NJ Department of Environmental Protection
Water Monitoring and Standards

AMBIENT BIOMONITORING NETWORK

Raritan Water Region

Watershed Management Areas 7, 8, 9, and 10
Round 3 Benthic Macroinvertebrate Data
Volume 1 of 2

February 2008

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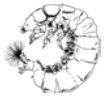

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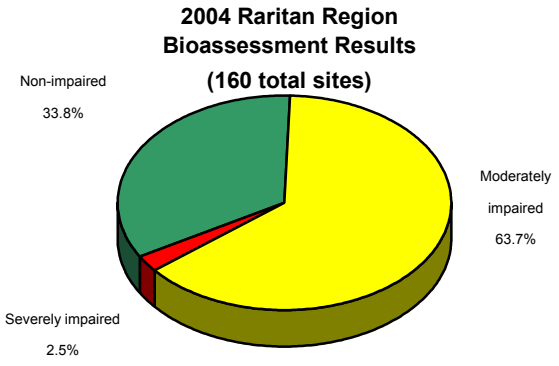
TABLE OF CONTENTS

Ambient Biomonitoring Network
Watershed Management Areas 7, 8, 9, and 10
Raritan River Region
Round 3 Benthic Macroinvertebrate Data
Volume 1 of 2

EXECUTIVE SUMMARY

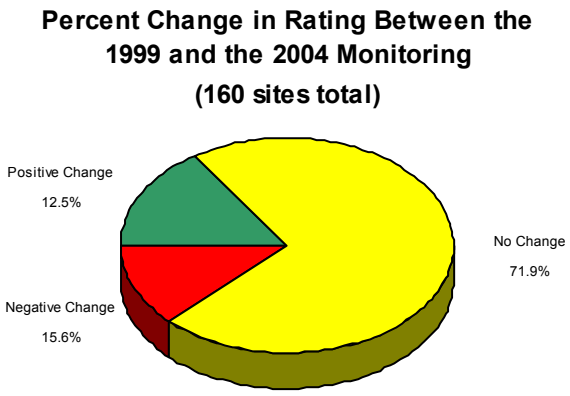
Biological monitoring of freshwater systems in New Jersey provides an effective means of gauging long-term trends in surface water quality throughout the State. The Ambient Biomonitoring Network (AMNET) is one of the major ongoing monitoring programs. This statewide network of over 800 AMNET stations employs sampling and taxonomic analysis of in-stream macroinvertebrate communities to assess the ecological condition at each station. Following sample analysis, an integrated index of "biometrics", based on community composition and pollution tolerance levels of individual taxa, assigns one of three "impairment" levels to each site (i.e., non-impaired, moderately impaired, or severely impaired). The results are considered reflective of the water or habitat quality at each site. This information is used by the Department, primarily in assessing progress toward the goals of the Clean Water Act via the Integrated Water Quality Monitoring and Assessment Report. AMNET data are also very useful for designation of Category 1 waters based on exceptional ecological significance. Results are reported separately for each of New Jersey's five major drainage basins or "Water Regions" (Lower Delaware, Upper Delaware/Northwest, Northeast, Raritan and Atlantic), each encompassing several sub-basins ("Watershed Management Areas"). The Water Regions, with an average of 165 AMNET sites each, are sampled in consecutive years on a five-year rotational basis.



This report presents the results for the biological monitoring conducted in Raritan Water Region from April to October 2004. The sampling of this Region marks the third round of data collection for this basin. For the Raritan Water Region, the results obtained in the current round are similar to those of the previous (second round) sampling. Currently, of 165 AMNET sites in the Raritan Water Region, 54 (33.75%) were found non-impaired, 102 (63.75%) moderately impaired, and 4 (2.5%) severely impaired, with five sites not sampled (AN0202, AN0382D, AN0389, AN0454, AN0455) due to site difficulties or bridge construction.

Results from the current, 3rd round (2004) of sampling are compared to those from the same sites sampled in the earlier rounds (1994, 1999). Of the 165 total AMNET sites presently in the Raritan Water Region, current sampling yielded substantially fewer severely impaired sites (2.5%) than did the first and second round sampling (5.6%, 9.2% respectively); however, the curent round yielded more moderately impaired sites (63.75%) than did the first and second rounds (56.9%, 55.6% respectively). Conversely, the number of non-impaired sites (33.75%) observed in the 2004 sampling

continued the decline consistently observed since the first and second rounds of sampling (37.5%, 35.2% respectively).



As reflected in the present study results, human land uses and practices, superimposed on the undisturbed physical terrain, play a major role in controlling the degree of pollution or degradation in a stream system. The relationship between benthic macroinvertebrate community impairment has been statistically related to different physiographic land types, land uses and other anthropogenic factors, on a statewide basis. These findings strongly indicate that human land uses and practices play a major role in the degree of pollution or degradation in a stream system. [15]

To determine what factors are contributing to impairments, or changes in impairment ratings, the Department has established a Stressor Identification (SI) process. The purpose of the Stressor Identification (SI) process, as developed by USEPA, is to identify the principle stressor(s), including but not limited to, specific pollutants responsible for the degraded biological condition. Identifying whether the principal stressor(s) is a *pollutant* or, if a specific pollutant(s) cannot be identified, is due to generic *pollution* is the first step towards deciding whether a pollutant(s) specific TMDL or other appropriate management measures will be taken to remediate the impairment. Five sites have been selected in this Water Region for initial Stressor Identification work. These sites are: AN0311 (Drakes Brook), AN0324 (Beaver Brook), AN0343 (Holland Brook) and AN0333 & AN0337 (Neshanic River).

INTRODUCTION

Rationale for Biological Monitoring

Biological monitoring, as referenced in this report, pertains to the collection and analysis of stream macroinvertebrate communities as indicators of water or habitat quality. Macroinvertebrates are larger-than-microscopic, primarily benthic (bottom-dwelling) fauna, which are generally ubiquitous in freshwater and estuarine environments, and play an integral role in the aquatic food web. Insects (largely immature forms) are especially characteristic of freshwaters; other major groups include worms, mollusks (snails, clams) and crustaceans (scuds, shrimp, crayfish, etc.). They are more readily collected and quantified than either fish or periphyton communities. Species comprising the in-stream community occupy various niches, based on functional adaptation or feeding mode (e.g., predators, filter or detritus feeders, scavengers); their presence and relative abundance is governed by environmental conditions (which may determine available food supply) and by pollution tolerance levels of the respective taxa. The overall community, thus, is holistically reflective of conditions in its environment. Assessments of ambient water / habitat quality can then be made based upon standardized procedures, which can show perturbations measured as changes or differences in community structure [1]. While development of a "multitrophic" approach to include finfish and periphyton communities with invertebrates is being investigated, the primary means of assessment to date has been through macroinvertebrate community analysis.

Advantages of Using Benthic Macroinvertebrates:

1. They are good indicators of localized conditions of water quality due to their limited mobility. As such, they are well suited for the assessment of site-specific pollution impacts.
2. They are sensitive to environmental impacts from both point and non-point sources of pollution.
3. They integrate the effects of short-term environmental variations, such as oil spills and intermittent discharges.
4. Sampling is relatively easy and inexpensive.
5. They are holistic indicators of overall water quality, even for substances that may be present, but at lower than detectable levels.
6. They are normally abundant in New Jersey waters as well as aquatic environments in general.
7. They serve as the primary food source for many species of commercially and recreationally important fishes.
8. Unlike chemical monitoring, where impacts to the environment tend to be by inference, not direct determination, they provide a direct measure of water quality in a manner consistent with the goals of the Clean Water Act.
9. They can be used to assess nonchemical impacts to the aquatic habitat, such as by thermal pollution, excessive sediment loading (siltation), or eutrophication.
10. To the general public, impacts to resident benthic macroinvertebrate communities are more tangible measurements of water quality than more esoteric listings of chemical test results.
11. When monitored together with relevant chemical/physical parameters, benthic macroinvertebrate communities can be used to identify sources of impairment.

Limitations of Biological Monitoring:

Biological monitoring cannot replace chemical monitoring, toxicity testing, and other standard environmental measurements. Each of these tools provides the analyst with specific information available only through its respective methodology.

The following illustrations provide an overview of the major macroinvertebrate indicator groups employed in making biological water quality assessments.

Benthic Macroinvertebrates Usually Indicative of Good Water Quality

Mayfly nymphs are often abundant wherever the water is clean. They are sensitive to various types of water pollution, including low dissolved oxygen, ammonia, biocides, and metals.

Stonefly nymphs are usually found only in cool, well-oxygenated waters free of pollution. Though not usually found in the numbers characteristic of mayflies, the presence of even a few stoneflies is indicative of good water quality.

Most caddisfly larvae, many of which build portable cases of stones, sticks, sand, and other detritus, are intolerant of water pollution.

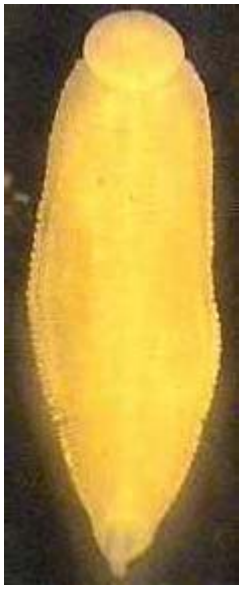
Aquatic beetles are common in well-oxygenated, swiftly running waters; many species are referred to as “riffle beetles.” They are usually indicative of clean water since they are sensitive to wetting agents (soaps and detergents) and other pollutants.

All photographs taken by D.Bryson, NJDEP

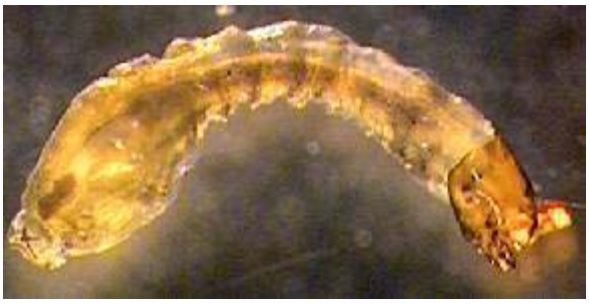
Benthic Macroinvertebrates Usually Indicative of Poor Water Quality

Midges (chironomids) are among the most common of aquatic invertebrates. They occupy a variety of aquatic habitats, including lakes, ponds, bogs, rivers, creeks, and marshes. They even exploit manmade habitats such as sewage treatment plants, water treatment plants, fish pools, irrigation ditches, and birdbaths. Many species are very tolerant of pollution.

Aquatic sowbugs, or freshwater isopods, are abundant in waters enriched with organic nutrients and low in dissolved oxygen. They are commonly observed in the recovery areas below sewage treatment plants.



Leeches and other segmented worms are very common in our lakes and streams, though not often noticed. They are tolerant of poor water quality and severe pollution.



Black fly larvae are filter feeders, capturing and ingesting plankton and bacteria from the surrounding water with specialized antennae. Some species are very tolerant of poor water quality and thus can be used as indicators of pollution.

All photographs taken by D.Bryson, NJDEP

STUDY DESIGN

Data Quality Objectives

The major goal of AMNET is to provide a long-term, cost-efficient means of gauging the quality of surface waters and watershed areas throughout the State. This is accomplished through biological sampling and analysis from a network of stream sites that adequately represents New Jersey's five major drainage basins and NJDEP's Watershed Management Areas (WMA). Administratively, a total of twenty-one WMA's have been delineated within New Jersey's five basins. Each major basin constitutes a "Water Region"; a major sub-basin forms each WMA. Within each WMA are several smaller sub-basins, delineated by the United States Geological Survey (USGS) as "hydrologic units," scale 11 (HUC11). The study area of the present report includes WMA #'s 7 (Elizabeth, Rahway, Woodbridge), 8 (North and South Branch Raritan), 9 (Lower Raritan, South River, Lawrence Brook), and 10 (Millstone River) (see Maps 1 – 7, Volume 2). The standard sampling interval of five years reflects a realistic temporal lag between cessation of an environmental perturbation and recovery of the impacted biological community. The Integrated Water Quality Monitoring and Assessment Report [2], which re-examines changes in New Jersey's stream systems on a two-year cycle, has indicated that five years is an optimum period for long-term biomonitoring. An ample network of stations is required for the creation of a long-term database, which in turn, is necessary for trend analysis and operation of water quality predictive models.

The AMNET program is designed to monitor a complete Water Region's complement of stations within a year's time, giving modelers and planners a snapshot of ambient biological impacts during that particular year. Sampling is curtailed through the coldest months (December to March) because of difficulties encountered in obtaining representative samples during this period.

SITE SELECTION

Sites were selected essentially to provide representative coverage of each Water Region, as well as the entire State. To ensure enough flow for sampling, sites on "first-order" streams are situated at least three miles downstream of headwaters (first order streams are those with no tributaries). Since most streams at this level have very little (or only intermittent) flow, most of the sites are situated on second-order streams (with only first-order streams as tributaries) and higher (with a greater hierarchy of tributaries). All sites are located in reasonably accessible and primarily wadable segments, proceeding downstream to the head-of-tide. Sites are numbered in approximate upstream to downstream order, from the mainstem of each major sub-basin to each adjacent tributary, and then to the next adjacent sub-basin. This is in an approximate north to south order within the Raritan Water Region.

To maximize data correlation, AMNET, wherever possible, incorporates existing stations of the Ambient Surface Water Chemical Monitoring Network, which is administered jointly by NJDEP and the USGS [3]. Furthermore, so as to gauge the effects of major tributaries and larger lakes, many AMNET sites are located near their confluence or outlet. An attempt is made when selecting sites to obtain a sample representative of the stream's total water quality. Sites are placed down stream of features such as known sources of contamination (e.g., point-source discharges, agricultural operations), or significant natural features such as wetlands, parks or wildlife management areas when it is determined that these features have a dominant impact (positively or negatively) on the stream.

Exact AMNET site locations were determined via the Global Positioning System (GPS) using Trimble Pathfinder units and the appropriate correction sources utilized by NJDEP. All positions were logged into the DEP's Geographical Information System (GIS) (see Maps 1 – 7, Appendix A, Volume 2).

For the first round of AMNET, a total of 146 stations had been established in the Raritan basin including the North and South Branches of the Raritan River, Millstone and South Rivers, and smaller sub-basins [4].

A total of 165 sites were established for the previous round of AMNET sampling in the Raritan Water Region (1999) [5]. This area (shown in Figure 1) primarily includes all New Jersey sub-basins draining to the Raritan River (WMA's #7, 8, 9, and 10). For the second round of AMNET (1999), the original study area was realigned to conform with the boundary between the newly established Water Regions [5]. Those sub-basins that drain to Raritan Bay via the Arthur Kill, i.e., the Elizabeth, Rahway, and Woodbridge rivers (now WMA 7), which were formerly part of the greater Passaic (Northeast) basin [6], have been included in the present study. The present Raritan study area (Figure 1) includes a total of 165 sampling sites, AN0194 – 204, AN0310 – 455 (see Table 2, Volume 2). Sites AN0202 (WB Elizabeth River), AN0382D (Millstone River), AN0389 (Devils Bk), AN0454 (Deep Run), and AN0455 (Tennent Bk) in the current data set were either too deep, had difficult access or there was bridge construction when visited and we were unable to sample these sites. Sites AN0454 and AN0455 also weren't sampled during the first round of sampling [4].

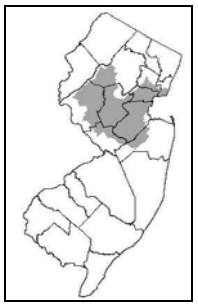


Figure 1

Map of 2004 study area

FIELD & LABORATORY METHODS

Benthic macroinvertebrate sampling and analysis is performed in accordance with the NJDEP Field Procedures Manual [7], Rapid Bioassessment Protocol (RBP) guidelines of the USEPA [8] and Standard Operating Procedures (SOP) of the NJDEP Aquatic Biomonitoring Laboratory [9]. As detailed in the SOP and in the quality assurance work plan [10], a thorough quality control program, with emphasis on macroinvertebrate taxonomy, is practiced.

Sample Collection

In general, a "multi-habitat" approach is used, focussing on the more productive habitat types [8]. The usual sampling device is a D-frame kick net of 800 x 900 um mesh size and one foot width (a Surber sampler or Ponar dredge may be employed when conditions require). In high-gradient streams, where the predominant substrate is cobble, the riffle/run area is the preferred sampling habitat; other likely habitat types are sampled when present. The kick net is held firmly against the hard bottom, and an area approximately one foot upstream of the net is disturbed using feet and/or hands. This procedure is repeated, sampling all velocity/depth regimes at the site, including at least one riffle-run-riffle sequence (if present). In the low-gradient Coastal Plain streams, bottoms generally consist of sand or mud without dominant cobble/riffle areas; therefore, a variety of stable substrates including woody debris, submerged macrophytes and portions of banks are sampled. The "jab and sweep" method [11] is employed; a minimum of 20 jabs/sweeps are taken, proportioned approximately to the numbers of each habitat type present. In all cases, stream distance sampled approaches, but does not exceed, 100M. Level of effort is consistent for all sites. In the presence of road crossings, where possible, sampling is done upstream of bridges, sufficiently removed to avoid influence of any associated channel alterations. The entire sample is sieved using a #30 mesh sieve bucket, put into wide-mouthed (1-L) jars, and preserved with 5 to 10% formalin (to 20% in cases of excessive organic loading). Both the sieve bucket and net are examined for adhering organisms. Any found are removed with forceps and placed into the sample jar. During the field operations, qualitative observations of habitat, surrounding land use, potential pollution sources, and presence of other aquatic biota are recorded (Appendix D, Volume 2); a visual-based qualitative habitat assessment [8] is also performed (see p. 10). These observations/evaluations, however, do not factor into

the final bioassessment rating.

Sample Processing and Sorting

In the laboratory, after rinsing in a #30 mesh sieve to remove the preservative, the composited sample is evenly distributed in a light-colored pan marked with grids of equal size. Using low-power magnification (6.3x), all organisms greater than 2mm in size are then removed from each randomly selected grid until a total of at least 100 organisms is obtained. Colonial groups (e.g., Bryozoa and Porifera), vertebrates, and terrestrial organisms are not included in the subsample. Organisms retained are reasonably intact to allow for accurate identification.

Macroinvertebrate Identification and Quality Control

The individuals from the subsample are identified to the lowest practicable taxonomic level, usually genus or species, using 7 to 30X stereozoom and 40 to 400X compound magnification. The Biomonitoring Unit currently uses Leica Model MZ6 stereomicroscopes and Leica Models DMLS and DME compound microscopes. A computerized digital camera system projects and records microscope images of selected specimens to aid in their identification. A comprehensive collection of taxonomic keys and other references, including functional (or niche) descriptions and pollution tolerance classifications for most species, is maintained in the laboratory. An indexed list of these is given in the Laboratory SOP [9]. Pertinent new reference material is added when available. Taxonomists confer with each other regarding species in question. The International Taxonomic Information System (ITIS) (www.itis.usda.gov) is monitored for possible changes in nomenclature or groupings. Consultation with other scientists in the field, particularly from agencies involved in similar programs (e.g., New York Department of Environmental Conservation, USGS, USEPA), provides added assistance and confirmation when needed. For verification, 10% of the samples are sent to a qualified independent consultant for parallel identifications. A macroinvertebrate specimen reference collection is maintained in the laboratory.

Data Analysis

Biological impairment may be caused by several major factors such as organic enrichment, habitat degradation, or toxicological effects. It may be manifested in several aspects of the benthic macroinvertebrate community. These include: absence of pollution-sensitive taxa, especially the EPT group (i.e., Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies)); excessive dominance of pollution-tolerant taxa such as Chironomidae (midges) and Oligochaeta (worms); low overall taxa numbers; or other perceptible differences in community structure relative to a reference condition.

The data analysis is an important part of the RBP protocol, developed under USEPA auspices as an expedient and cost-effective monitoring tool. It recognizes the use of community metrics and the pollution indicator concept. “Biometrics” measure different components of community structure, including population and functional parameters, each with a different range of sensitivity to pollution stresses [1, 12]. The use of a variety of biometrics assures a more robust or valid assessment; therefore, an anomaly in any one metric is less likely to invalidate the study findings. The results are integrated through common scoring criteria, derived from an established comparable database, to determine a final numerical rating and consequent biological condition category (see Table 1). This provides the analyst with an easily communicated evaluation of relative impairment, referred to in this report as the “bioassessment rating." For RBP protocols, results are based on 100 organism sub-samples. Scoring criteria for RBP protocols [1] are calibrated for family level taxonomy, giving three final rating categories (non-impaired, moderately impaired, and severely impaired).

The biometrics employed, and subsequent integrated index, were developed as outlined in RBP methods [1]. The final numerical rating is referred to as the "New Jersey Impairment Score" (NJIS) and was statistically validated based upon data from 200 New Jersey stream sites [13]. The scoring criteria and rating categories are presented in Table 1. The metrics from which the NJIS is derived are explained below:

1. **Total Taxa or Taxa Richness** (# families) — an index of community diversity; the number usually increases with increasing water or habitat quality.

2. **Percent Contribution of the Dominant Family** (to the total # families) — dominance by relatively few species/families would indicate environmental stress.

3. **# EPT Families** — the number of families represented within the orders Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies), which are generally pollution-sensitive.

4. **Percent EPT** (of the total # individuals) — would increase with increasing water quality.

5. **Hilsenhoff (Family) Biotic Index** — tolerance values of 0 - 10 are assigned to individual families (zero = most intolerant); these values are used in the formula for calculating the Biotic Index which summarizes the overall pollution tolerance of the entire benthic macroinvertebrate community with a single value.

Trend Analysis

In evaluating the current AMNET data against that for the previous round, a significant improvement or decline is considered to have occurred if the difference in NJIS scores has changed the bioassessment rating. A complete list of site-by-site comparisons is presented in Table 2, where a (+) indicates a significant improvement, a (–) indicates a significant decline, and a (/) indicates no change in rating; a slash may have a (+) or a (-) indicating that the score improved or declined, but the bioassessment rating did not. If a site was only sampled once in concurrent rounds, the change will have "nd" meaning there was "no data" available for a comparison.

SUPPLEMENTAL ANALYSES / EVALUATION METHODS

Morphological Abnormalities

Occasionally, morphological abnormalities have been found in individual macroinvertebrates recovered in the Bureau of Freshwater & Biological Monitoring's (BFBM) AMNET collections. These deformities have been most readily detected in the Chironomidae (midges), where they occur primarily in the head appendages (antennae) and mouth parts (mentum and mandibles). While the incidence has been most frequent in the chironomids (especially those species categorized as detritivores, herbivores or periphyton feeders), abnormalities have also been observed in individuals of other taxonomic groups. Although this is not a factor in the NJIS data analysis, such features are noted as they may signify possible contaminants or stressful conditions in the respective drainages.

