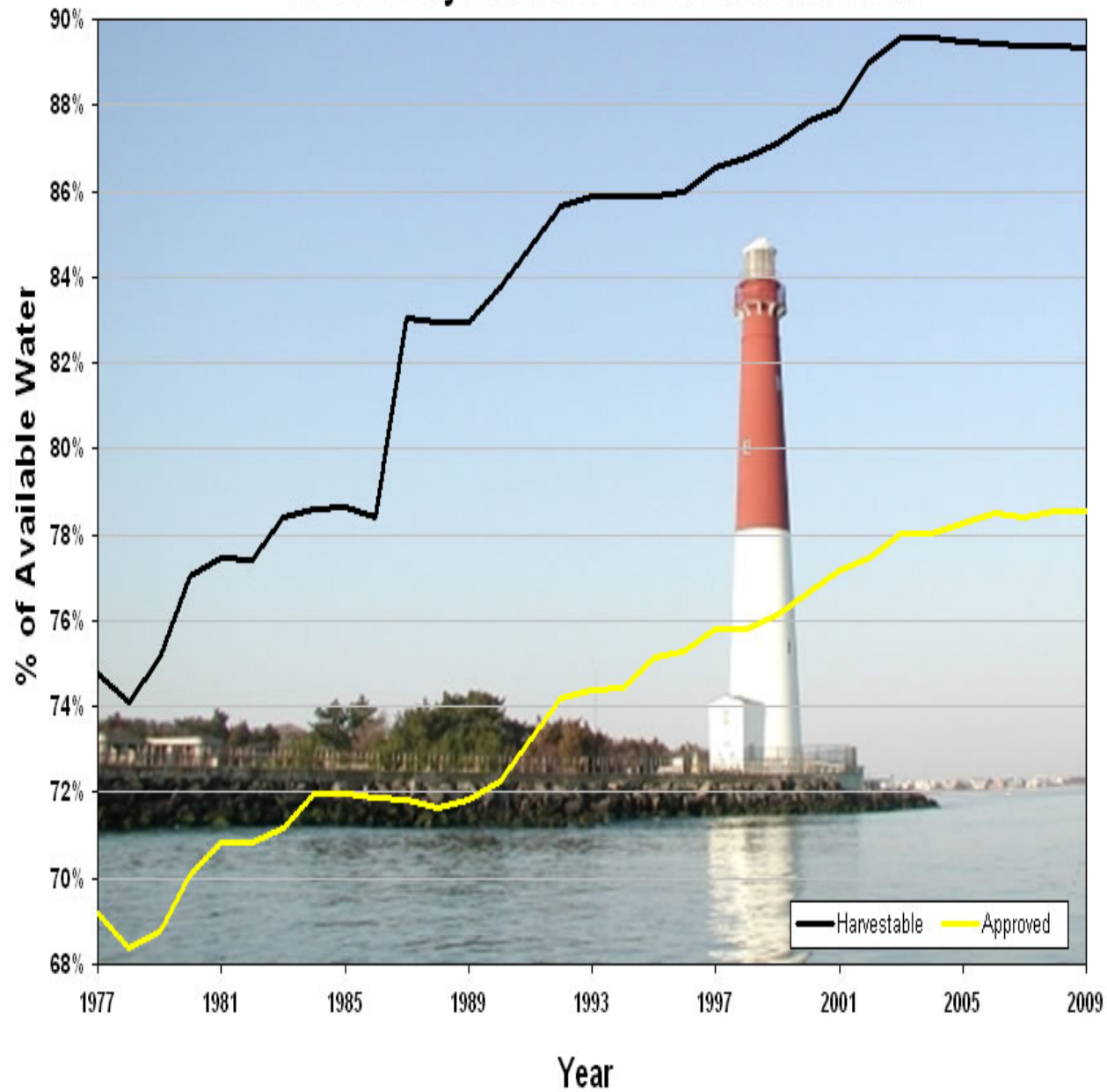


Harvestable (90%)

Shellfish Classifications:

- Approved (80%)
- Seasonal harvest
- Special restrictions
- Prohibited

New Jersey Shellfish Water Classifications

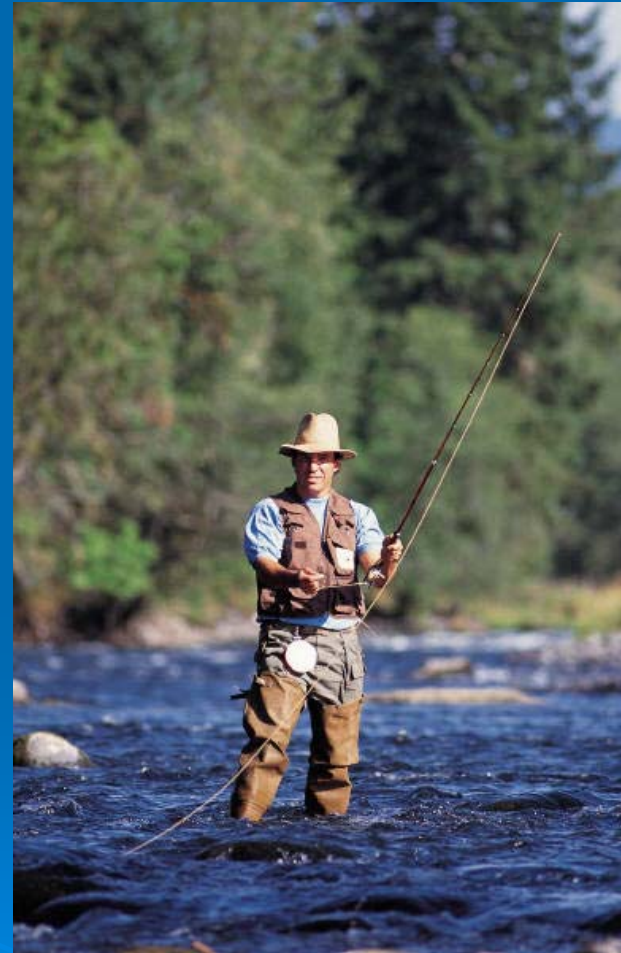


Use Assessment Results

➤ Fish Consumption:

- 0.3% fully supporting
- 35.0% not supporting*
- 64.7% not assessed

*Statewide TMDL for Mercury Impairments in Fish Tissue adopted June 2010 resulted in 90 delistings, including some that met the TMDL water quality target for mercury.



Observed Trends

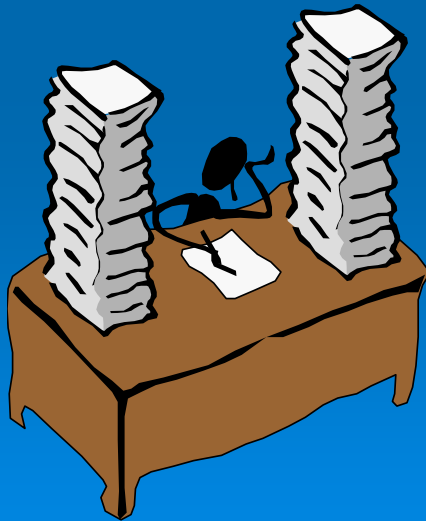
- USGS water quality trend analysis
 - 36 stations 1984-2004
 - 70 stations between 1998 and 2007
 - DO, pH, TDS, TP, NO₂+NO₃, N+NH₄
- Declining conditions for TDS, nitrate
- Improving conditions for TP
- No discernable trend for other parameters

Observed Trends *(cont'd)*

- Long term data show nutrient levels & DO conditions significantly improved over time
 - Upgrade and regionalization of wastewater treatment plants statewide in late 1980's.
 - Sampling methods for DO (grab vs. continuous)
- Trend analysis shows generally stable water quality conditions statewide, with some improvements (TP) & some declines (TDS and nitrates).
 - Continued impact of NPS (e.g., TDS) & legacy pollutants (PCB, DDX)
 - Need increased stormwater/NPS controls, targeted TMDLs, restoration activities, regional/national approaches