Abnormalities observed in the course of identification are noted; these results are summarized by sample site in Table 3, Volume 2. For Chironomidae, the data are displayed as # of chironomids with abnormalities / # of chironomids examined. For all other taxa, just the number of individuals with abnormalities is presented. Photographic examples of abnormalities in midge larvae and amphipods

(scuds) are presented in Appendix B, Volume 2.

Habitat Assessment

The physical attributes of habitat play an integral role in the health of the macroinvertebrate community. Where stations are physically comparable, detected impacts can be attributed to water quality factors; however, physical habitat degradation alone can account for biological impairment in a stream [1]. Parameters evaluated include in-stream substrate, channel morphology, bank structural features, and riparian vegetation. The area evaluated includes the sample site and its immediate surroundings, particularly upstream, usually within a 100 – 200 foot radius. The visual-based qualitative habitat assessment results in one of four condition categories: optimal, suboptimal, marginal or poor, as outlined in the 1999 revisions to the USEPA criteria [8].

The habitat assessment is separated into two basic approaches; one designed for high gradient streams and one designed for low gradient streams [8]. Examples of assessment forms for each approach can be found in Appendix C, Volume 2. Streams in the northern regions of New Jersey are generally considered to be "high gradient" streams, having substrates of rock and cobble of various sizes, and with relatively swift flow. Those in the Coastal Plain regions of southern New Jersey are considered as "low gradient" streams, having slower flow and more homogeneous substrates, primarily of sand or gravel and finer sediments. Habitat assessments may be temporarily downgraded by adverse weather conditions, such as excessive rainfall or prolonged drought. It should also be noted that habitat assessments are performed independently of the macroinvertebrate community analysis; thus, they do not factor into the final impairment score, but are used primarily as supplementary information.

Fish IBI

In addition to the AMNET sampling performed on freshwater streams, BFBM also supplements the benthic monitoring by performing a fish Index of Biotic Integrity (IBI) analysis at or near many AMNET stations. An IBI is an index that measures the health of a stream based on multiple attributes of the resident fish assemblage. Each site sampled is scored based on its deviation from reference conditions (i.e., what would be found in an unimpacted stream) and classified as poor, fair, good or excellent.

Data provided by the IBI have become another component of the NJDEP's suite of environmental indicators. The data help to measure water quality use attainment and the Department's success in attaining the Clean Water Act goal of "fishable" waters as elaborated in the Department's Integrated Water Quality Monitoring and Assessment Report. IBI data will also be used to develop biological criteria, prioritize sites for further studies, provide biological impact assessments, and assess status and trends of the state's freshwater fish assemblages.

There were 21 IBI sites performed in the Raritan basin prior to this round of sampling. Of them, 1 was Poor, 9 were Fair, 9 were Good and 2 displayed an Excellent IBI Rating. For more info on the Fish IBI results and reports, visit the BFBM web site at: www.state.nj.us/dep/wms/bfbm.

Chemical Monitoring

The Bureau of Water Quality Standards and Assessment (BWQSA) is responsible for the development, adoption, and administration of New Jersey's Surface Quality Standards (SWQS) and Ground Water Quality Standards (GWQS) [14]. This includes the development of water quality criteria to protect aquatic life and human health, the assignment of stream classifications to reflect existing and designated uses, and the promulgation of antidegradation policies to protect and maintain the quality of surface and ground waters of the State. The SWQS are used by many DEP programs including: the New Jersey Pollutant Discharge Elimination System program, Site Remediation program, Stream Encroachment and the Land Use Regulation Program.

The SWQS form the basis for monitoring the degree of impairment of surface water bodies and for calculating total maximum daily loads (TMDLs), which represent the assimilative capacity of surface water for a given parameter of concern. The development of TMDLs includes balancing the impacts from point sources, non-point sources and natural background conditions. TMDLs are developed on a watershed basis to aid watershed management planning efforts. The State develops a list of impaired waters (303d) and a surface water quality inventory report (305b) every two years.

BWQSA is also responsible for conducting and coordinating water quality assessments of all waters of the State. These assessments are reported through the New Jersey Integrated Water Quality Monitoring and Assessment Report (Integrated Report). [2] Historically, the Department summarized statewide water quality in a biennial report entitled, "New Jersey's Water Quality Inventory Report" (also known as the "305(b) Report") and proposed a separate "303(d) list" or "List of Impaired Waters". The current USEPA format for these reports (instituted in 2002) integrates the reporting requirements of Sections 303(d) and 305(b) of the Federal Clean Water Act into one comprehensive, integrated water quality assessment report.

To prepare the Integrated Report, BWQSA compiles available monitoring data from various agencies and organizations that collect measurements from the State's streams. The physical/chemical data is compared to water quality criteria outlined in the SWQS. Values for each measured parameter are evaluated and used to determine whether the waterway is in "full attainment of aquatic life use" or in "non-attainment of aquatic life use" based upon the levels outlined in those standards.

In this report, AMNET results were compared to BWQSA's use attainment designations as assessed using physical / chemical specific criterion. A list of the AMNET sites corresponding to stream segments designated by BWQSA between 2004 and 2006 as "non-attainment of aquatic life use" based upon physical/chemical criterion can be found in Table 5, Volume 2. Eighty-four (84) sites were designated as "non-attainment of aquatic life use" for at lease one physical / chemical parameter; the most common exceedences of the Surface and Ground Water Quality Standards being Temperature and Total Phosphorus. Of these 84 sites, 51 sites were designated as "non-attainment of aquatic life use" for two or more of the following physical / chemical parameters: Total Phosphorus, Total Dissolved Solids, Total Suspended Solids, pH, Dissolved Oxygen, and Temperature. All but twenty-five (25) AMNET sites, where an exceedence occurred, received a Moderately or Severely Impaired biological assessment. The remaining twenty-five (25) AMNET sites where an exceedence occurred received a Nonimpaired biological assessment (see Table 5, Volume 2). Special attention should be given to the nonimpaired sites that exceeded standards. Continued degradation of the water quality will likely downgrade the nonimpaired assessment in the future.

The Department will attempt to identify the potential sources of impairment using the Department's Stressor Identification (SI) process. The purpose of the Stressor Identification (SI) process is to identify the principle stressor(s), including but not limited to specific pollutants, responsible for the degraded biological condition. . Identifying whether the principal stressor(s) is a *pollutant** or due to more generic landscape changes caused by human activities, is the first step towards deciding whether a pollutant(s) specific TMDL or other appropriate management measures will be taken to remediate the impairment. Five sites have been selected in this Water Region for initial Stressor Identification work. These sites are: AN0311 (Drakes Brook), AN0324 (Beaver Brook), AN0343 (Holland Brook) and AN0333 & AN0337 (Neshanic River).

* As defined in the N.J. Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and the Federal Water Pollution Control Act, aka "Clean Water Act" (33 U.S.C. 1251-1376)

RESULTS AND DISCUSSION

Summary of Statewide AMNET Data

The current study marks the third round of sampling for the Raritan basin AMNET study. Of the regions sampled to date for the third round, the Upper Delaware continues to yield considerably more nonimpaired sites than did the second round results for all other New Jersey Water regions. The Raritan basin has not shown any considerable changes since the previous rounds but the percent of nonimpaired sites has shown a slight decline. The table below presents the proportions of non-impaired, moderately and severely impaired AMNET sites for all New Jersey Water Regions in the first and second AMNET round, plus the third round for the Raritan, Northeast and Upper Delaware/Northwest Water Region.

Region	Number of sites			
Third round	Non-impaired	Moderately impaired	Severely impaired	Total sites
Upper Delaware	78 (54.9%)	60 (42.3%)	4 (2.8%)	142
Northeast	32 (31.1%)	68 (66.0%)	3 (2.9%)	103
Raritan	54 (33.8%)	102 (63.7%)	4 (2.5%)	160
Second round				
Upper Delaware	80 (58.0%)	57 (41.3%)	1 (0.7%)	139
Northeast	38 (36.9%)	59 (57.3%)	6 (5.8%)	103
Raritan	57 (35.2%)	90 (55.6%)	15 (9.2%)	162
Atlantic	75 (35.2%)	115 (54.0%)	23 (10.8%)	213
Lower Delaware	31 (15.7%)	139 (70.6%)	27 (13.7%)	197
First round				
Upper Delaware	87 (45.8%)	71 (37.4%)	32 (16.8%)	190
Northeast	36 (31.3%)	63 (54.8%)	16 (13.9%)	115
Raritan	54 (37.5%)	82 (56.9%)	8 (5.6%)	144
Atlantic	76 (38.6%)	100 (50.8%)	21 (10.6%)	197
Lower Delaware	17 (14.7%)	83 (71.5%)	16 (13.8%)	116

Results and Trends

Overall, the bioassessment ratings for each of the monitoring stations are best estimates of the in-stream biological impairment based upon the data obtained in the current AMNET survey. Detailed taxonomic and statistical data, bioassessment ratings, habitat assessment scores and observations for each AMNET site are given in Table 2 and Appendix D, Volume 2.

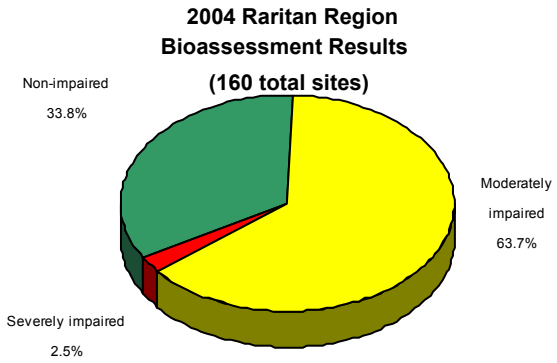


Figure 2

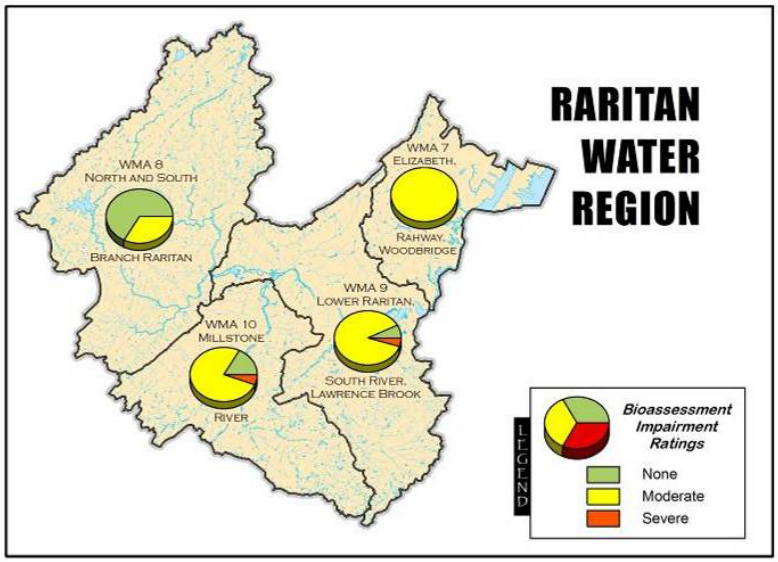


Figure 3. Map of the Raritan Water Region showing relative stream impairment levels in each Watershed Management Area.

Figure 2 depicts the overall results for the current study in the Raritan Water Region. Of the 160 monitoring stations sampled during this study period, 54 or **33.8%** were rated as "**non-impaired"**, 102 or **63.7%** were rated as "**moderately impaired"**, and 4 or **2.5%** were rated as "**severely impaired"** (see Table 2, Volume 2). Figure 3 illustrates the proportions of non-impaired, moderately and severely impaired sites in each WMA of the Raritan Water Region for the current AMNET round.

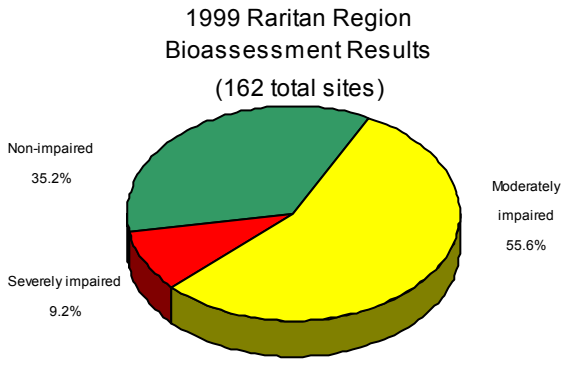


Figure 4

Figure 4 shows the results obtained from 162 AMNET sites within the Raritan Water Region that were sampled during the previous Raritan study (see "Site Selection" p.6 & Table 2, Volume 2). While the results for 2004 were similar to those for 1999, for the current sampling period the numbers of non-impaired and severely impaired sites were slightly lower, but the number of moderately impaired sites were slightly higher. The first sampling (1994) of 144 sites yielded more severely impaired sites (5.6%) than in the most recent sampling [4].

Figure 5 displays the percentage change in rating among the same 160 AMNET sites in the Raritan Water Region that were sampled during the second (1999) study period [4], and again during the current (2004) study period (see "Site Selection" p.5 & Table 2, Volume 2). The green indicates sites that have undergone a positive change, yellow indicates no change, and red indicates a negative change. Positive change includes both severe to moderate, and moderate to non-impairment; negative change includes both non-impairment to moderate and moderate to severe impairment. (see Table 2, Volume 2). As the figure shows, the majority of the 160 sites have exhibited no change between the 2nd and 3rd rounds of sampling.

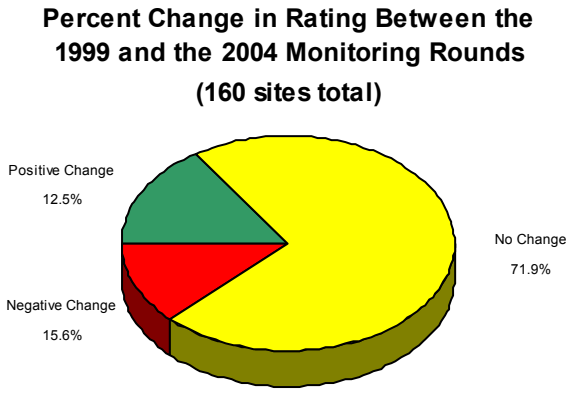


Figure 5

Regional Results

A USGS study, using data generated from NJDEP's AMNET program [15], statistically related levels of impairment to physiographic land types, corresponding land uses, and other anthropogenic factors on a statewide scale. A non-impaired community was most positively related to the area of forested and undeveloped land in its watershed upstream, and to the total underlying terrain in the steeper gradient ecoregions of northwestern New Jersey (i.e., Reading Prong/Highlands). Conversely, a severely impaired community was most positively related to the area of urban land, and to the total volume of wastewater (point source) discharge [15]. The table below presents the proportion of non-impaired, moderately impaired and severely impaired AMNET sites, based on the current data, in each of the Raritan Watershed Management Areas.

WMA's	Sub-basins	Non-impaired	Moderately impaired	Severely impaired	Total sites
7	Elizabeth / Rahway / Woodbridge Rivers system	---	11 (100.0%)	---	11
8	North and South Branch Raritan Rivers system	45 (66.2%)	23 (33.8%)	---	68
9	Lower Raritan / South Rivers system	3 (6.8%)	39 (88.6%)	2 (4.6%)	44
10	Millstone River system	6 (16.2%)	29 (78.4%)	2 (5.4%)	37
	Totals:	54 (33.8%)	102 (63.7%)	4 (2.5%)	160

In the Raritan Water Region the majority of NJIS scores (63.7%) fall within the "moderately impaired" range; about a third are "non-impaired" and only four sites are rated as "severely impaired" (see Table 2, Volume 2).

Evaluation by WMA

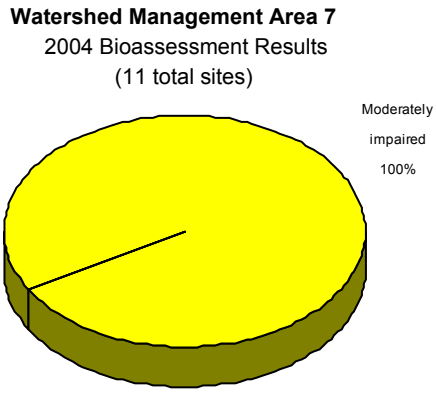


Figure 6

Watershed Management Area #7 includes a total of 12 AMNET sites in the Elizabeth and Rahway Rivers and several smaller streams in portions of Essex, Middlesex and Union Counties; these include Robinsons Branch and unnamed tributaries to Robinsons Branch (see Map 2, Volume 2). One site (AN0202) was not sampled due to bridge construction at the site. Figure 6 shows the current site rating summaries for WMA #7 with 100% (11 sites) moderately impaired. Figure 7 depicts the results obtained from 12 sites sampled during the earlier (1999) survey [4]. Comparing the current results to the earlier results, a significant improvement is seen at three sites and a significant decline, at one site (see Table 2, Volume 2). The number of non-impaired and severely impaired sites is lower than the earlier data, and the number of moderately impaired sites is slightly increased. The majority (72.7%) of habitat scores are in the suboptimal range, with 27.3% receiving a marginal score. Abnormalities in chironomid larvae and other invertebrate families were found at four sites (two on on the Rahway River, one on the South Branch Rahway River and one on Robinsons Branch) (see Map 2, Table 3, Volume 2). One of these sites displayed chronic abnormalities (see Table 3, Volume 2). The table below presents a synopsis of AMNET data for WMA #7; AMNET site locations and bioassessment ratings within WMA #7 are shown in Figure 8.

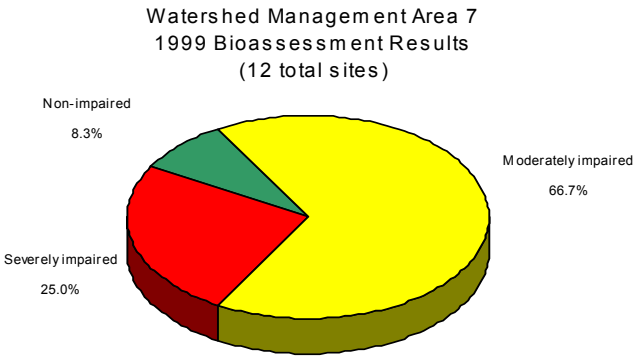


Figure 7

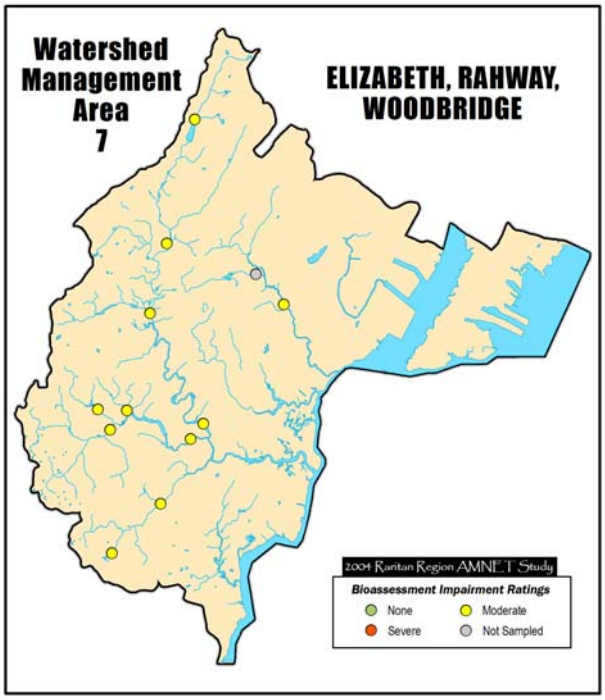


Figure 8

WMA # 7 Combined Results Table

NJIS Rating	1999		2004			Habitat Assessment	2004	
Non-Impaired	1	8.3%	---	------		Optimal	---	------
Moderate	7	66.7%	11	100%		Suboptimal	8	72.7%
Severe	3	25.0%	---	------		Marginal	3	27.3%
						Poor	---	------
Total sites	12		11				11	

Watershed Management Area #8 includes a total of 68 AMNET sites in the North and South Branch of the Raritan River, and its tributaries, in Hunterdon, Morris, and Somerset Counties (see Maps 3 & 4, Volume 2). Figure 9 shows the current site rating summaries for WMA # 8: 66.2% (45 sites) non-impaired and 33.8% (23 sites) moderately impaired. There was one new site (AN0324A) this round. Figure 10 depicts the results obtained from 68 sites sampled during the earlier (1999) survey [4]. Comparing the 2004 results to the earlier (1999) results, a significant improvement is apparent at one site while five sites exhibited a decline in impairment rating (see Table 2, Volume 2). The majority (58.8%) of habitat scores are in the suboptimal range with 33.8% receiving an optimal and 7.4% receiving a marginal score. Abnormalities in chironomid larvae and other invertebrate families were found at nine sites (three on the South Branch Raritan River, two on the Lamington River, and one each on North Branch Raritan River, North Branch Rockaway Creek, Middle Brook, and Peapack Brook) (see Maps 3 and 4, Table 3, Volume 2). Two of these sites displayed chronic abnormalities (see Table 3, Volume 2). The table below presents a synopsis of AMNET data for WMA #8; AMNET site locations and bioassessment ratings within WMA #8 are shown in Figure 11.