Schedule

- November 1: NJR Public Notice
- November 16: Public Info Meeting
- December 1: Public Comment Period Ends
- Spring/Summer 2011:



- Publish Final 303(d) List/ Integrated Report
- Submit to USEPA for Approval
- Adopt final 2010 303(d) List

For More Information...

www.state.nj.us/dep/wms/bwqsa/generalinfo.htm

Assessment

- [Surface Water Quality Standards](#)
- [Ground Water Quality Standards](#)
- [Water Quality Assessment](#)
- [GIS Coverages](#)
- [SWQS and GWQS Rule Archives](#)
- [Technical Support and Related Documents](#)

General Information

The federal Clean Water Act mandates that states submit biennial reports to USEPA describing the quality of their waters. The biennial Statewide Water Quality Inventory Report or "305(b) Report" must include the status of principal waters in terms of overall water quality and support of designated uses, as well as strategies to maintain and improve water quality. The 305(b) reports are used by Congress and USEPA to establish program priorities and funding for federal and state water resource management programs. The biennial List of Water Quality Limited Waters or "303(d) List" identifies waters that are not attaining designated uses because they do not meet surface water quality standards despite the implementation of technology-based effluent limits. States must prioritize waters on the 303(d) List of Water Quality Limited Waters for Total Maximum Daily Load (TMDL) analyses and identify those high priority waters for which they anticipate establishing TMDLs in the next two years. The Integrated Report satisfies the reporting and public participation requirements of Sections 303(d), 305(b), and 314 of the federal Clean Water Act.

New Jersey's Integrated Reports

The New Jersey Integrated Water Quality Monitoring and Assessment Reports are intended to provide effective tools for maintaining high quality waters and improving the quality of waters that do not attain their designated uses. The Integrated Reports describe attainment of the designated uses specified in [New Jersey's Surface Water Quality Standards](#) (N.J.A.C. 7:9B), which include: aquatic life; recreation; drinking, industrial, and agricultural water supply; fish consumption; and shellfish harvest for consumption. The Integrated Report includes the following information to inform and guide water resource management at statewide, regional, and local levels:

- [Integrated Water Quality Monitoring and Assessment Methods \(Methods Document\)](#), which details the assessment methods used to by the Department to generate the Integrated List.
- The [Integrated List of Waters](#) , which identifies the use assessment results for each assessment unit as one of five categories, called "sublists", ranging from full attainment to non-attainment/requires a TMDL;
- The [303\(d\) List of Water Quality Limited Waters](#), which identifies waters assessed as impaired for specific pollutants based on non-attainment of the designated use i.e., Sublist 5);
- Sources and causes of pollutants causing impairment, where known;
- A schedule of TMDLs to be developed in the next two years to address impaired waters identified on Sublist 5 (303(d) List);
- Ongoing and planned strategies to maintain and improve water quality statewide, including summaries of the Department's water pollution control programs; improve and expand water quality monitoring, including the Department's [Water Monitoring & Assessment Strategy \(2005-2014\)](#); and improve water quality assessment methods.

- [2010 Integrated Report Information](#)
- [2008 Integrated Report Information](#)

Local intranet 100%

Assessing the Assessment Process

- Does the current assessment/listing process identify “real” water quality problems?
- How should we address transitional waters; i.e., waters that are on the 303(d) list, then off, then on again?
- What other types of data do we need to collect to ID problems & pollution sources?
- Is there a better way to “look” at our waters?
- How can we assess more waters with limited resources?

Assessing ... *(continued)*

- Are we monitoring the right waters at the right time for the right things under the right conditions to identify actual water quality conditions?
- How should we assess natural variation in water quality in comparison with a fixed criterion?
- How should we be monitoring to assess the full impacts of nutrients on water quality?
- Are there other factors we should be considering?

Questions?