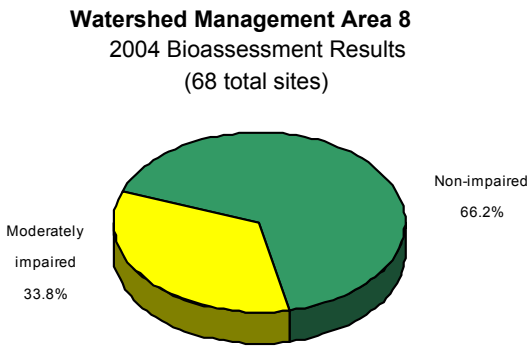


Figure 9

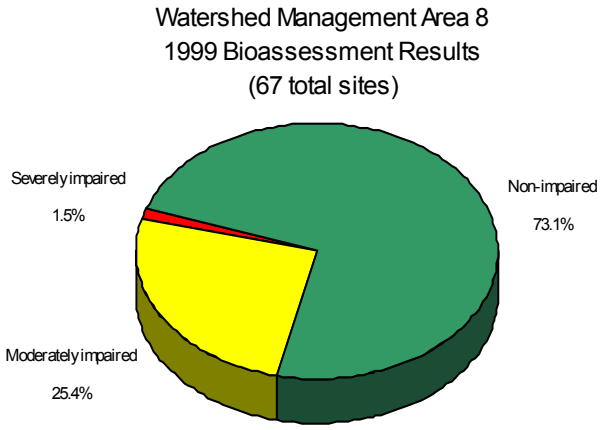


Figure 10

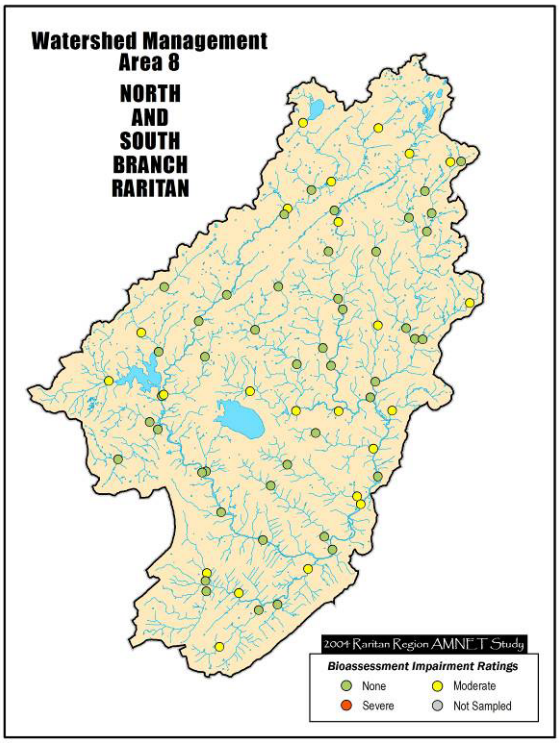


Figure 11

WMA # 8 Combined Results Table

NJIS Rating	1999		2004			Habitat Assessment	2004	
Non-Impaired	49	73.1%	45	66.2%		Optimal	23	33.8%
Moderate	17	25.4%	23	33.8%		Suboptimal	40	58.8%
Severe	1	1.5%	---	-----		Marginal	5	7.4%
						Poor	---	------
Total sites	67		68				68	

Watershed Management Area #9 includes a total of 46 AMNET sites in the Lower Raritan River, South River and Lawrence Brook and its tributaries in Middlessex, Monmouth, Somerset and Union Counties (see Maps 5 and 6, Volume 2). Figure 12 shows the current site rating summaries for WMA # 9: 6.8% (3 sites) non-impaired, 88.6% (39 sites) moderately impaired and 4.6% (2 sites) severely impaired. Two sites (AN0454, AN0455) were not sampled this round. Site AN0454 had bridge construction and it was determined that site AN0455 is a tidal site and therefore would violate the BFBM sampling protocol, so this site will be dropped from the program. Figure 13 depicts the results obtained from 46 sites sampled during the earlier (1999) survey [4]. Comparing the current to the earlier results, a significant improvement is seen at three sites, and a significant decline at two sites (see Table 2, Volume 2). The number of moderately impaired sites increased slightly from that of the earlier sampling, while the number of non-impaired and severely impaired sites is slightly reduced (see Table 2, Volume 2). The majority of sites (77.2%) received a sub-optimal habitat score, with 11.4% receiving an optimal and a marginal score. Abnormalities in chironomid larvae and other invertebrate families were found at 18 sites: one each on Ambrose Brook, Dukes Brook, E Br Middle Brook, Middle Brook, Mill Brook, McGellairds Brook, Peters Brook, Pine Brook, Sawmill Brook, Stony Brook, unnamed tributary to Raritan River; two each on Manalapan Brook and Matchaponix Brook; and three on Green Brook (see Maps 5 and 6, Table 3, Volume 2). Eight of these sites displayed chronic abnormalities (see Table 3, Volume 2). The table below presents a synopsis of AMNET data for WMA #9; AMNET site locations and bioassessment ratings within WMA # 9 are shown in Figure 14.

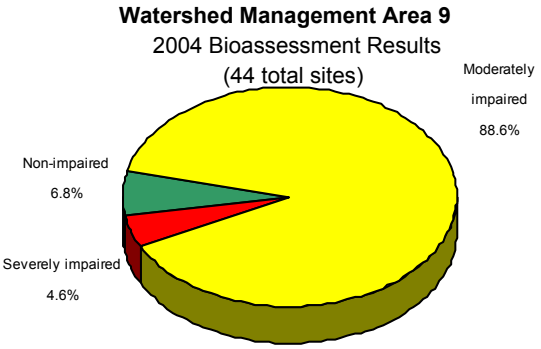


Figure 12

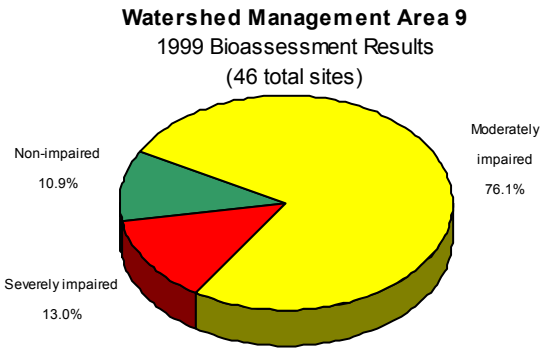


Figure 13

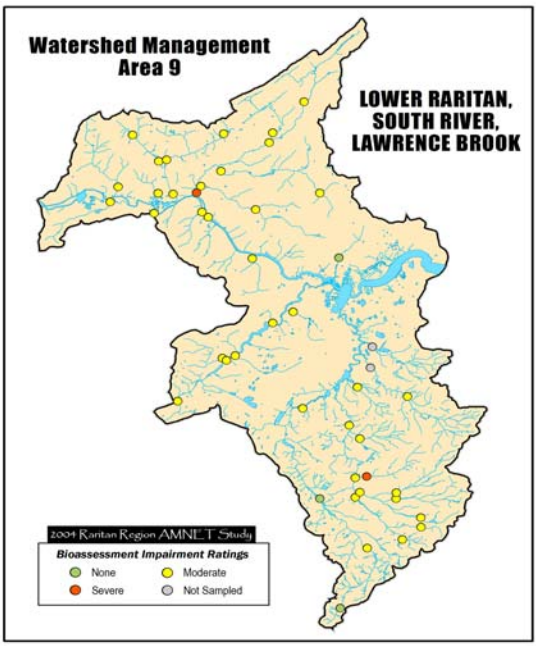


Figure 14

WMA # 9 Combined Results Table

NJIS Rating	1999		2004			Habitat Assessment	2004	
Non-Impaired	5	10.9%	3	6.8%		Optimal	5	11.4%
Moderate	35	76.1%	39	88.6%		Suboptimal	34	77.2%
Severe	6	13.0%	2	4.6%		Marginal	5	11.4%
	46		44			Poor	---	------
Total sites	46		44				44	

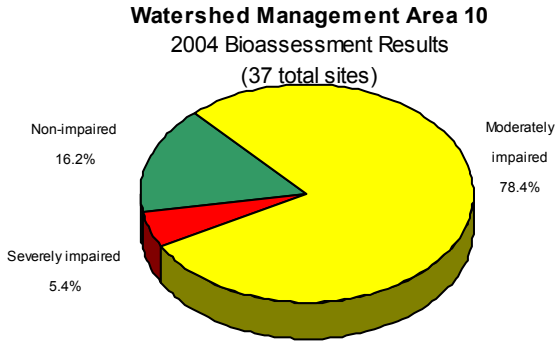


Figure 15

Watershed Management Area #10 includes a total of 39 AMNET sites in the Millstone River and its tributaries in Mercer, Middlesex, Monmouth and Somerset Counties (see Map 7 , Volume 2). Figure 15 shows the current site rating summaries for WMA # 10: 16.2% (6 sites) non-impaired, 78.4% (29 sites) moderately impaired and 5.4% (two sites) severely impaired. Two sites (AN0382D, AN0389) were not sampled due to bridge construction. Figure 16 depicts the results obtained from 37 sites sampled during the earlier (1999) survey [4]. Comparing the current to the earlier results, a significant improvement is seen at seven sites (see Table 2, Volume 2). The number of non-impaired sites increased slightly from that of the earlier sampling, and the number of moderately impaired and severely impaired sites is slightly reduced (see Table 2, Volume 2). The majority of sites (62.2%) received a sub-optimal habitat score, with 35.1% receiving an optimal score and 2.7% receiving a marginal score. Abnormalities in chironomid larvae and other invertebrate families were found at seven sites in Mercer, Middlesex and and Somerset Counties: one each on Bear Brook, Cranbury

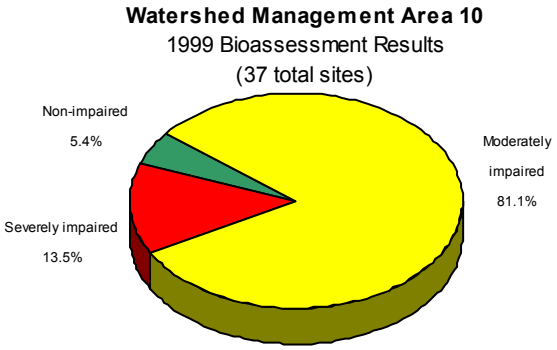


Figure 16

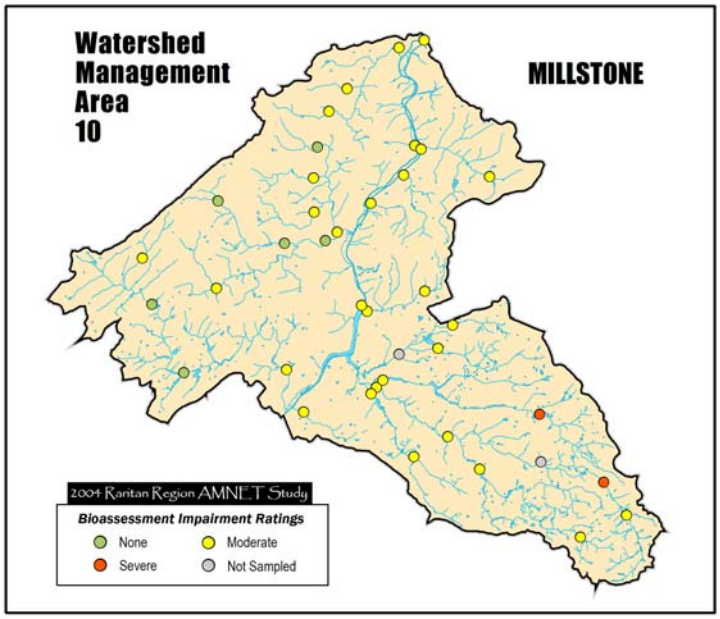


Figure 17

Brook, Cruser Brook, Heathcote Brook, Millstone River, Six Mile Run and Ten Mile Run (see Map 7, Table 3, Volume 2). Three of these sites displayed chronic abnormalities (see Table 3, Volume 2). The table below presents a synopsis of AMNET data for WMA #10; AMNET site locations and bioassessment ratings within WMA # 10 are shown in Figure 17.

WMA # 10 Combined Results Table

NJIS Rating	1999		2004			Habitat Assessment	2004	
Non-Impaired	2	5.4%	6	16.2%		Optimal	13	35.1%
Moderate	30	81.1%	29	78.4%		Suboptimal	23	62.2%
Severe	5	13.5%	2	5.4%		Marginal	1	2.7%
						Poor	---	------
Total sites	37		37				37	

Macroinvertebrate Abnormalities

Occasionally, morphological abnormalities have been found in individual macroinvertebrates recovered in the BFBM AMNET collections. These deformities have been most often detected in larval organisms belonging to the insect family Chironomidae (midges), where they occur primarily in the head appendages (antennae) and mouthparts (mentum and mandibles). Abnormalities have also been observed in individuals of other taxonomic groups (such as Amphipoda), but they are most often noted in the mouthparts and antennae of Chironomidae because these features are key characteristics used in identification. Chironomidae larvae often comprise a large component of the benthic community of a stream or river, particularly in those affected by human disturbances, and they are part of the diet of predatory invertebrates and fish. As a result, chironomids are an important transfer vector linking the movement of contaminants from sediments to higher trophic levels [16].

Hamilton and Saether [17] noted deformed specimens (Chironomidae) occurred in areas of industrial or agricultural chemical input, but not in areas receiving only domestic effluents. Subsequent studies have supported this finding. But the presence of deformed organisms in a sample is difficult to interpret. Not all genera appear to react to the presence of contaminants in the same manner [18]. Most of the research has been focused on a few genera. The North Carolina Division of Environmental Management [19] has developed an index to evaluate deformities, using the frequency and severity of deformities observed in Chironomidae larvae of just the genus Chironomus. Morphological deformities undoubtedly occur in Chironomidae larvae living in uncontaminated environments. Even robust, healthy populations of any fauna are likely to include a certain proportion of physiologically weaker individuals which, for various reasons, may be more prone or genetically predisposed to malformation [18]. With a lack of baseline data of deformities in more pristine environments, the level at which these deformities becomes significant is somewhat uncertain. Currently, although not an indicator of specific contaminants, the occurrence of abnormal chironomid larvae can serve as an economical and long-term monitor of the benthic environment, and can suggest where more intensive bioassays and chemical testing would be most effectively employed [20].

Bearing in mind that the primary focus of the AMNET sampling is not to find morphological abnormalities, a listing of all AMNET sites in the Raritan Water Region exhibiting these deformities is presented in Table 3 (Volume 2). The data are displayed as # of chironomids with abnormalities / # of chironomids examined. For all other taxa, just the number of individuals with abnormalities is presented. The significance of these abnormalities has not been statistically evaluated. Deformities are called "chronic" if they were observed in more than one round of sampling at a given site. Also, the presence of abnormalities is not factored into the NJIS but, rather, used to identify sites where additional investigations are needed.

Fewer abnormalities are seen in the current sampling than in the previous (1999) sampling [4]. From the current sampling of 160 sites, 34 (21.3%) contained organisms with abnormalities (Maps 2 - 7 , Volume 2). 14 of the sites exhibited a "chronic" presence of abnormalities (Table 3, Volume 2). Notably, the majority of these "chronic" sites are situated in areas where a higher percentage of urban land use occurs (Maps 2 - 7, Volume 2). Further study is needed to establish the significance of the presence of abnormalities.

Causes and Conditions of Impairment

Biological impairment, as determined through RBP analysis, is manifested by alterations or differences in

macroinvertebrate community structure, compared to a reference or "ideal" condition. In an impaired situation, taxa of pollution-tolerant groups (such as worms and midges) tend to dominate over pollution-intolerant forms (e.g., mayflies, stoneflies, etc.), with an overall depression in species diversity. Such discrepancies are typically due to degraded instream environmental conditions, which may be caused by various human activities or land uses and, in some cases, by natural features or events. Environmental factors that may adversely affect stream biology, including both chemical and physical parameters, are listed below:

1. Degraded habitat (see Table 4, Volume 2)
    a. lack of stable and varied substrate
    b. lack of bank vegetation/canopy (= poor bank stability, lack of shade)
    c. excessive sedimentation (= poor substrate and water clarity)
    d. lack of streamflow (= low water level, low dissolved oxygen, possible sedimentation, undesirable vegetation)
2. Eutrophication (= excessive nutrients promoting undesirable vegetation or algal blooms, and increased turbidity)
3. Domestic (organic) waste (promotes hypoxia, turbidity, eutrophication)
4. Physiochemical water quality factors which, alone or in combination, can have adverse effects
    a. higher than normal temperature
    b. excessive turbidity
    c. lack of dissolved oxygen
    d. presence of toxicants (in various chemical forms)

Inter-related human activities or practices, land uses, and natural features or events that contribute to degraded stream quality include:

1. Deforestation/development/construction (largely via runoff from non-point sources)
2. Urbanization/industrialization (largely via runoff from non-point sources)
3. Agricultural operations (largely via runoff from non-point sources)
4. Municipal or industrial wastewater discharge (from point sources)
5. Artificial channelization or habitat alteration
6. Upstream impoundment, lake or pond
7. Drought conditions

Habitat Assessment vs. Biological Impairment

The relationship between habitat assessment scores and corresponding NJIS scores were plotted, and a coefficient of determination (R^2) value calculated for each WMA (Appendix C, Volume 2). The R^2 has a value ranging from zero to one, and is a fraction of the variance shared by two variables graphed along an X and Y axis. For example, if $R^2 = 0.59$, then 59% of the variance in X can be explained by the variance in Y, or vice versa. The higher the R^2 value, the more likely the variance in one variable can be explained by the variance of another. In this case the variables are habitat assessments vs. biological impairment (NJIS). The R^2 values were calculated to determine if general trends in habitat degradation could explain general trends in biological impairment. For all sites in the Raritan Water Region, an overall R^2 value of 0.14 was calculated when comparing habitat assessments to NJIS. This can be interpreted that for all sites in this region, a strong direct correlation between habitat and biological impairment existed 14% of the time. An R^2 value was also calculated, individually, for the three WMA's in this Water Region. The R^2

values for WMA 7, 8, 9, and 10, were 0.26, 0.13, 0.13, and 0.02 respectively. Again, this indicates that a strong direct correlation between habitat and biological impairment existed 2% - 26% of the time.

The R^2 values suggest that other factors, which may include land use and/or water quality, are likely contributing to the observed biological impairments. Sites with an impaired biological assessment, but with a relatively high habitat assessment score, could be impacted by point and/or nonpoint sources outside the range of the visual based habitat assessment. Also, an intermittent or short term impact may have occurred which left no obvious visual evidence at the site. In these cases, further investigation is needed to determine the source of impairment that is affecting the biota. Some sites assessed with a non-impaired biological assessment may have a relatively degraded habitat assessment. This could be due to a temporary degradation, such as drought or flooding (near to the time of the assessment), which was not severe enough to effect the biota. It is also possible that a temporary or recent degradation may not have immediate observable effects on the biota. In either case, these sites should be studied further to avoid future impairment to the biota. Due to the prevalence of multiple stressors throughout the State, it is further suggested that the relationship between habitat assessments and biological assessments be studied on a site-by-site basis.

As reflected in the present study results, human land uses and practices, superimposed on the undisturbed physical terrain, play a major role in controlling the degree of pollution or degradation in a stream system [15]. The relationship between benthic macroinvertebrate community impairment has been statistically related to different physiographic land types, land uses and other anthropogenic factors, on a statewide basis [15]. These findings strongly indicate that human land uses and practices play a major role in the degree of pollution or degradation in a stream system. Data analysis from Ayers et al., 2000 [21] for instance, concludes the following:

1) Fish and invertebrate communities are commonly impaired in urban streams;
2) Invertebrate community impairment was related to total urban land and total wastewater flow upstream of a site;
3) Changes in aquatic community structure were statistically related to environmental variables along the urban gradient – that is to say that such things as impervious surfaces were related to a negative response in the aquatic invertebrate community.

Conversely, the same Ayers data analysis also demonstrated that the area of forest and wetland in a stream's drainage basin was a strong mitigating factor in protecting invertebrate community health.

Additional Information

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REFERENCES

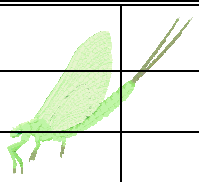
1. Plafkin, J.L., M.T. Barbour, K.D. Porter, S.K. Gross and R.M. Hughes, 1989. Rapid bioassessment protocols for use in streams and rivers—benthic macroinvertebrates and fish. EPA/44/4-89-002. US Environmental Protection Agency. Washington, D.C. 143pp. and appendices.
2. New Jersey Department of Environmental Protection. 2006. New Jersey 2006 Integrated Water Quality Monitoring and Assessment Report, 305 (b) and 303 (d). Water Monitoring and Standards. Trenton, NJ.
3. New Jersey Department of Environmental Protection. Data report, 1998. New Jersey's modernized ambient chemical monitoring network. Division of Watershed Management. Trenton, NJ. 12pp.
4. New Jersey Department of Environmental Protection. Data report, 1995. Ambient biomonitoring network, Raritan River drainage basins. Bureau of Water Monitoring. Trenton, NJ. 8pp. and maps and appendices.
5. New Jersey Department of Environmental Protection. Data report, 2000. Ambient biomonitoring network Raritan Region. Bureau of Water Monitoring. Trenton, NJ. 16pp. and maps and appendices.
6. New Jersey Department of Environmental Protection. Data report, 1994. Ambient biomonitoring network, Arthur Kill, Passaic, Hackensack, and Wallkill River drainage basins. Bureau of Water Monitoring. Trenton, NJ. 10pp. and maps and appendices.
7. New Jersey Department of Environmental Protection. 1992. Field sampling procedures manual. NJDEP. Trenton, NJ. 360pp.
8. Barbour, M.T., J. Gerritson, B.D. Snyder and J.B. Stribling. 1999. Rapid bioassessment protocols for use in wadable streams and rivers: Periphyton, Benthic Macroinverbrates, and Fish, 2nd ed. USEPA 841-B-99-002. Chps. 1–11 and appendices.
9. New Jersey Department of Environmental Protection. Laboratory report, 1998. Standard operating procedures for the aquatic biomonitoring laboratory. Bureau of Freshwater & Biological Monitoring. Trenton, NJ.
10. New Jersey Department of Environmental Protection. Report, 2004. Work/quality assurance project plan: Ambient Biomonitoring Network (AMNET), Raritan Region, FY04-05. Bureau of Freshwater and Biological Monitoring. Trenton, NJ.
11. U.S. Environmental Protection Agency. 1997. Field and laboratory methods for macroinvertebrate and habitat assessment of low gradient nontidal streams. Mid-Atlantic Coastal Streams Workgroup, Environmental Services Division, Region 3. Wheeling, WV. 23pp. and appendices.
12. Klemm, D.J., P.A. Lewis, F. Fulk and J.M. Lazorchak. 1990. Macroinvertebrate field and laboratory methods for evaluating the biological integrity of surface waters. EPA/600/4-90/030. U.S. Environmental Protection Agency. Cincinnati, OH. 206pp. and appendices.
13. Kurtenbach, J. 1991. A method for rapid bioassessment of streams in New Jersey using benthic macroinvertebrates. Bull. N. Am. Benth. Soc. 8(1):129.
14. New Jersey Department of Environmental Protection. 2006. Surface and Ground Water Quality Standards. Water Monitoring and Standards. Trenton, NJ.
15. Kennen, J.G. 1998. Relation of benthic macroinvertebrate community impairment to basin characteristics in New Jersey streams. Fact Sheet FS-057-98. U.S. Geological Survey. West Trenton, NJ.
16. Dickman, Mike, Ian Brindle, and Martin Benson, 1992. Evidence of teratogens in sediments of the Niagara River Watershed as reflected by chironomid (Diptera: Chironomidae) deformities. Journal of Great Lakes Res. 18(3):467-480.
17. Hamilton, A.L. and O.A. Saether, 1971. The occurrence of characteristic deformities in the chironomid larvae of several Canadian lakes. Canadian Entomologist 103:363-368.
18. Warwick, W.F., 1985. Morphological abnormalities in Chironomidae (Diptera) larvae as measures of toxic stress in freshwater ecosystems: indexing antennal deformities in *Chironomus* Meigen. Canadian Journal of Fisheries and Aquatic Sciences 42:1881-1914.
19. Lenat, David R., 1993. Using mentum deformities of *Chironomus* larvae to evaluate the effects of toxicity and organic loading in streams. Journal of N. Am. Benthol. Soc. 12(3):265-269.
20. Diggins, T.P. and K.M. Stewart, 1993. Deformities of aquatic larval midges (Chironomidae: Diptera) in the sediments of the Buffalo River, New York. Journal of Great Lakes Res. 19(4):648-659
21. Ayers, M., Kennon, J., Stackleberg, P., Kauffman, L. 2000. Building a stronger scientific basis for landuse planning and watershed management effects on water quality and aquatic communities in NJ streams. USGS. West Trenton, NJ.

TABLE 1

BIOLOGICAL CRITERIA FOR SCREENING WATER QUALITY IN NEW JERSEY FRESHWATER STREAMS*

Scoring Criteria for Rapid Bioassessments[1]

Biometrics	6	3	0
Taxa Richness (total Families)	>10	10-5	4-0
E+P+T Index[2] (EPT)	>5	5-3	2-0
Percent Dominance[3] (%CDF)	<40	40-60	>60
Percent EPT[4] (%EPT)	>35	35-10	<10
Modified Family Biotic Index[5] (FBI)	<5	5-7	>7



NOTE: The previous AMNET reports (1994-1996) contained incorrect number ranges for Modified Family Biotic Index. Using the incorrect numbers could lower the biological assessment on 9% of the sites evaluated. The numbers now presented in this table are correct and scores from previous reports were calculated using these ranges. No incorrect biological assessments exist in the previous reports.

Biological Assessment	Total Score
Non-impaired	24-30
Moderately Impaired	9-21
Severely Impaired	0-6

Attributes

Non-impaired: benthic community comparable to other undisturbed streams within the region; community characterized by a maximum taxa richness, balanced taxa groups, and good representation of intolerant individuals.

Moderately Impaired: macroinvertebrate richness reduced, in particular EPT taxa; reduced community balance and numbers of intolerant taxa.

Severely Impaired: benthic community dramatically different from those in less impaired situations; macroinvertebrates dominated by a few taxa, but with many individuals; only tolerant individuals present.

*
1 From Kurtenbach, 1991, based on RBP II protocols.
2 Follows RBP Protocol II; using 100 organism subsample, family level taxonomy
3 Ephemeroptera, Plecoptera, Trichoptera
4 % contribution of the dominant family
5 Including the hydropsychid family
Also known as the Hilsenhoff Biotic Index

NJ Department of Environmental Protection
Water Monitoring and Standards

AMBIENT BIOMONITORING NETWORK

Raritan Water Region

Watershed Management Areas 7, 8, 9, and 10
Round 3 Benthic Macroinvertebrate Data
Volume 2 of 2

February 2008

State of New Jersey
Jon S. Corzine, Governor

NJ Department of Environmental Protection
Lisa Jackson, Commissioner

NJ Department of Environmental Protection
Land Use Management
Mark Mauriello, Assistant Commissioner

Water Monitoring and Standards
Leslie McGeorge, Administrator

Bureau of Freshwater & Biological Monitoring
Alfred L. Korndoerfer, Jr., Chief

February 2008

AMBIENT BIOMONITORING NETWORK

Raritan Water Region
Watershed Management Areas 7, 8, 9, and 10

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Volume 2 of 2

Water Monitoring Report Prepared By:
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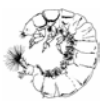


AMBIENT BIOMONITORING NETWORK

Watershed Management Areas 7, 8, 9, and 10

Raritan Water Region

Round 3 Benthic Macroinvertebrate Data

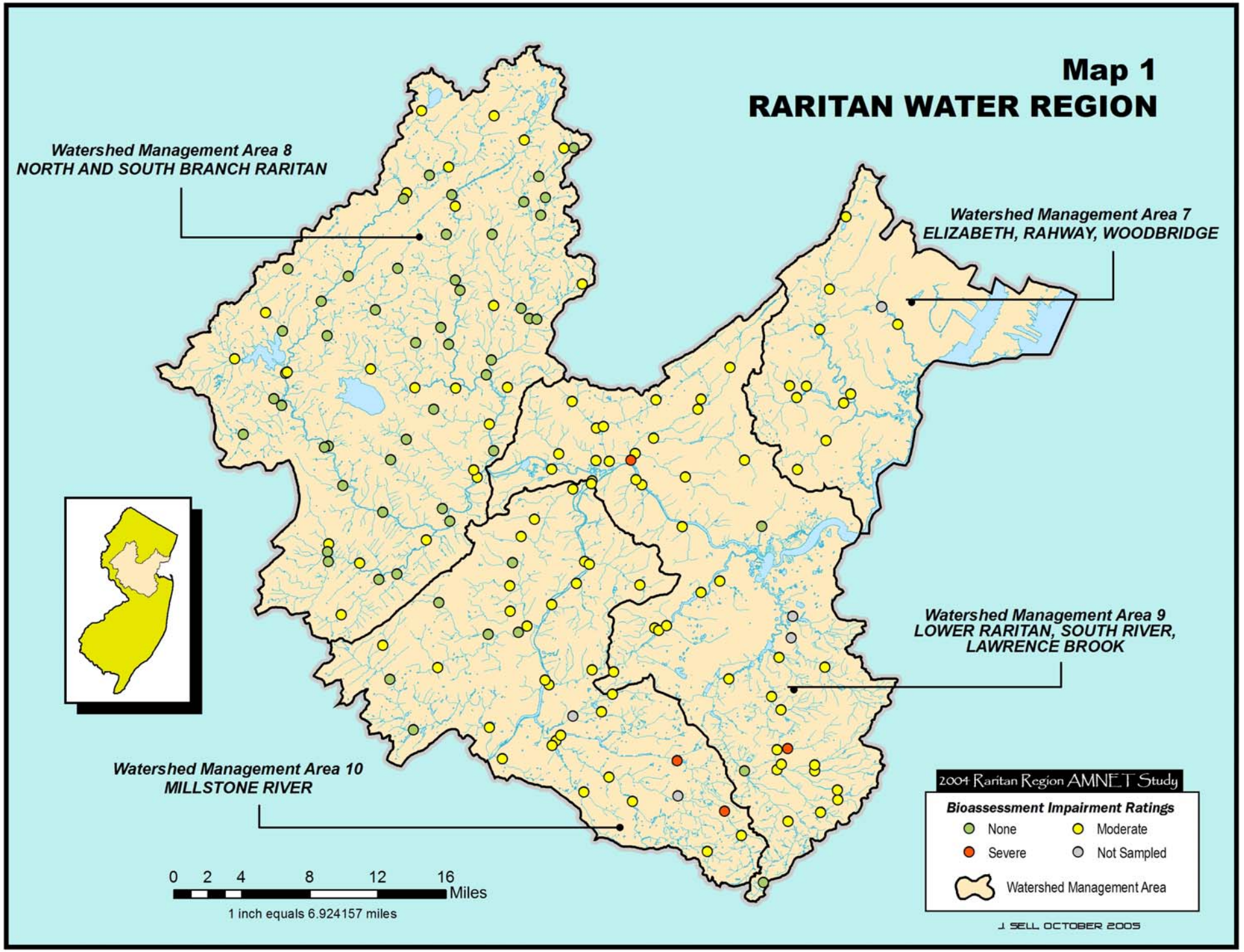
Volume 2 of 2

TABLE OF CONTENTS

MAPS

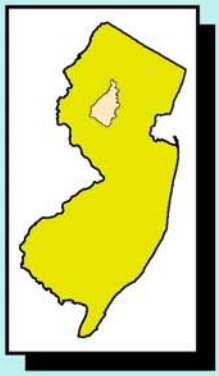
Round 3 Raritan Region AMNET Study
WMA's 7, 8, 9, & 10

AMNET site locations and their respective biological ratings, for each major sub-basin, are shown in maps 1- 7. Also identified are sites that exhibited significant and chronic macroinvertebrate abnormalities.


Map 1
RARITAN WATER REGION
Watershed Management Area 8
NORTH AND SOUTH BRANCH RARITAN
Watershed Management Area 7
ELIZABETH, RAHWAY, WOODBRIDGE
Watershed Management Area 9
LOWER RARITAN, SOUTH RIVER,
LAWRENCE BROOK
Watershed Management Area 10
MILLSTONE RIVER
0 2 4 8 12 16
Miles
1 inch equals 6.924157 miles
2004 Raritan Region AMNET Study
Bioassessment Impairment Ratings
None
Moderate
Severe
Not Sampled
Watershed Management Area
J SELL OCTOBER 2005

Map 2
ELIZABETH, RAHWAY, WOODBRIDGE
Watershed
Management
Area 7
AN0192 - Rahway River
Orange
AN0193 - Rahway River
Union
AN0202 - West Branch Elizabeth River
AN0204 - West Branch Elizabeth River
AN0194 - Rahway River
Westfield
Bayonne
AN0197 - Robinsons Branch trib
AN0198 - Robinsons Branch trib
AN0195 - Rahway River
AN0196 - Robinsons Branch
AN0199 - Robinsons Branch
Rahway
AN0201 - South Branch Rahway River
Menlo Park
AN0200 - South Branch Rahway River
PARKWAY
STATE
GARDEN
2004 Raritan Region AMNET Study
Bioassessment Impairment Ratings
None
Moderate
Severe
Not Sampled
Macroinvertebrate Abnormalities
Macroinvertebrate Abnormalities Present
Chronic Macroinvertebrate Abnormalities
0 1 2 4 6 8
Miles
1 inch equals 2.853198 miles
J. SELL OCTOBER 2005

Map 3
NORTH BRANCH RARITAN RIVER
Watershed Management Area 8 (Part)



Kenvil
Milltown
Fairmount
Oldwick
Bernardsville
Milltown

AN0356 - Lamington River
AN0344 - UNT to India Bk
AN0344A - India Bk
AN0347 - Dawsons Bk
AN0357 - Tanners Bk
AN0345 - India Bk
AN0358 - Lamington River
AN0348 - Burnett Bk
AN0346 - N Br Raritan River
AN0359 - Trout Bk
AN0349 - Peapack Bk
AN0364 - N Br Rockaway Ck
AN0360 - Lamington River
AN0352 - Mine Bk
AN0361 - UNT to Lamington River
AN0354 - Middle Bk
AN0365 - N Br Rockaway Ck
AN0350 - Peapack Bk
AN0351 - N Br Raritan River
AN0353 - Mine Bk
AN0362 - Cold Bk
AN0366 - N Br Rockaway Ck
AN0363 - Lamington River
AN0355 - Middle Bk
AN0367 - S Br Rockaway Ck
AN0370 - Lamington River
AN0368 - S Br Rockaway Ck
AN0371 - Chambers Bk B
AN0369 - Rockaway Ck
AN0372 - Chambers Bk A
AN0373 - Chambers Bk A
AN0374 - N Br Raritan River

80 46 10 513 510 525 206 512 202 517 523 287 78 22

0 0.5 1 2 3 4 Miles

1 inch equals 2.717194 miles

2004 Raritan Region AMNET Study

Bioassessment Impairment Ratings

None Moderate Severe

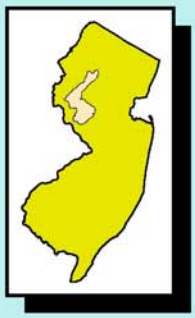
Macroinvertebrate Abnormalities

Macroinvertebrate Abnormalities Present

Chronic Macroinvertebrate Abnormalities

J SELL OCTOBER 2005

Map 4
SOUTH BRANCH RARITAN RIVER
Watershed Management Area 8 (Part)



AN0310 - South Branch Raritan River
AN0311 - Drakes Bk
Mount Olive
AN0312 - Drakes Bk
AN0313 - Stony Bk
AN0314 - Electric Bk
AN0315 - South Branch Raritan River
AN0318 - Spruce Run
AN0316 - South Branch Raritan River
AN0317 - South Branch Raritan River
AN0319 - Spruce Run
AN0320 - Willoughby Bk
AN0323 - Beaver Bk
AN0321 - Mulhockaway Ck
Pattenburg
AN0324 - Beaver Bk
AN0322 - South Branch Raritan River
AN0324A - Sidney Bk
AN0325 - Cakepoulin Ck
AN0325B - Cakepoulin Ck
AN0342 - Holland Bk
Readington
AN0326 - South Branch Raritan River
AN0327 - Prescott Bk
AN0339 - Pleasant Run
AN0343 - Holland Bk
AN0341 - South Branch Raritan River
AN0328 - Assiscong Ck
AN0340 - Pleasant Run
AN0329 - South Branch Raritan River
Flemington
AN0338 - South Branch Raritan River
Neshanic
AN0330 - First Neshanic River
AN0337 - Neshanic River
AN0331 - Second Neshanic River
AN0333 - Neshanic River
AN0332 - Third Neshanic River
AN0336 - Furmans Bk
AN0335 - Back Bk
Ringoes
AN0334 - Back Bk

0 1 2 4 6 8 Miles

1 inch equals 3.719062 miles

2004 Raritan Region AMNET Study

Bioassessment Impairment Ratings

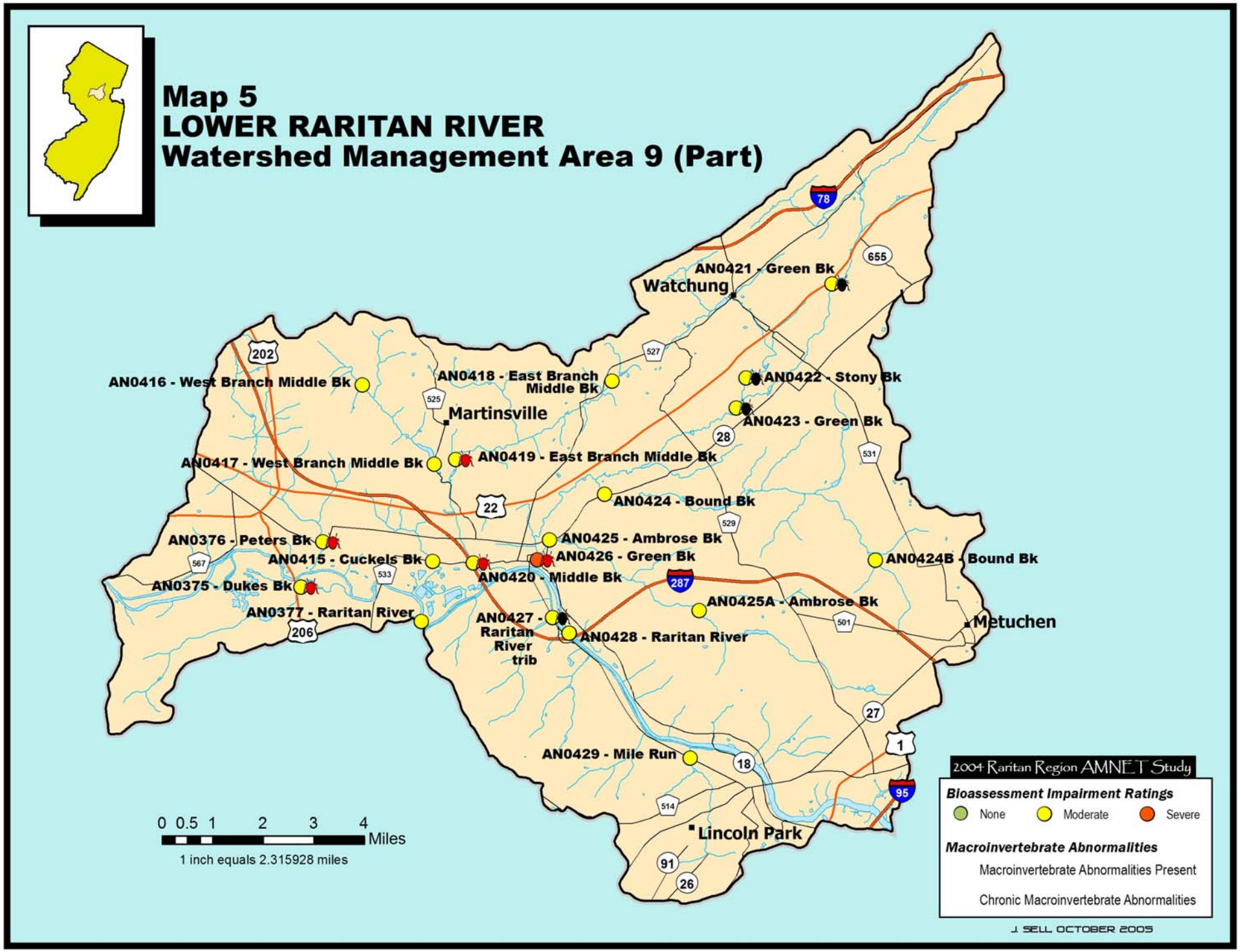
None · Moderate · Severe

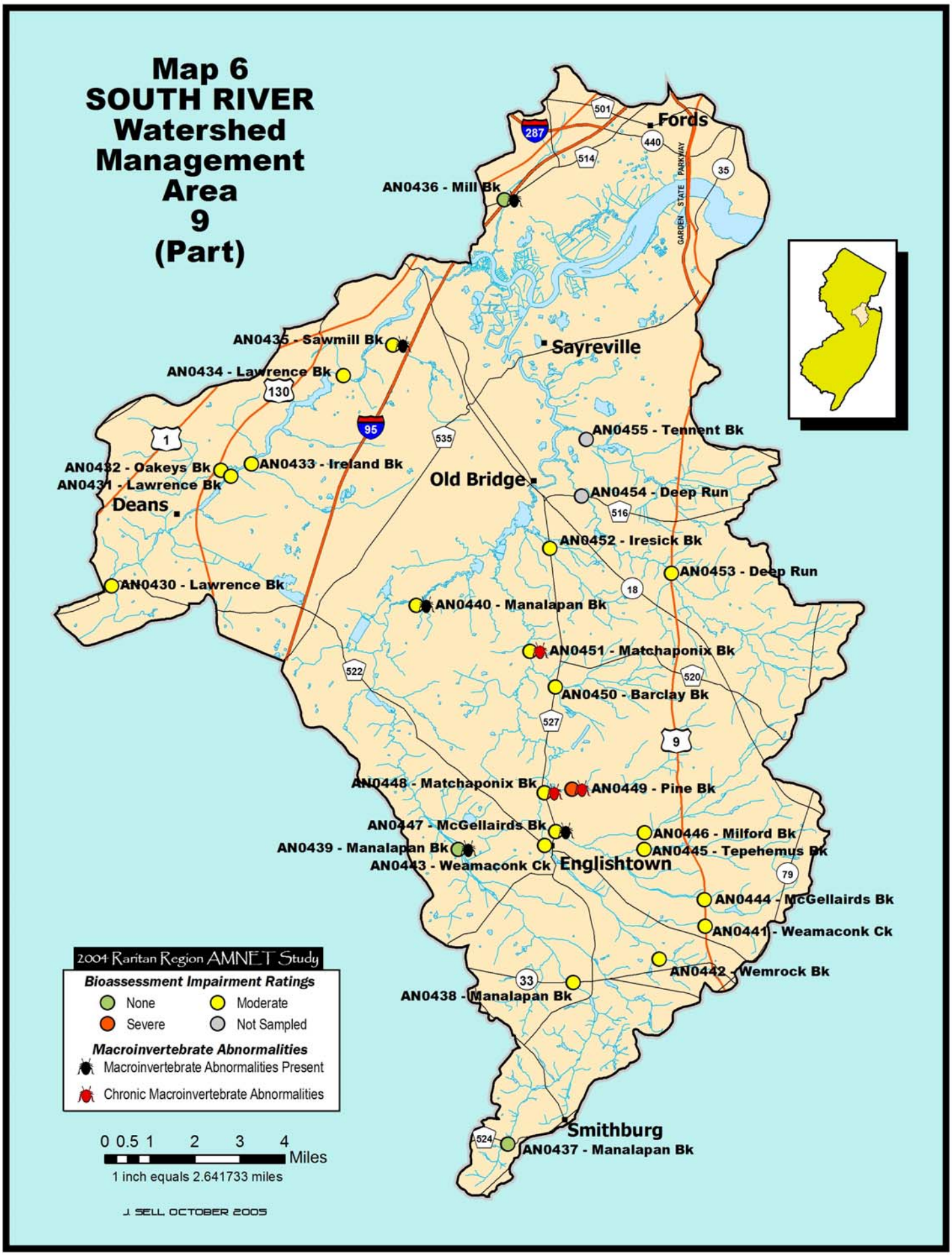
Macroinvertebrate Abnormalities

Macroinvertebrate Abnormalities Present

Chronic Macroinvertebrate Abnormalities

J SELL OCTOBER 2005


Map 5
LOWER RARITAN RIVER
Watershed Management Area 9 (Part)
AN0421 - Green Bk
Watchung
AN0416 - West Branch Middle Bk
AN0418 - East Branch Middle Bk
AN0422 - Stony Bk
Martinsville
AN0423 - Green Bk
AN0417 - West Branch Middle Bk
AN0419 - East Branch Middle Bk
AN0424 - Bound Bk
AN0376 - Peters Bk
AN0425 - Ambrose Bk
AN0415 - Cuckels Bk
AN0426 - Green Bk
AN0424B - Bound Bk
AN0375 - Dukes Bk
AN0420 - Middle Bk
AN0425A - Ambrose Bk
AN0377 - Raritan River
AN0427 - Raritan River trib
AN0428 - Raritan River
Metuchen
AN0429 - Mile Run
Lincoln Park
78
655
202
527
525
28
531
22
529
567
533
287
501
206
27
1
18
95
514
91
26
0 0.5 1 2 3 4 Miles
1 inch equals 2.315928 miles
2004 Raritan Region AMNET Study
Bioassessment Impairment Ratings
None
Moderate
Severe
Macroinvertebrate Abnormalities
Macroinvertebrate Abnormalities Present
Chronic Macroinvertebrate Abnormalities
J SELL OCTOBER 2005


Map 6
SOUTH RIVER
Watershed
Management
Area
9
(Part)
Fords
Sayreville
Old Bridge
Deans
Englishtown
Smithburg
AN0436 - Mill Bk
AN0435 - Sawmill Bk
AN0434 - Lawrence Bk
AN0432 - Oakeys Bk
AN0431 - Lawrence Bk
AN0433 - Ireland Bk
AN0430 - Lawrence Bk
AN0455 - Tennent Bk
AN0454 - Deep Run
AN0452 - Iresick Bk
AN0453 - Deep Run
AN0440 - Manalapan Bk
AN0451 - Matchaponix Bk
AN0450 - Barclay Bk
AN0448 - Matchaponix Bk
AN0449 - Pine Bk
AN0447 - McGellairds Bk
AN0439 - Manalapan Bk
AN0443 - Weamaconk Ck
AN0446 - Milford Bk
AN0445 - Tepehemus Bk
AN0444 - McGellairds Bk
AN0441 - Weamaconk Ck
AN0442 - Wemrock Bk
AN0438 - Manalapan Bk
AN0437 - Manalapan Bk
GARDEN STATE PARKWAY
287
501
440
514
35
130
1
95
535
516
18
522
520
527
9
79
33
524
2004 Raritan Region AMNET Study
Bioassessment Impairment Ratings
None
Moderate
Severe
Not Sampled
Macroinvertebrate Abnormalities
Macroinvertebrate Abnormalities Present
Chronic Macroinvertebrate Abnormalities
0 0.5 1 2 3 4
Miles
1 inch equals 2.641733 miles
J SELL OCTOBER 2005

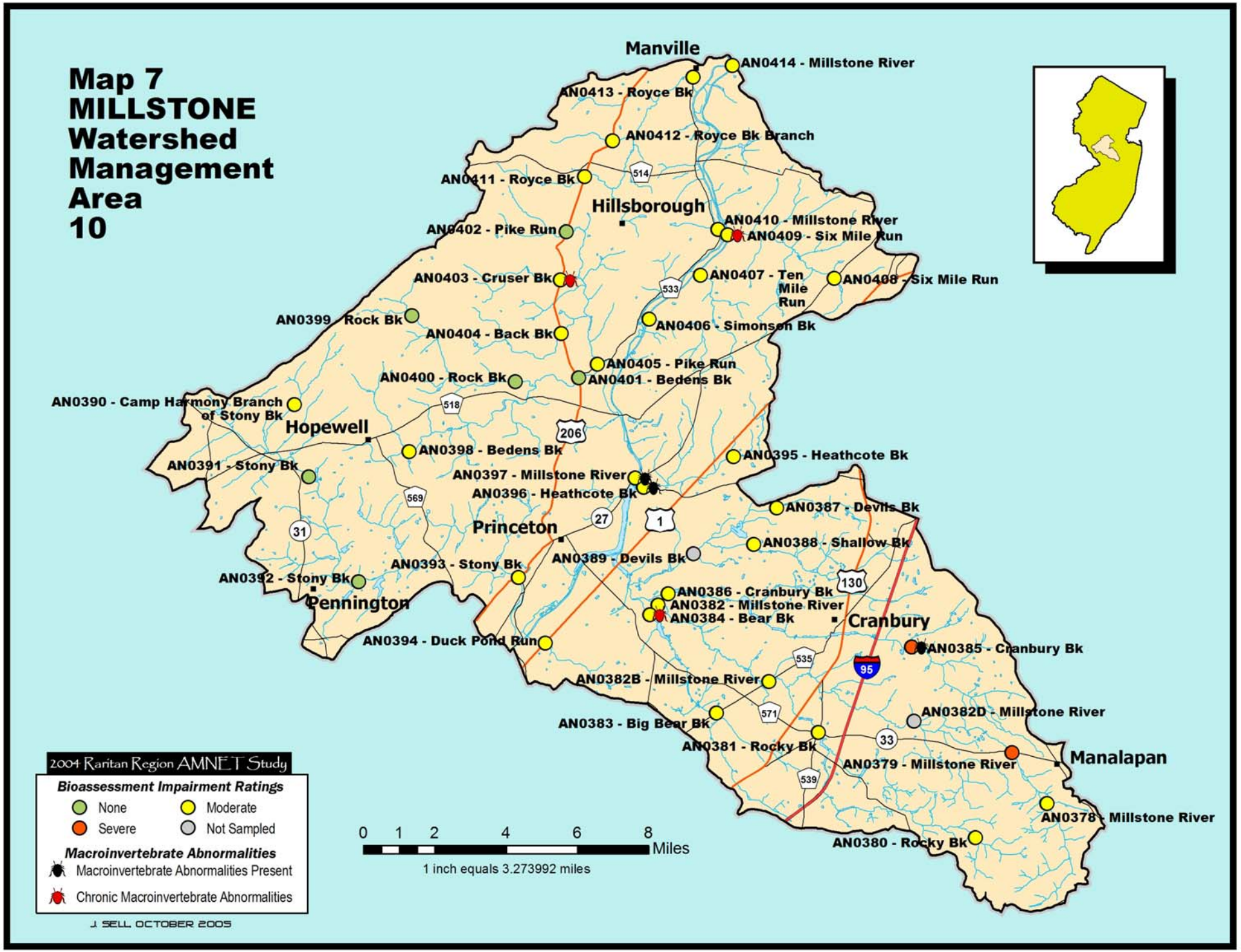

Map 7
MILLSTONE
Watershed
Management
Area
10
Manville
AN0414 - Millstone River
AN0413 - Royce Bk
AN0412 - Royce Bk Branch
AN0411 - Royce Bk
514
Hillsborough
AN0410 - Millstone River
AN0409 - Six Mile Run
AN0402 - Pike Run
AN0403 - Cruser Bk
AN0407 - Ten Mile Run
AN0408 - Six Mile Run
533
AN0399 - Rock Bk
AN0404 - Back Bk
AN0406 - Simonson Bk
AN0405 - Pike Run
AN0400 - Rock Bk
AN0401 - Bedens Bk
AN0390 - Camp Harmony Branch of Stony Bk
518
Hopewell
206
AN0398 - Bedens Bk
AN0395 - Heathcote Bk
AN0391 - Stony Bk
AN0397 - Millstone River
AN0396 - Heathcote Bk
569
AN0387 - Devils Bk
27
1
Princeton
31
AN0388 - Shallow Bk
AN0389 - Devils Bk
AN0393 - Stony Bk
AN0392 - Stony Bk
130
AN0386 - Cranbury Bk
AN0382 - Millstone River
AN0384 - Bear Bk
Pennington
Cranbury
AN0394 - Duck Pond Run
AN0385 - Cranbury Bk
535
95
AN0382B - Millstone River
AN0382D - Millstone River
571
AN0383 - Big Bear Bk
33
AN0381 - Rocky Bk
Manalapan
AN0379 - Millstone River
539
AN0378 - Millstone River
AN0380 - Rocky Bk
2004 Raritan Region AMNET Study
Bioassessment Impairment Ratings
None
Moderate
Severe
Not Sampled
Macroinvertebrate Abnormalities
Macroinvertebrate Abnormalities Present
Chronic Macroinvertebrate Abnormalities
0 1 2 4 6 8
Miles
1 inch equals 3.273992 miles
J. SELL OCTOBER 2005

Table 2

Comparative Scores / Ratings (see notes)

Watershed Management Areas 7, 8, 9 and 10

Station	NJ Impairment Score		Change in Rating	Habitat Score	WMA
	1999	2004			
192	15	12	/-	58	7
193	9	18	/+	152	7
194	3	12	+	107	7
195	6	18	+	134	7
196	12	9	/-	101	7
197	15	18	/+	125	7
198	18	12	/-	111	7
199	15	15	/	116	7
200	6	18	+	113	7
201	12	18	/+	131	7
202	12	nd	nd	nd	7
204	24	21	—	102	7
310	15	15	/	178	8
311	21	21	/	124	8
312	30	21	—	153	8
313	30	30	/	164	8
314	30	12	—	101	8
315	24	24	/	147	8
316	27	24	/-	178	8
317	30	30	/	183	8
318	30	30	/	178	8
319	24	21	—	162	8
320	27	30	/+	174	8
321	24	21	—	177	8
322	27	27	/	111	8
323	30	27	/-	184	8
324	9	12	/+	103	8
324A	nd	30	nd	159	8
325	30	27	/-	157	8
325B	30	30	/	150	8
326	18	30	+	143	8
327	30	30	/	167	8
328	30	30	/	178	8
329	27	24	/-	145	8
330	12	12	/	142	8
331	21	27	+	137	8
332	21	30	+	129	8
333	12	21	/+	130	8
334	18	21	/+	112	8
335	12	27	+	108	8
336	27	30	/+	154	8
337	18	21	/+	146	8
338	30	27	/-	137	8
339	30	30	/	156	8
340	21	24	+	110	8
341	27	21	—	135	8
342	30	30	/	152	8
343	21	15	/-	111	8
344	30	21	—	160	8
344A	27	30	/+	115	8
345	30	30	/	189	8
346	30	24	/-	162	8
347	30	30	/	145	8
348	30	30	/	163	8
349	30	30	/	167	8
350	30	30	/	142	8
351	30	27	/-	147	8
352	6	18	+	147	8
353	21	24	+	115	8
354	30	9	—	136	8
355	24	27	/+	130	8
356	9	9	/	119	8
357	27	24	/-	106	8
358	27	21	—	191	8
359	30	30	/	166	8
360	30	30	/	157	8
361	30	30	/	161	8
362	30	30	/	137	8
363	30	30	/	156	8
364	30	27	/-	154	8
365	30	30	/	144	8
366	30	30	/	180	8
367	30	21	—	165	8
368	21	15	/-	171	8
369	27	15	—	104	8
370	30	27	/-	137	8
371	18	15	/-	128	8
372	24	27	/+	139	8
373	30	18	—	163	8
374	30	30	/	156	8
375	21	12	/-	130	9
376	9	15	/+	113	9
377	21	12	/-	118	9
378	9	18	/+	112	10
379	18	6	—	150	10
380	18	21	/+	148	10
381	6	15	+	108	10
382	21	15	/-	158	10
382B	15	15	/	133	10
382D	12	nd	nd	nd	10
383	12	12	/	160	10
384	24	12	—	170	10
385	6	3	/-	146	10
386	nd	9	nd	158	10
387	6	15	+	166	10
388	15	12	/-	146	10
389	21	nd	nd	nd	10
390	15	21	/+	162	10
391	12	27	+	167	10
392	21	24	+	154	10
393	12	21	/+	173	10
394	18	9	/-	141	10
395	15	12	/-	126	10
396	24	18	—	168	10
397	9	18	/+	170	10
398	21	15	/-	165	10
399	18	27	+	171	10
400	nd	24	nd	128	10
401	15	27	+	143	10
402	18	24	+	161	10
403	21	21	/	153	10
404	21	21	/	121	10
405	3	15	+	150	10
406	15	12	/-	112	10
407	21	18	/-	155	10
408	15	9	/-	149	10
409	18	15	/-	140	10
410	15	15	/	157	10
411	21	18	/-	160	10
412	12	12	/	162	10
413	6	9	+	131	10
414	15	21	/+	123	10
415	15	12	/-	134	9
416	18	9	/-	158	9
417	12	18	/+	152	9
418	18	15	/-	157	9

NOTES:

Comparison of NJ impairment score results between earliest and latest sampling dates:

nd no data
\+ indicates positive change in rating
— indicates negative change in rating
/ indicates no change in rating
/+ or /- indicates change in score, but not in rating (see Table 1)

NJ Impairment Score	Value
Non-Impaired	24 - 30
Moderately Impaired	9 - 21
Severely Impaired	0 - 6

Habitat Score	Value
Optimal	160 - 200
Sub-optimal	110 - 159
Marginal	60 - 109
Poor	<60

Table 2

Comparative Scores / Ratings (see notes)

Watershed Management Areas 7, 8, 9 and 10

Station	NJ Impairment Score		Change in Rating	Habitat Score	**WMA**	Station	NJ Impairment Score		Change in Rating	Habitat Score	**WMA**	Station	NJ Impairment Score		Change in Rating	Habitat Score	**WMA**
	1999	2004															
419	27	15	—	157	9												
420	30	21	—	169	9												
421	15	15	/	118	9												
422	15	15	/	158	9												
423	9	18	/+	122	9												
424	12	15	/+	134	9												
424B	6	12	+	82	9												
425	15	12	/-	168	9												
425A	18	15	/-	100	9												
426	15	3	—	105	9												
427	18	12	/-	134	9												
428	24	18	—	135	9												
429	6	12	+	126	9												
430	6	9	+	156	9												
431	12	15	/-	115	9												
432	15	18	/+	167	9												
433	21	15	/-	190	9												
434	15	15	/	149	9												
435	12	9	/-	76	9												
436	15	24	+	155	9												
437	27	24	/-	158	9												
438	27	12	—	143	9												
439	18	24	+	110	9												
440	21	15	/-	138	9												
441	9	12	/+	134	9												
442	21	12	/-	148	9												
443	15	15	/	141	9												
444	15	21	/+	134	9												
445	12	12	/	122	9												
446	15	15	/	127	9												
447	6	9	+	127	9												
448	15	15	/	133	9												
449	6	6	/	115	9												
450	21	12	/-	146	9												
451	12	9	/-	113	9												
452	15	9	/-	78	9												
453	15	9	/-	122	9												
454	6	nd	nd	nd	9												
455	15	nd	nd	nd	9												

NOTES:

Comparison of NJ impairment score results between earliest and latest sampling dates:

nd no data
\+ indicates positive change in rating
— indicates negative change in rating
/ indicates no change in rating
/+ or /- indicates change in score, but not in rating (see Table 1)

NJ Impairment Score	Value
Non-Impaired	24 - 30
Moderately Impaired	9 - 21
Severely Impaired	0 - 6

Habitat Score	Value
Optimal	160 - 200
Sub-optimal	110 - 159
Marginal	60 - 109
Poor	<60

Table 3

Macroinvertebrate Abnormalities (see notes)

Watershed Management Areas 7, 8, 9, and 10

Station	1999	2004	WMA			Station	1999	2004	WMA				
193	1/15+1*		7			393	1/44		10				
194	+2	+1	7			395	4/16*		10				
195		+3	7			396		1/36	10				
197	1/3*		7			397		1/58	10				
199		+1	7			401	2/52		10				
200		1/8	7			403	2/44	2/18	10				
202	1/26		7			405	3/31*		10				
204	3/26*		7			409	1/2*	+1	10				
311	+1		8			411	1/1*		10				
315	+1		8			417	2/29*		9				
316		1/48	8			418	1/14*		9				
322	2/44		8			419	1/19	1/43	9				
325B	1/35		8			420	3/15*	2/41	9				
330	5/82*		8			421		+1, 3/19	9				
332	+1		8			422		1/23	9				
334	+3		8			423		1/43	9				
337	+1		8			424	2/3*		9				
343	1/33		8			424B	+1		9				
348	1/10*		8			425A	+1		9				
349		1/9	8			426	+1	3/70	9				
350	1/26		8			427		1/19	9				
353	1/38		8			428	1/21		9				
355		2/37	8			431	1/24		9				
356	+1	+2	8			435		1/14	9				
358	+1	1/38	8			436		1/26	9				
366		1/15	8			438	4/12*		9				
372	2/29*		8			439		1/22	9				
374		+1	8			440		1/59	9				
375	1/22	+1	9			445	3/25*		9				
376	3/15*	+1	9			447		+1	9				
379	1/28		10			448	3/23*+1	+2	9				
382	+2		10			449	3/48*	1/60	9				
382B	+1		10			450	2/25*		9				
384	2/21*	1/53	10			451	+1	1/70	9				
385		3/114	10			452	1/17*		9				
392	1/8*		10										

NOTES:

chironomids with deformities / # chironomids examined

+ — indicates the number of non-chironomids having abnormalities

abnormalities are considered chronic if they appear in both the 1999 and the 2004 columns

Table 4 — **HABITAT ASSESSMENT FOR *HIGH* GRADIENT STREAMS**

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity / depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yrs.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

HABITAT SCORES	VALUE
OPTIMAL	160 X 200
SUB-OPTIMAL	110 X 159
MARGINAL	60 X 109
POOR	< 60

Table 4 (cont.) — HABITAT ASSESSMENT FOR *LOW* GRADIENT STREAMS

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% <20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yrs.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Bank Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

HABITAT SCORES	VALUE
OPTIMAL	160 X 200
SUB-OPTIMAL	110 X 159
MARGINAL	60 X 109
POOR	< 60

Table 5 - List of AMNET sites with Possible Exceedences:

Amnet#	Stream Name	Station Location	Exceedences
AN0192	Rahway R	Northfield Ave	Tot Phos, TDS
AN0193	Rahway R	Rt 82 (Morris Ave) nr Washington Ave	Tot Phos
AN0194	Rahway R	Rt 509 Kenilworth Blvd	Tot Phos
AN0195	Rahway R	River Rd & Church St	Tot Phos, TSS
AN0197	Robinsons Br trib	Raritan Rd (Terrell Rd) Otl Shackamaxon Lk	Tot Phos
AN0198	Robinsons Br trib	Lamberts Mill Rd	Tot Phos
AN0199	Robinsons Br	Rt 27	Tot Phos
AN0200	Rahway R S Br	Parsonage Rd	Tot Phos, TDS, PCB, Dioxin
AN0201	Rahway R S Br	in Merrill Park off Fairview Rd; off of Dover Rd	Tot Phos, TDS, PCB, Dioxin
AN0202	W Br Elizabeth R	Vaux Hall Rd	Tot Phos, TDS
AN0204	Elizabeth R	North Ave	Tot Phos, TDS
AN0313*	Stony Bk	Fairview Ave	Tot Phos, Temp
AN0314	Electric Bk	Fairview Ave	Tot Phos, Temp
AN0315*	S Br Raritan R	Rt 517	Tot Phos, Temp
AN0316*	S Br Raritan R	off Raritan River Rd (Rt 512)	Tot Phos, Temp
AN0317*	S Br Raritan R	River Rd (Ken Lockwood Gorge)	Tot Phos, Temp
AN0318*	Spruce Run	Newport Rd	Tot Phos
AN0320*	Willoughby Bk	Rt 31	Tot Phos, Temp, pH
AN0321	Mulhockaway Ck	Van Syckel Rd (Rt 635)	Temp
AN0323*	Beaver Bk	Herman Thau Rd	Tot Phos
AN0324	Beaver Bk	Leigh St	Tot Phos
AN0325*	Cakepoulin Ck	Lower Lands Down Rd	Tot Phos, DDX
AN0325B*	Cakepoulin Ck	Rt 513	Tot Phos, DDX
AN0326*	S Br Raritan R	Stanton Rd	pH, Temp
AN0328*	Assiscong Ck	River Rd	pH, Temp
AN0329*	Raritan R S Br	Rt 613 (Old York Rd)	Tot Phos
AN0332*	Third Neshanic R	Rt 31	DO
AN0333	Neshanic R	Everitt Rd	Tot Phos
AN0336*	Furmans Bk	Welisewitz Rd (below confluence of streams)	Tot Phos
AN0337	Neshanic R	Rt 514 (Amwell Rd.)	Tot Phos
AN0338*	Raritan R S Br	Elm St	Tot Phos
AN0341	Raritan R S Br	Studdiford Drive	Tot Phos
AN0357*	Tanners Bk	Tanners Brook Rd	Temp
AN0358	Lamington R	Rt 24 (Cooper Mill Park)	Tot Phos, Temp
AN0359*	Trout Bk	State Pk Rd near Hacklebarney St Pk	Tot Phos, Temp
AN0360*	Lamington R	Rt 512	Tot Phos, Temp
AN0363*	Lamington R	Rt 523	Tot Phos, Temp
AN0367	Rockaway Ck S Br	Windy Acres Farm (unpaved farm road)	Tot Phos, Temp
AN0368	Rockaway Ck S Br	Rt 22	Tot Phos, Temp
AN0369	Rockaway Ck	Island Rd	Tot Phos, pH
AN0370*	Lamington R	Cowperthwaite Rd	Tot Phos, pH
AN0371	Chambers Bk B	Love Rd	Tot Phos
AN0374*	Raritan R N Br	Rt 202	Tot Phos
AN0378	Millstone R	Baird Rd	Tot Phos, pH, TSS
AN0379	Millstone R	Rt 33	Tot Phos, pH, TSS
AN0381	Rocky Bk	Main St (outlet of Peddie Lake)	Tot Phos, pH
AN0382	Millstone R	Grovers Mill Rd	Tot Phos, pH

* non impaired AMNET site

results from the NJDEP 2006 Integrated List

Appendix A — Station Numbers and Locations for the Round 3 Raritan Region AMNET Study

Site	Stream	Latitude Longitude	Watershed Management Area
AN0192	Rahway River	40 46'11.022"N 74 16'59.605"W	7
AN0193	Rahway River	40 42'28.817"N 74 18'06.441"W	7
AN0194	Rahway River	40 40'24.010"N 74 18'46.508"W	7
AN0195	Rahway River	40 37'05.443"N 74 16'42.076"W	7
AN0196	Robinsons Br	40 36'55.135"N 74 20'20.659"W	7
AN0197	UNT to Robinsons Br	40 37'31.702"N 74 20'49.072"W	7
AN0198	UNT to Robinsons Br	40 37'29.941"N 74 19'41.278"W	7
AN0199	Robinsons Br	40 36'38.305"N 74 17'11.475"W	7
AN0200	South Br Rahway River	40 33'13.769"N 74 20'17.255"W	7
AN0201	South Br Rahway River	40 34'56.816"N 74 18'00.962"W	7
AN0202	West Br Elizabeth River	40 41'33.989"N 74 14'32.817"W	7
AN0204	Elizabeth River	40 40'39.173"N 74 13'32.202"W	7
AN0310	S Br Raritan River	40 51'37.094"N 74 45'35.854"W	8
AN0311	Drakes Bk	40 51'21.932"N 74 40'41.956"W	8
AN0312	Drakes Bk	40 48'43.555"N 74 43'45.689"W	8
AN0313	Stony Bk	40 48'18.444"N 74 45'03.008"W	8
AN0314	Electric Bk	40 47'23.423"N 74 46'34.952"W	8
AN0315	S Br Raritan River	40 47'06.051"N 74 46 48.068"W	8
AN0316	S Br Raritan River	40 43 07.160"N 74 50 30.437"W	8
AN0317	S Br Raritan River	40 41 48.921"N 74 52'18.904"W	8
AN0318	Spruce Run	40 43'29.440"N 74 54'33.994"W	8
AN0319	Spruce Run	40 41'13.965"N 74 56'02.431"W	8
AN0320	Willoughby Bk	40 40'17.910"N 74 54'54.388"W	8
AN0321	Mulhockaway Ck	40 38'50.889"N 74 58'07.677"W	8
AN0322	S Br Raritan River	40 38'06.966"N 74 54'41.665"W	8
AN0323	Beaver Bk	40 40'03.182"N 74 51'55.159"W	8
AN0324	Beaver Bk	40 38'10.799"N 74 54'34.759"W	8
AN0325	Cakepoulin Ck	40 36'28.147"N 74 54'56.769"W	8
AN0325B	Cakepoulin Ck	40 34'58.880"N 74 57'30.385"W	8
AN0326	S Br Raritan River	40 34'20.716"N 74 52'04.310"W	8
AN0327	Prescott Bk	40 34'24.249"N 74 51'48.234"W	8
AN0328	Assiscong Ck	40 32'23.181"N 74 50 49.303"W	8
AN0329	S Br Raritan River	40 31'01.180"N 74 48'06.911"W	8
AN0330	First Neshanic River	40 29'22.982"N 74 51'44.174"W	8
AN0331	Second Neshanic River	40 28'59.461"N 74 51'49.423"W	8
AN0332	Third Neshanic River	40 28'29.339"N 74 51'46.023"W	8
AN0333	Neshanic River	40 28'24.360"N 74 49'39.483"W	8
AN0334	Back Bk	40 25'46.280"N 74 50'50.907"W	8
AN0335	Back Bk	40 27'33.733"N 74 48'22.644"W	8
AN0336	Furmans Bk	40 27'50.648"N 74 47'09.998"W	8
AN0337	Neshanic River	40 29'36.452"N 74 45'11.866"W	8
AN0338	S Br Raritan River	40 30'33.765"N 74 43'37.036"W	8
AN0339	Pleasant Run	40 33'42.941"N 74 47'37.118"W	8
AN0340	Pleasant Run	40 31'12.166"N 74 44'08.481"W	8
AN0341	S Br Raritan River	40 32'48.659"N 74 41'47.348"W	8
AN0342	Holland Bk	40 34'44.840"N 74 46'33.607"W	8
AN0343	Holland Bk	40 33'11.473"N 74 42'01.971"W	8
AN0344	UNT to India Bk	40 49'41.598"N 74 36'00.921"W	8
AN0344A	India Bk	40 49'42.514"N 74 35'20.931"W	8
AN0345	India Bk	40 47'10.332"N 74 37'13.896"W	8
AN0346	N Br Raritan River	40 46'16.431"N 74 37'32.833"W	8
AN0347	Dawsons Bk	40 48'15.845"N 74 37'41.071"W	8
AN0348	Burnett Bk	40 46'57.039"N 74 38'42.290"W	8
AN0349	Peapack Bk	40 45'16.418"N 74 40'50.428"W	8
AN0350	Peapack Bk	40 41'29.592"N 74 38'52.271"W	8
AN0351	N Br Raritan River	40 40'58.337"N 74 38'18.657"W	8
AN0352	Mine Bk	40 42'44.667"N 74 34'45.474"W	8
AN0353	Mine Bk	40 40'56.332"N 74 37'48.227"W	8
AN0354	Middle Bk	40 41'37.919"N 74 40'42.730"W	8
AN0355	Middle Bk	40 38'50.859"N 74 40'51.794"W	8
AN0356	Lamington River	40 50'06.932"N 74 38'40.546"W	8
AN0357	Tanners Bk	40 47'17.943"N 74 43'32.431"W	8
AN0358	Lamington River	40 46'43.453"N 74 43'18.019"W	8
AN0359	Trout Bk	40 45'16.396"N 74 43'55.187"W	8

Appendix A — Station Numbers and Locations for the Round 3 Raritan Region AMNET Study

Site	Stream	Latitude Longitude	Watershed Management Area
AN0360	Lamington River	40 42'56.246"N 74 43'17.630"W	8
AN0361	UNT to Lamington River	40 42'24.643"N 74 42'59.361"W	8
AN0362	Cold Bk	40 40'30.024"N 74 44'16.069"W	8
AN0363	Lamington River	40 39'38.381"N 74 43'44.250"W	8
AN0364	N Br Rockaway Ck	40 43'31.244"N 74 47'10.077"W	8
AN0365	N Br Rockaway Ck	40 41'23.540"N 74 48'39.928"W	8
AN0366	N Br Rockaway Ck	40 39'42.387"N 74 45'57.240"W	8
AN0367	S Br Rockaway Ck	40 38'22.213"N 74 48'58.420"W	8
AN0368	S Br Rockaway Ck	40 37'24.551"N 74 45'59.963"W	8
AN0369	Rockaway Ck	40 37'23.975"N 74 43'15.131"W	8
AN0370	Lamington River	40 38'04.804"N 74 41'12.197"W	8
AN0371	Chambers(B) Bk	40 37'26.183"N 74 39'46.916"W	8
AN0372	Chambers(A) Bk	40 36'18.705"N 74 44'43.402"W	8
AN0373	Chambers(A) Bk	40 35'32.488"N 74 40'58.840"W	8
AN0374	N Br Raritan River	40 34'11.002"N 74 40'41.493"W	8
AN0375	Dukes Bk	40 33'14.314"N 74 36'48.227"W	9
AN0376	Peters Bk	40 34'01.277"N 74 36'18.868"W	9
AN0377	Raritan River	40 32'39.200"N 74 34'05.421"W	9
AN0378	Millstone River	40 14'28.495"N 74 24'04.832"W	10
AN0379	Millstone River	40 15'43.051"N 74 25'12.305"W	10
AN0380	Rocky Bk	40 13'38.371"N 74 26'22.149"W	10
AN0381	Rocky Bk	40 16'13.026"N 74 31'21.855"W	10
AN0382	Millstone River	40 19'19.653"N 74 36'28.695"W	10
AN0382B	Millstone River	40 17'27.435"N 74 32'58.014"W	10
AN0382D	Millstone River	40 16'28.620"N 74 28'20.525"W	10
AN0383	Big Bear Bk	40 16'41.201"N 74 34'36.982"W	10
AN0384	Bear Bk	40 19'05.323"N 74 36'44.554"W	10
AN0385	Cranbury Bk	40 18'18.858"N 74 28'23.669"W	10
AN0386	Cranbury Bk	40 19'35.979"N 74 36'09.714"W	10
AN0387	Devils Bk	40 21'42.428"N 74 32'42.028"W	10
AN0388	Shallow Bk	40 20'48.608"N 74 33'25.879"W	10
AN0389	Devils Bk	40 20'35.129"N 74 35'21.073"W	10
AN0390	Camp Harmony Br of Stony Bk	40 24'12.202"N 74 48'06.008"W	10
AN0391	Stony Bk	40 22'26.598"N 74 47'37.479"W	10
AN0392	Stony Bk	40 19'52.630"N 74 46'01.800"W	10
AN0393	Stony Bk	40 19'59.682"N 74 40'55.949"W	10
AN0394	Duck Pond Run	40 18'23.496"N 74 40'04.668"W	10
AN0395	Heathcote Bk	40 22'57.502"N 74 34'04.740"W	10
AN0396	Heathcote Bk	40 22'11.952"N 74 36'56.978"W	10
AN0397	Millstone River	40 22'25.677"N 74 37'12.787"W	10
AN0398	Bedens Bk	40 23'03.999"N 74 44'25.474"W	10
AN0399	Rock Bk	40 26'23.130"N 74 44'21.646"W	10
AN0400	Rock Bk	40 24'46.881"N 74 41'02.493"W	10
AN0401	Bedens Bk	40 24'52.520"N 74 39 01.533"W	10
AN0402	Pike Run	40 28'26.673"N 74 39'25.494"W	10
AN0403	Cruser Bk	40 27'15.949"N 74 39'36.505"W	10
AN0404	Back Bk	40 25'57.702"N 74 39'34.796"W	10
AN0405	Pike Run	40 25'12.408"N 74 38'25.663"W	10
AN0406	Simonson Bk	40 26'18.513"N 74 36'46.689"W	10
AN0407	Ten Mile Run	40 27'23.093"N 74 35'08.581"W	10
AN0408	Six Mile Run	40 27'18.952"N 74 30'52.166"W	10
AN0409	Six Mile Run	40 28'22.389"N 74 34'16.033"W	10
AN0410	Millstone River	40 28'30.495"N 74 34'34.587"W	10
AN0411	Royce Bk	40 29'47.714"N 74 38'50.800"W	10
AN0412	Royce Bk Br	40 30'40.115"N 74 37'57.560"W	10
AN0413	Royce Bk	40 32'13.363"N 74 35'22.668"W	10
AN0414	Millstone River	40 32'30.924"N 74 34'07.554"W	10
AN0415	Cuckels Bk	40 34'07.355"N 74 34'10.841"W	9
AN0416	W Br Middle Bk	40 36'43.383"N 74 35'25.710"W	9
AN0417	W Br Middle Bk	40 35'21.701"N 74 33'48.395"W	9
AN0418	E Br Middle Bk	40 36'47.621"N 74 29'47.454"W	9
AN0419	E Br Middle Bk	40 35'29.891"N 74 33'18.072"W	9
AN0420	Middle Bk	40 34'05.056"N 74 33'12.661"W	9
AN0421	Green Bk	40 38'27.731"N 74 24'49.425"W	9

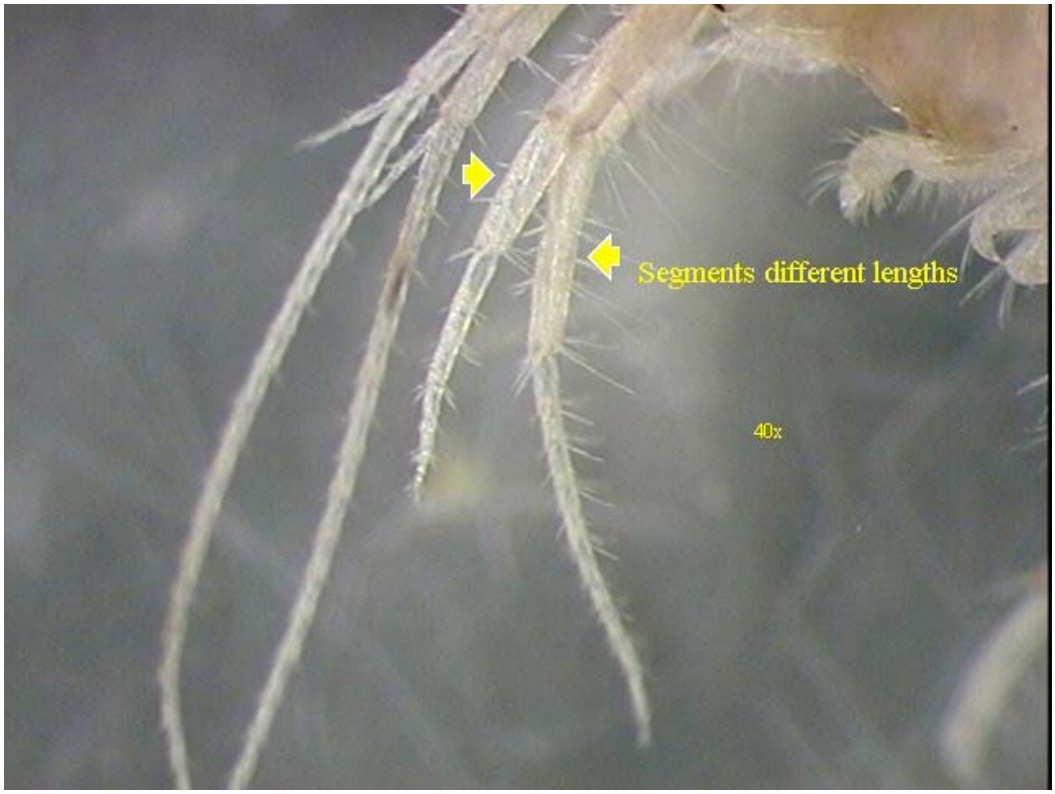
Appendix A — Station Numbers and Locations for the Round 3 Raritan Region AMNET Study

Site	Stream	Latitude Longitude	Watershed Management Area
AN0422	Stony Bk	40 36'50.903"N 74 26'45.891"W	9
AN0423	Green Bk	40 36'19.635"N 74 26'59.268"W	9
AN0424	Bound Bk	40 34'50.497"N 74 29'57.414"W	9
AN0424B	Bound Bk	40 33'42.614"N 74 23'51.312"W	9
AN0425	Ambrose Bk	40 34'03.434"N 74 31'12.003"W	9
AN0425A	Ambrose Bk	40 32'50.115"N 74 27'51.059"W	9
AN0426	Green Bk	40 33'42.746"N 74 31'28.350"W	9
AN0427	UNT to Raritan River	40 32'43.133"N 74 31'08.009"W	9
AN0428	Raritan River	40 32'27.225"N 74 30'45.415"W	9
AN0429	Mile Run	40 30'20.042"N 74 28'02.071"W	9
AN0430	Lawrence Bk	40 22'51.506"N 74 32'37.700"W	9
AN0431	Lawrence Bk	40 24'58.850"N 74 29'36.930"W	9
AN0432	Oakeys Bk	40 25'06.100"N 74 29'52.230"W	9
AN0433	Ireland Bk	40 25'13.409"N 74 29'05.490"W	9
AN0434	Lawrence Bk	40 26'55.734"N 74 26'46.339"W	9
AN0435	Sawmill Bk	40 27'30.816"N 74 25'31.092"W	9
AN0436	Mill Bk	40 30'19.531"N 74 22'41.572"W	9
AN0437	Manalapan Bk	40 12'03.912"N 74 22'37.976"W	9
AN0438	Manalapan Bk	40 15'11.336"N 74 20'58.593"W	9
AN0439	Manalapan Bk	40 17'46.133"N 74 23'52.302"W	9
AN0440	Manalapan Bk	40 22'29.077"N 74 24'55.526"W	9
AN0441	Weamaconk Ck	40 16'16.554"N 74 17'39.011"W	9
AN0442	Wemrock Bk	40 15'38.376"N 74 18'48.562"W	9
AN0443	Weamaconk Ck	40 17'50.467"N 74 21'41.881"W	9
AN0444	McGellairds Bk	40 16'46.999"N 74 17'40.200"W	9
AN0445	Tepehemus Bk	40 17'45.840"N 74 19'11.045"W	9
AN0446	Milford Bk	40 18'04.840"N 74 19'10.375"W	9
AN0447	McGellairds Bk	40 18'06.501"N 74 21'24.895"W	9
AN0448	Matchaponix Bk	40 18'51.593"N 74 21'42.425"W	9
AN0449	Pine Bk	40 18'55.566"N 74 21'00.198"W	9
AN0450	Barclay Bk	40 20'54.059"N 74 21'25.188"W	9
AN0451	Matchaponix Bk	40 21'35.558"N 74 22'03.691"W	9
AN0452	Iresick Bk	40 23'35.113"N 74 21'33.397"W	9
AN0453	Deep Run	40 23'05.771"N 74 18'28.741"W	9
AN0454	Deep Run	40 24'35.749"N 74 20'45.052"W	9
AN0455	Tennent Bk	40 25'40.902"N 74 20'39.356"W	9

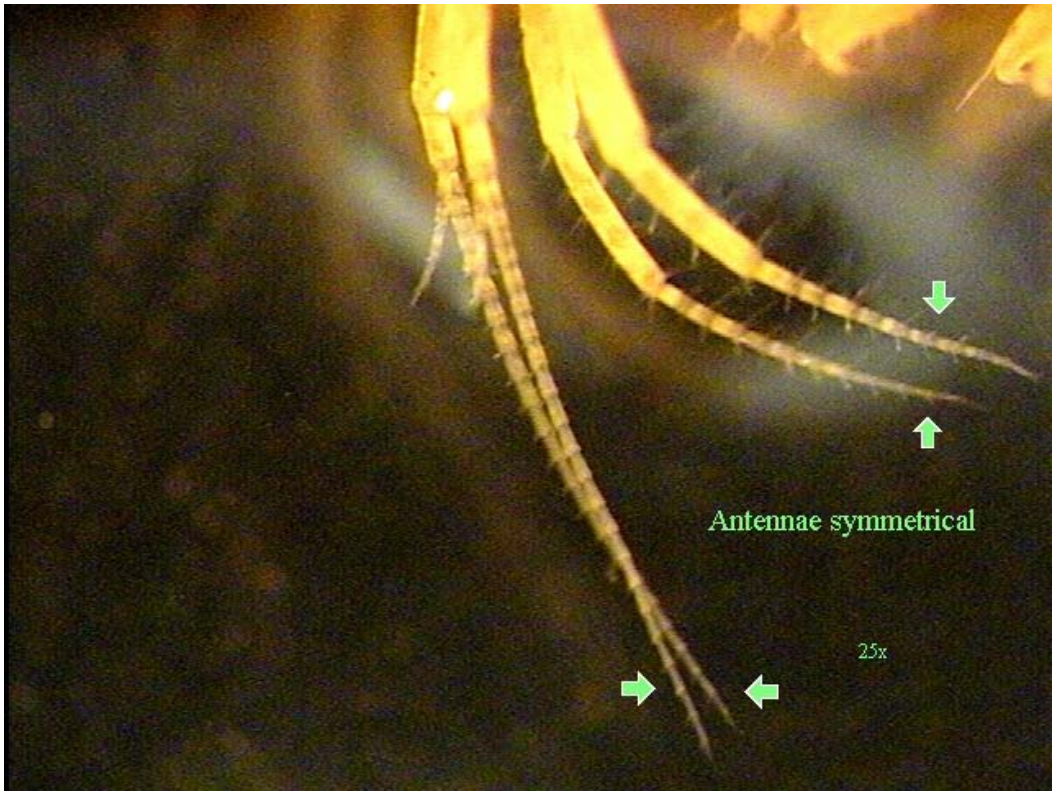
APPENDIX B

Pictures of Morphological Abnormalities in Larval Chironomidae and Amphipoda Recovered in Recent AMNET Surveys

Gammarus fasciatus with second antennae showing different lengths

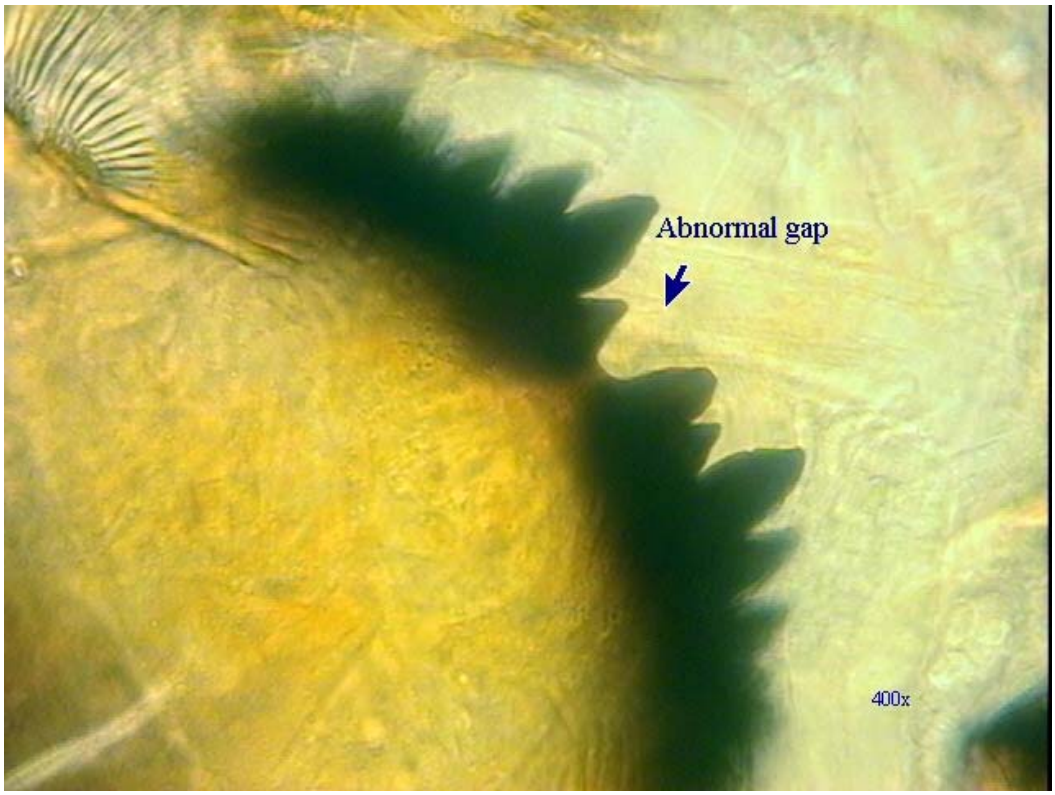


Gammarus fasciatus with normal antennae (showing antennal pairs of same length)

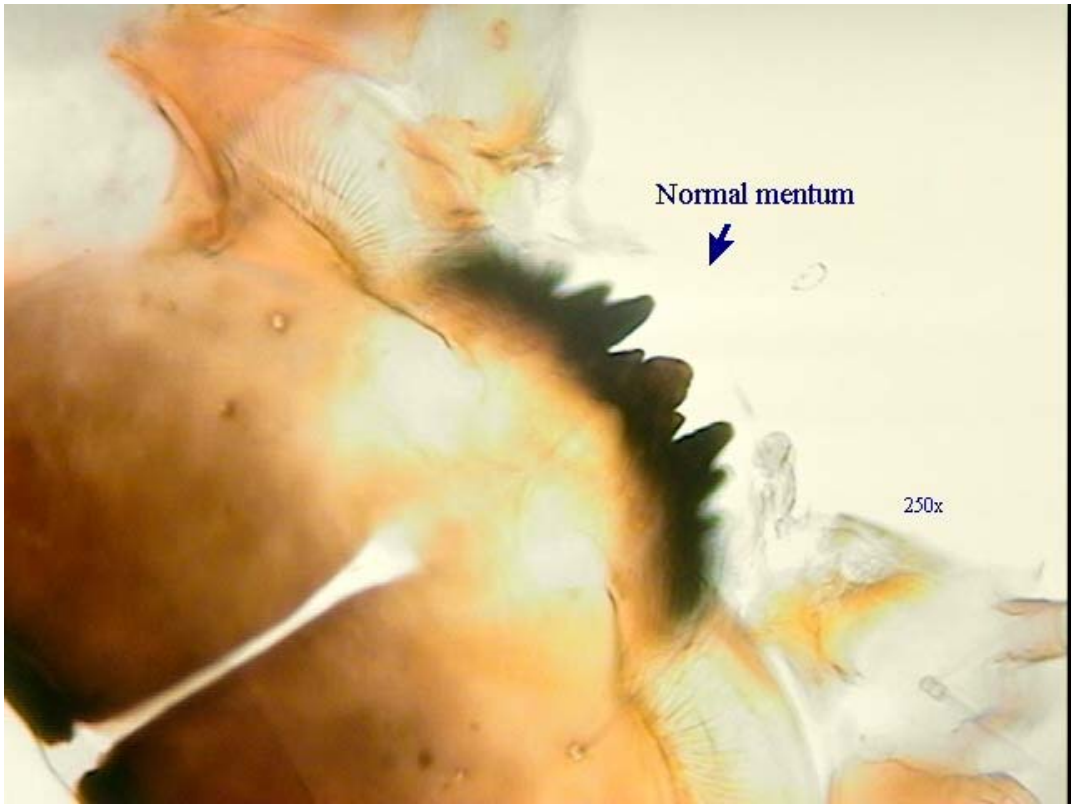


All photographs taken by D.Bryson, NJDEP

Chironomus species with mentum abnormality



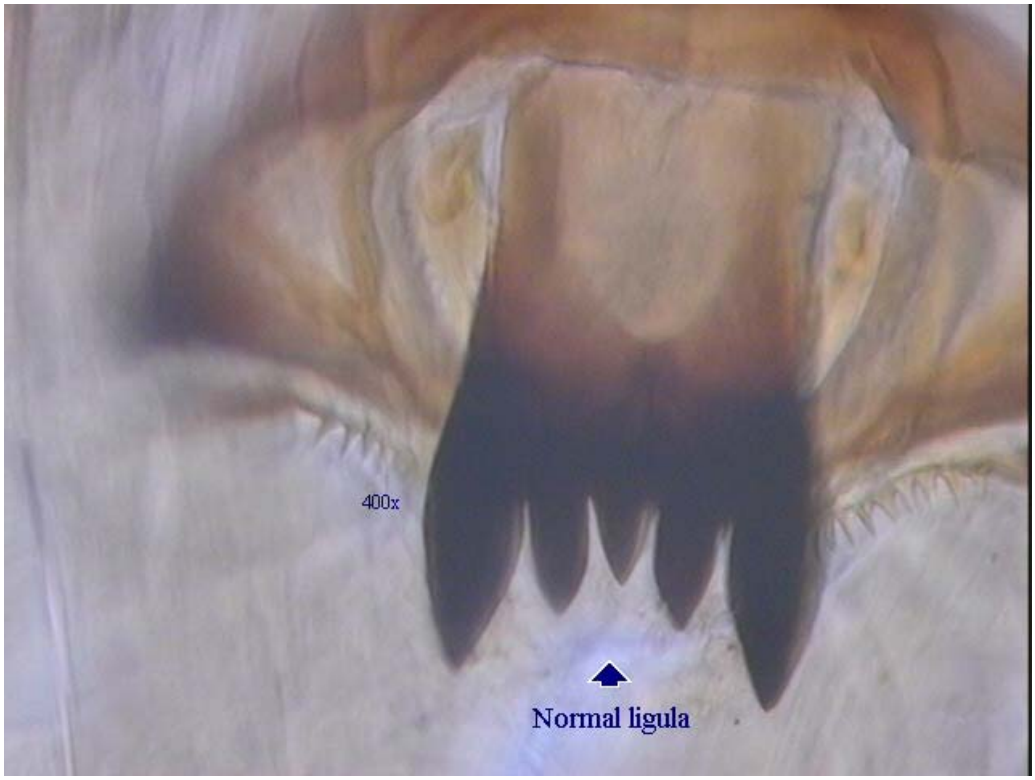
Chironomus species with normal mentum



All photographs taken by D.Bryson, NJDEP

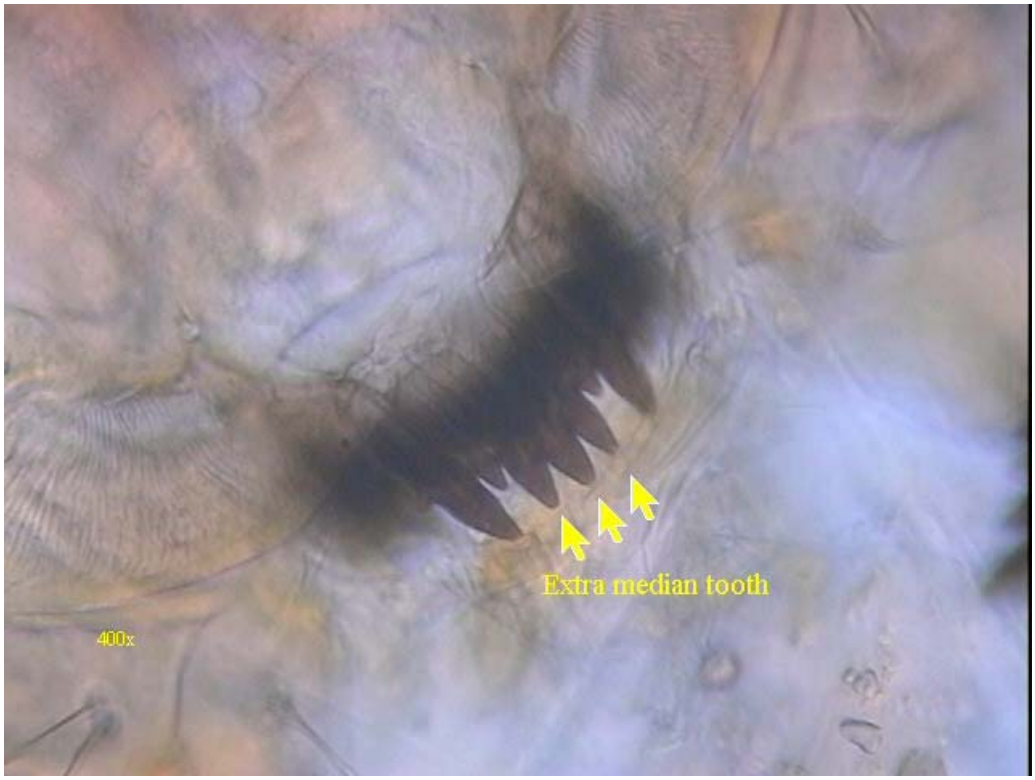
Procladius species with abnormal ligula

Procladius species with normal ligula

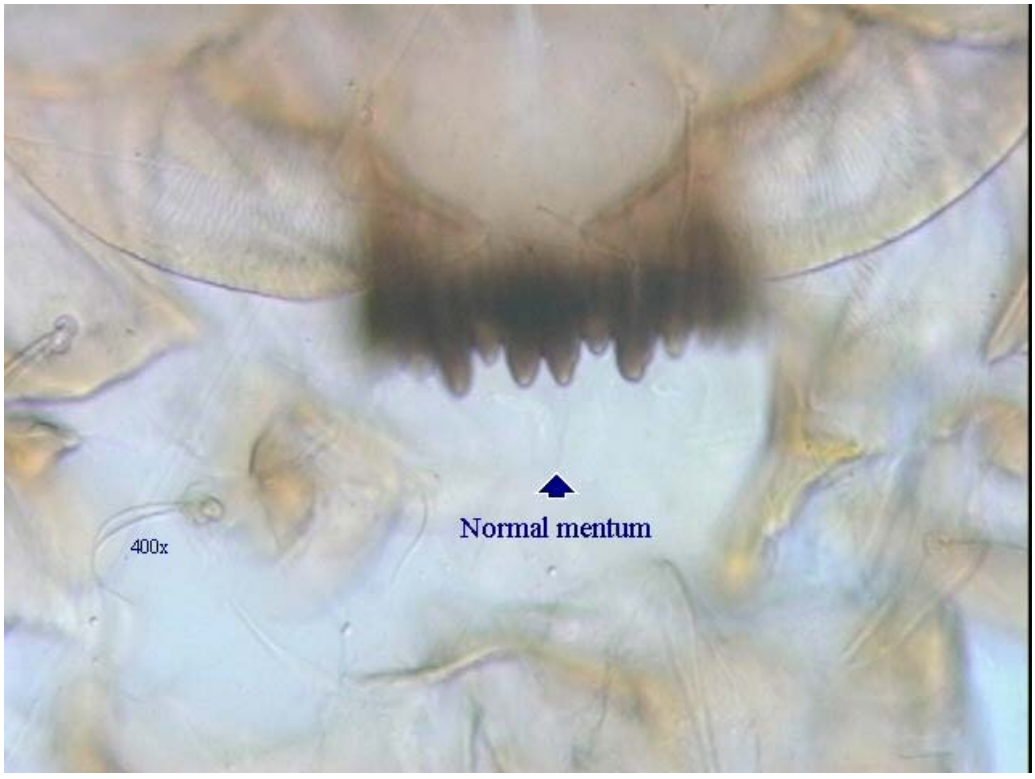


All photographs taken by D.Bryson, NJDEP

Polypedilum species with abnormal mentum



Polypedilum species with normal mentum



All photographs taken by D.Bryson, NJDEP

APPENDIX C

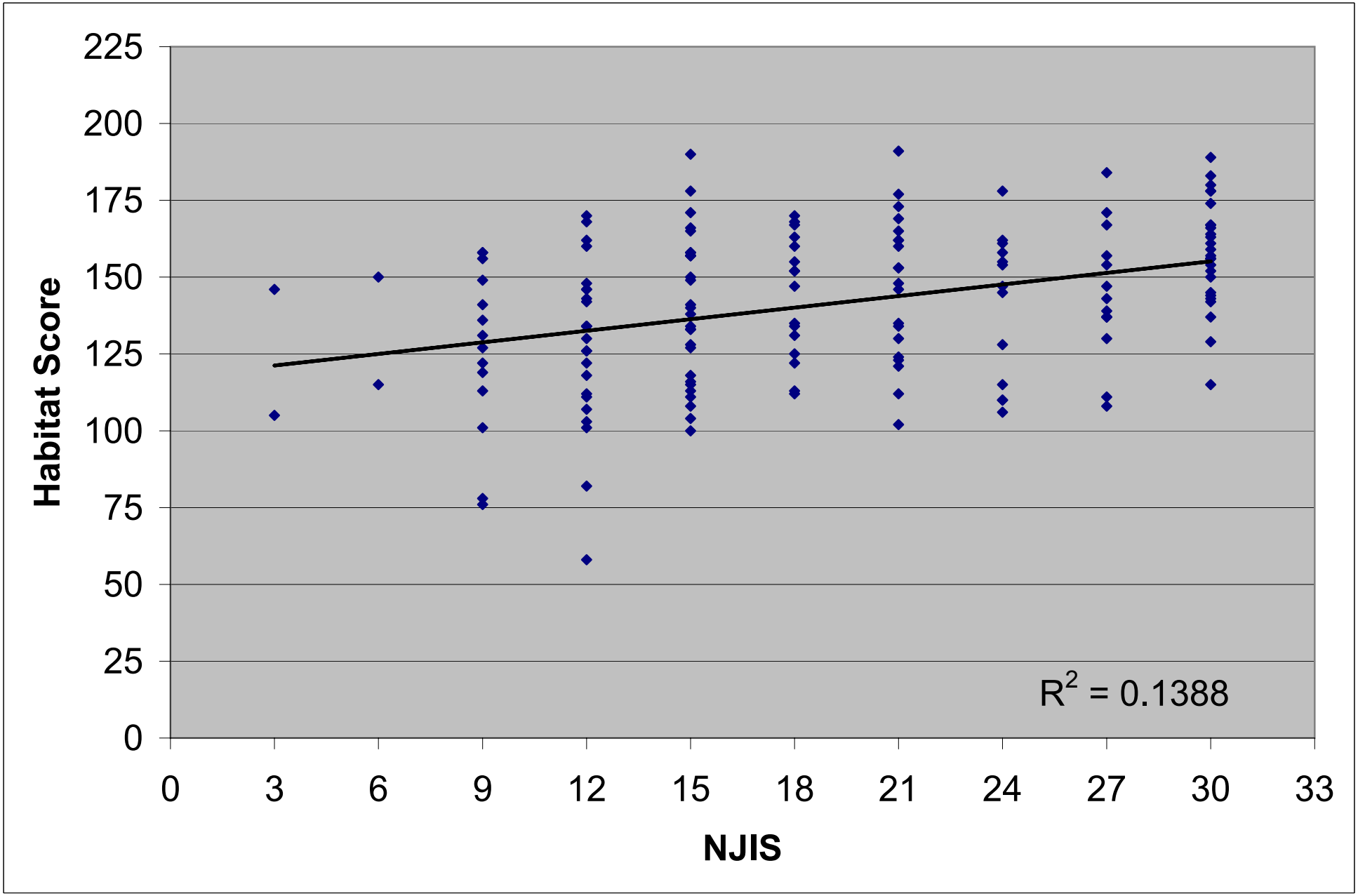
Graphical Comparison of New Jersey Impairment Scores versus Habitat Assessment Scores from the 2004 Raritan Region AMNET Study

Comparative Scores of

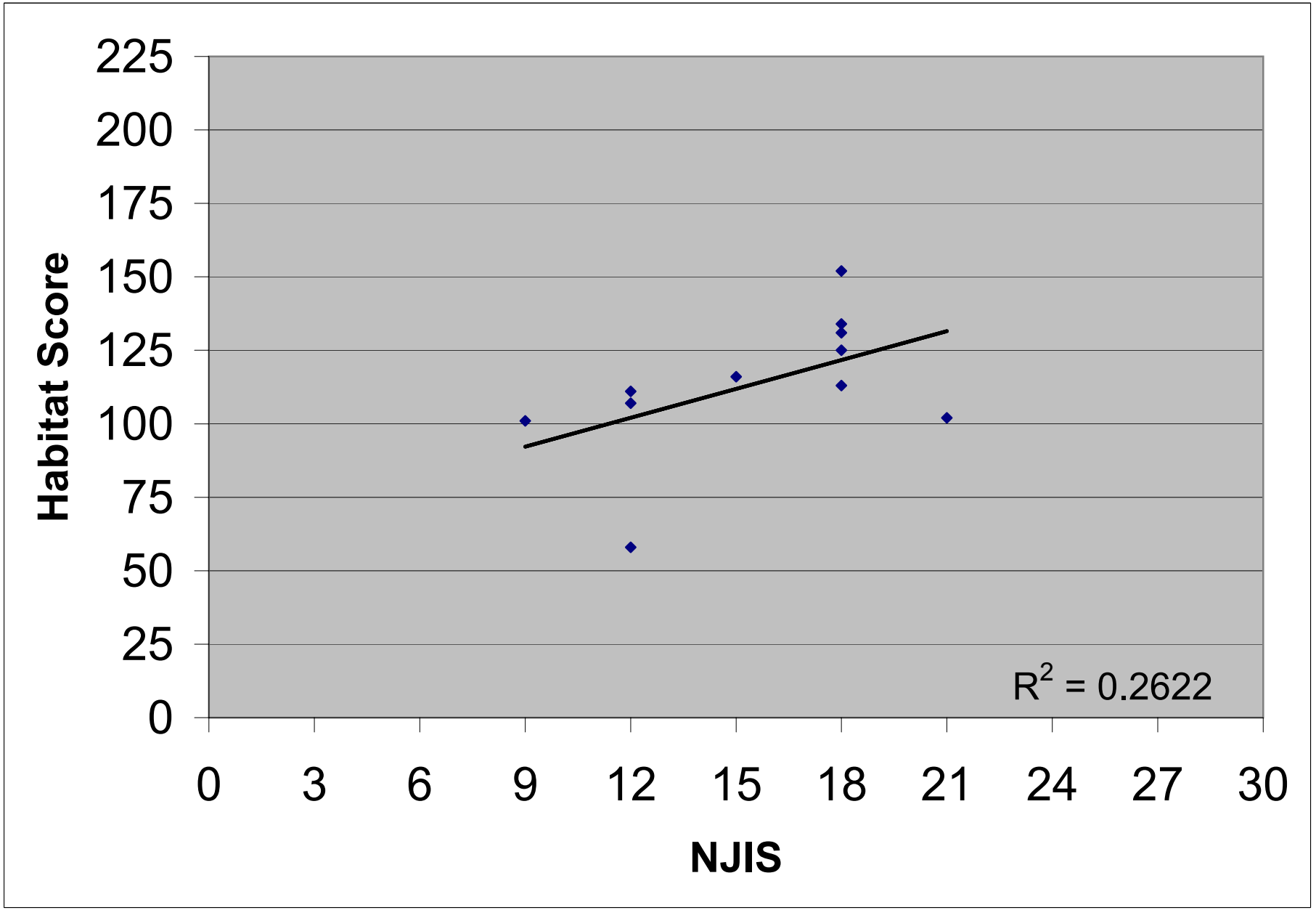
HABITAT vs. NJIS

Combined

Round 3



Comparative Scores of
HABITAT vs. NJIS
WMA 7
Round 3

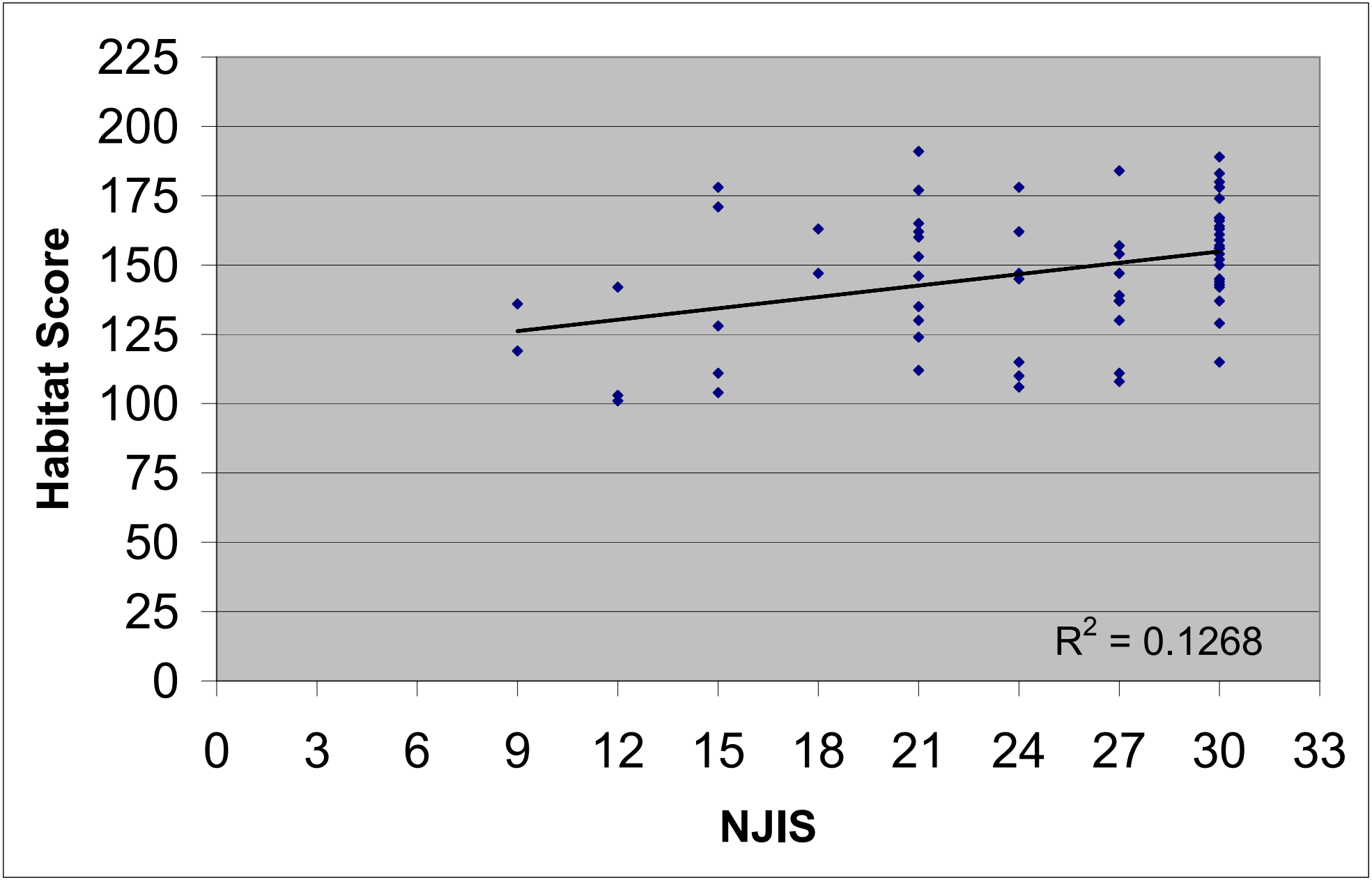


Comparative Scores of

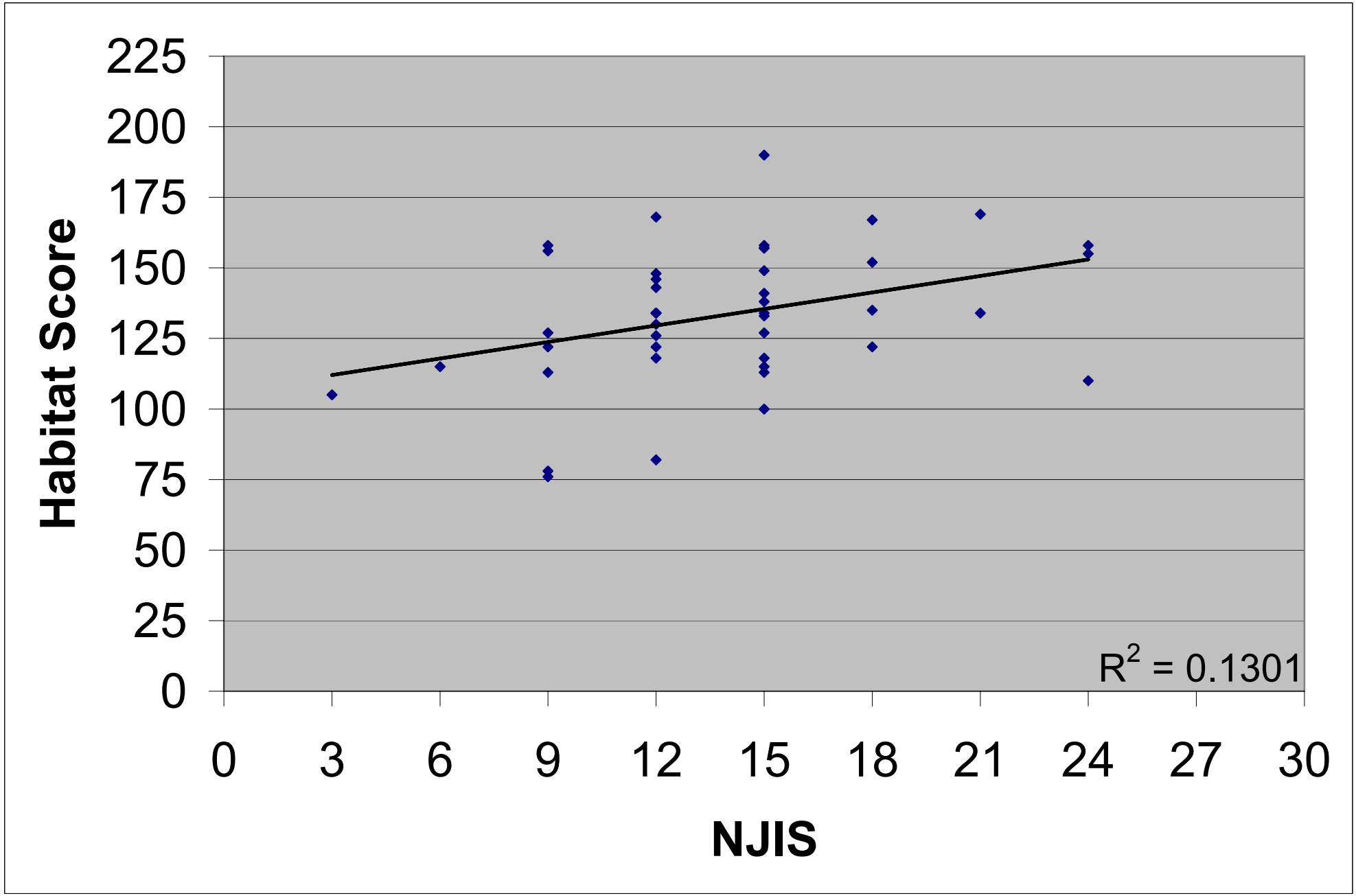
HABITAT vs. NJIS

WMA 8

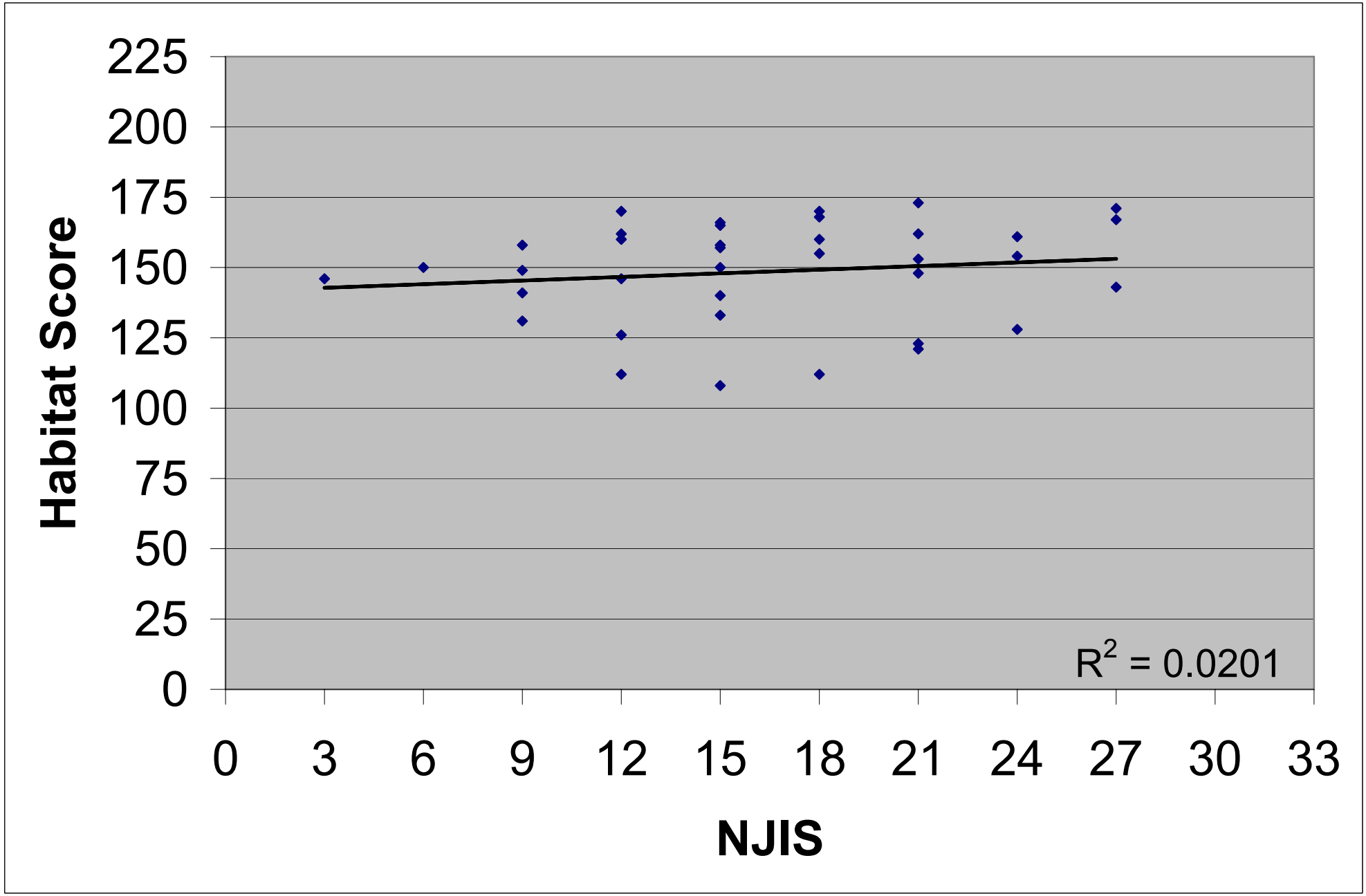
Round 3



Comparative Scores of
HABITAT vs. NJIS
WMA 9
Round 3



Comparative Scores of
HABITAT vs. NJIS
WMA 10
Round 3



APPENDIX D

Taxonomic and Statistical Data, NJIS Scores, Habitat Assessment Scores and Observations from the 2004 Raritan Region AMNET Study

(Site numbers, locations and USGS topographic quadrangle, top of page.)

Notes/Definitions:

Statistical data includes those biometric results that are applied to the NJIS rating. Appendix D also includes certain biometrics that have been given as optional for the RBP analysis [2] but are not employed for the NJIS rating [12]; these include ratios of certain functional types or pollution sensitive to pollution tolerant groups; for these (1-3 below), higher values generally indicate better water quality.

1. *Scraper/Filtering Collector Ratio* — dominance of filtering collectors indicates organic enrichment; however, if toxicants are present in the system, their adsorption on macrophytes and fine particulate organics can affect the abundance of filtering collectors.
2. *Shredder/Total Ratio* — considering their diet of coarse particulate organic matter (CPOM), a lack of shredders may indicate the presence of toxicants, particularly from terrestrial sources (e.g. pesticides), as these are readily adsorbed to the CPOM.
3. *EPT/Chironomid Ratio* — even distribution among the major groups, with strong representation in the pollution-sensitive taxa (Ephemeroptera, Plecoptera, Trichoptera), reflects a good biotic condition; dominance of chironomids reflects environmental stress.

Included in the NJIS score are:

1. Taxa Richness – number of families represented in sample.
2. Family Biotic Index – assigns a pollution tolerance level to each family on a scale of zero to ten, zero being least tolerant.
3. Dominant Family – expressed as a percent of total families.
4. Number of EPT families – E + P + T.
5. Percent EPT - % of total families.

See METHODS, Table 1.

Other notes:

1. UNT – un-named tributary
2. Blood Red Chironomidae – primarily members of the tribe Chironomini (subfamily Chironominae), which posses a hemoglobin-like pigment that retains oxygen, thus increasing their tolerance to organic pollution.
3. Habitat observations supplement the habitat assessment scores in Table 2 and Appendix C; Open Canopy = overhead vegetation; water quality measurements taken in field include temperature (°C), pH, dissolved oxygen, conductivity.

APPENDIX D (cont.)
Taxonomic List of Macroinvertebrate Families Found at New Jersey AMNET Sites

- Phylum PLATYHELMINTHES
  - Class TURBELLARIA (flatworms)
    - Order TRICLADIDA
      - Family Dendrocoelidae
      - Family Planariidae
    - Order MACROSTOMIDA
      - Family Macrostomidae
    - Order NEORHABDOCOELA
      - Family Typhloplanidae
    - Order ALLOEOCOELA
      - Family Plagiostomidae
      - Family Prorhynchidae
- Phylum NEMERTEA (proboscis worms)
  - Class ENOPLA
    - Order HOPLONEMERTINI
      - Family Tetrastemmatidae
- Phylum NEMATODA (roundworms)
- Phylum ANNELIDA
  - Class OLIGOCHAETA (aquatic earthworms)
    - Order HAPLOTAXIDA
      - Family Aeolosomatidae
      - Family Enchytraeidae
      - Family Haplotaxidae
      - Family Lumbricidae
      - Family Naididae
      - Family Tubificidae
    - Order LUMBRICULIDA
      - Family Lumbriculidae
  - Class BRANCHIOBDELLIDA
    - Family Branchiobdellidae
  - Class POLYCHAETA
    - Family Sabellidae
  - Class HIRUDINEA (leeches)
    - Order RHYNCHOBELLIDA
      - Family Glossiphoniidae
      - Family Piscicolidae
    - Order ARHYNCHOBDELLIDA
      - Family Erpobdellidae
    - Order GNATHOBDELLIDA
      - Family Hirudinidae
- Phylum ARTHROPODA
  - Class CRUSTACEA
    - Order ISOPODA (aquatic sow bugs)
      - Family Asellidae
      - Family Oniscidae
      - Family Porcellionidae
    - Order AMPHIPODA (scuds, sideswimmers)
      - Family Gammaridae
      - Family Talitridae
    - Order DECAPODA (crayfish, shrimp)
      - Family Astacidae
      - Family Cambaridae
      - Family Palaemonidae
  - Class ARACHNOIDEA
    - Order HYDRACARINA (water mites)
      - Family Arrenuridae
      - Family Axonopsidae
      - Family Hydryphantidae
      - Family Hygrobatidae
      - Family Lebertiidae
      - Family Limnesiidae
      - Family Pionidae
      - Family Sperchonidae
      - Family Unionicolidae
  - Class CHILOPODA (centipedes)
  - Class DIPLOPODA (millipedes)
  - Class INSECTA
    - Order COLLEMBOLA (springtails)
      - Family Entomobryidae
      - Family Hypogastruridae
      - Family Isotomidae
      - Family Onychiuridae
      - Family Poduridae
    - Order PLECOPTERA (stoneflies)
      - Family Capniidae
      - Family Chloroperlidae
      - Family Leuctridae
      - Family Nemouridae
      - Family Peltoperlidae
      - Family Perlidae
      - Family Perlodidae
      - Family Pteronarcyidae
      - Family Taeniopterygidae
    - Order EPHEMEROPTERA (mayflies)
      - Family Baetidae
      - Family Baetiscidae
      - Family Caenidae
      - Family Ephemerellidae
      - Family Ephemeridae
      - Family Heptageniidae
      - Family Leptophlebiidae
      - Family Metretopodidae
      - Family Oligoneuriidae
      - Family Polymitarcyidae
      - Family Potamanthidae
      - Family Siphlonuridae
      - Family Tricorythidae

Includes only those taxa that are employed in calculation of the NJIS rating; major taxa are listed in the order presented in Pennak (1978) [17].

Order ODONATA
- Suborder ANISOPTERA (dragonflies)
  - Family Aeshnidae
  - Cordulegastridae
  - Corduliidae
  - Gomphidae
  - Libellulidae
  - Macromiidae
- Suborder ZYGOPTERA (damselflies)
  - Family Calopterygidae
  - Coenagrionidae
  - Lestidae

Order HEMIPTERA (true bugs)
- Family Belostomatidae
- Corixidae
- Gerridae
- Mesoveliidae
- Nepidae
- Notonectidae
- Pleidae
- Veliidae

Order MEGALOPTERA
- Family Corydalidae (dobsonflies, fishflies)
- Sialidae (alderflies)

Order NEUROPTERA
- Family Sisyridae (spongilla flies)

Order TRICHOPTERA (caddisflies)
- Family Brachycentridae
- Calamoceratidae
- Glossosomatidae
- Helicopsychidae
- Hydropsychidae
- Hydroptilidae
- Lepidostomatidae
- Leptoceridae
- Limnephilidae
- Molannidae
- Odontoceridae
- Philopotamidae
- Phryganeidae
- Polycentropodidae
- Psychomyiidae
- Rhyacophilidae
- Sericostomatidae

Order LEPIDOPTERA (aquatic caterpillars)
- Family Nepticulidae
- Pyralidae

Order COLEOPTERA (beetles)
- Family Chrysomelidae
- Curculionidae
- Dryopidae
- Dytiscidae
- Elmidae
- Gyrinidae
- Haliplidae
- Hydrophilidae
- Lampyridae
- Noteridae
- Psephenidae
- Ptilodactylidae
- Scirtidae

Order DIPTERA (flies, midges)
- Family Athericidae
- Blephariceridae
- Ceratopogonidae
- Chaoboridae
- Chironomidae
- Culicidae
- Dixidae
- Dolichopodidae
- Empididae
- Ephydridae
- Muscidae
- Phoridae
- Psychodidae
- Ptychopteridae
- Sciomyzidae
- Simuliidae
- Stratiomyidae
- Syrphidae
- Tabanidae
- Tanyderidae
- Tipulidae

Phylum MOLLUSCA
- Class GASTROPODA (snails)
  - Order BASOMMATOPHORA
    - Family Ancylidae
    - Lymnaeidae
    - Physidae
    - Planorbidae
  - Order MESOGASTROPODA
    - Family Hydrobiidae
    - Pleuroceridae
    - Valvatidae
    - Viviparidae
- Class PELECYPODA (clams, mussels)
  - Order EULAMELLIBRANCHIA
    - Family Unionidae
  - Order HETERODONTA
    - Family Corbiculidae
    - Sphaeriidae

Station: AN0192
Rahway River, Northfield Ave, West Orange, Essex County
Caldwell USGS Quadrangle
Date Sampled: 10/13/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	38
BloodRed Chironomidae	8	20
Naididae	7	16
Coenagrionidae	9	8
Sphaeriidae	8	6
Chironomidae	6	3
Physidae	7	3
Planorbidae	6	3
Veliidae	9	2
Aeshnidae	3	1
Corduliidae	5	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 101
% Contribution of Dominant Family: 37.62 % (Tubificidae)
Family Biotic Index: 8.47
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 75 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 30.0' / 3.0'
Substrate: Gravel, Mud, Silt....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Poor
Canopy: Mostly Closed....Other: Water Temp. 12.6 C / pH 7.0 SU / DO 8.2 mg/L / Cond. 1130 umhos; Suburban
Sample site runs through parking lot of medical building. ;

Station: AN0193
Rahway River, Route 82, Springfield Twp., Union County
Roselle USGS Quadrangle
Date Sampled: 10/13/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	43
Asellidae	8	13
Gammaridae	4	10
Coenagrionidae	9	9
Chironomidae	6	3
BloodRed Chironomidae	8	3
Planariidae	4	3
Glossiphoniidae	8	3
Sphaeriidae	8	3
Tubificidae	10	2
Lumbriculidae	8	2
Calopterygidae	5	1
Libellulidae	9	1
Empididae	6	1
Hydroptilidae	4	1
Naididae	7	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 43.00 % (Hydropsychidae)
Family Biotic Index: 5.70
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 44.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 152 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 63.0' / 2'
Substrate: Gravel, Snags....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Partly Open....Other: Water Temp. 12.6 C / pH 7.1 SU / DO 8.0 mg/L / Cond. 1360 umhos; Suburban.
Storm sewers present.; Ducks, periphyton present.

Station: AN0194
Rahway River, Route 509, Cranford Twp., Union County
Roselle USGS Quadrangle
Date Sampled: 10/13/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	49
Tubificidae	10	25
Hydrobiidae	8	12
BloodRed Chironomidae	8	4
Naididae	7	3
Chironomidae	6	3
Asellidae	8	2
Hydropsychidae	4	1
Coenagrionidae	9	1
Sphaeriidae	8	1
Glossiphoniidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 102
% Contribution of Dominant Family: 48.04 % (Gammaridae)
Family Biotic Index: 6.45
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.98
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 120 (Sub-Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 70.0' / 2.5' - 3.5'
Substrate: Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Water temp. 13.4 C / pH 7.4 SU / DO 7.8 mg/L / Cond. 740 umhos; Suburban. Storm sewers present.
Station downstream of dam. USGS Station present.; Ducks, periphyton present.

Station: AN0195
Rahway River, River Rd. & Church St., Rahway, Union County
Perth Amboy USGS Quadrangle
Date Sampled: 10/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	52
Elmidae	4	24
Planariidae	4	9
Hydropsychidae	4	8
Sphaeriidae	8	5
Ancylidae	6	2
Chironomidae	6	2
Planorbidae	6	2
Tetrastemmatidae	7	2
Heptageniidae	4	1
Hydroptilidae	4	1
Erpobdellidae	8	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 109
% Contribution of Dominant Family: 47.71 % (Gammaridae)
Family Biotic Index: 4.39
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 9.17
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 134 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 82.5' / 1.0'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Open....Other: Water Temp. 11.5 C / pH 8.1 SU / DO 8.8 mg/L / Cond. 491 umhos;
Suburban.
Storm sewers present.;

Station: AN0196
Robinsons Brook, Goodmans Crossing, Scotch Plains Twp., Union County
Perth Amboy USGS Quadrangle
Date Sampled: 10/05/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydrobiidae	8	63
Gammaridae	4	11
Tubificidae	10	9
Asellidae	8	6
Sphaeriidae	8	5
Plagiostomidae	4	4
Chironomidae	6	3
Coenagrionidae	9	2
Planariidae	4	1
Elmidae	4	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 106
% Contribution of Dominant Family: 59.43 % (Hydrobiidae)
Family Biotic Index: 7.48
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 101 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear, Grayish Haze....Flow: Slow....Width/Depth (ft): 28.0' / 2.5'
Substrate: Gravel, Mud, Silt....StreamBank Vegetation/Stability: Trees, shrubs, Grass/Poor
Canopy: Closed....Other: Water Temp. 13.5 C / pH 6.9 SU / DO 6.3 mg/L / Cond. 566 umhos; Suburban. Storm sewers present.
Fish, periphyton, macrophytes, debris present.; Construction on left. Upstream of bridge, flow is very slow.

Station: AN0197
UNT To Robinsons Brook, Raritan Rd., Scotch Plains Twp., Union County
Roselle USGS Quadrangle
Date Sampled: 10/07/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	86
Chironomidae	6	4
Planariidae	4	3
BloodRed Chironomidae	8	3
Coenagrionidae	9	2
Elmidae	4	2
Asellidae	8	1
Empididae	6	1
Naididae	7	1
Nematoda	6	1
Sphaeriidae	8	1
Planorbidae	6	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 107
% Contribution of Dominant Family: 80.37 % (Hydropsychidae)
Family Biotic Index: 4.47
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 80.37
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 125 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 23.0' / <1.0'
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Grasses, Shrubs, Trees/Fair
Canopy: Mostly Open....Other: Water Temp. 15.0 C / pH 7.7 SU / DO 7.0 mg/L / Cond. 372 umhos; Suburban.
Storm sewers present.; Some algae growth, Filamentous algae, and fish present.

Station: AN0198
UNT To Robinsons Brook, Lamberts Mill Rd., Westfield Twp., Union County
Perth Amboy USGS Quadrangle
Date Sampled: 10/07/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydrobiidae	8	26
Coenagrionidae	9	23
Gammaridae	4	15
Planorbidae	6	9
Tubificidae	10	8
Naididae	7	7
BloodRed Chironomidae	8	5
Chironomidae	6	3
Sphaeriidae	8	2
Aeshnidae	3	1
Glossiphoniidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Hydrobiidae)
Family Biotic Index: 7.43
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 111 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 22.0' / <1.0'
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: Shrubs, Trees/Fair
Canopy: Partly Open....Other: Water Temp. 13.9 C / pH 7.5 SU / DO 6.9 mg/L / Cond. 373 umhos; Suburban. High school on left bank.
Storm sewers present.; Fish, periphyton, frogs, filamentous algae present.

Station: AN0199
Robinsons Brook, Route 27, Rahway, Union County
Perth Amboy USGS Quadrangle
Date Sampled: 10/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	46
Hydropsychidae	4	25
Elmidae	4	12
Coenagrionidae	9	8
Asellidae	8	4
BloodRed Chironomidae	8	2
Sphaeriidae	8	2
Tipulidae	3	1
Lumbricidae	10	1
Planorbidae	6	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 102
% Contribution of Dominant Family: 45.10 % (Gammaridae)
Family Biotic Index: 4.77
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 24.51
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 116 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 45.0' / 1.0'
Substrate: Gravel / sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 12.2 C / pH 7.5 SU / DO 9.3 mg/L / Cond. 245 umhos; Suburban
Storm sewers present;

Station: AN0200
South Branch Rahway River, Parsonage Rd., Edison Twp., Middlesex County
Perth Amboy USGS Quadrangle
Date Sampled: 10/07/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	65
Planariidae	4	8
Chironomidae	6	8
Erpobdellidae	8	7
Elmidae	4	7
Tubificidae	10	2
Tetrastemmatidae	7	2
Hydrophilidae	5	1
Asellidae	8	1
Gammaridae	4	1
Empididae	6	1
Naididae	7	1
Planorbidae	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 105
% Contribution of Dominant Family: 61.90 % (Hydropsychidae)
Family Biotic Index: 4.70
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 61.90
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 113 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15.0' / <0.5'
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Grasses, Few Shrubs/Fair
Canopy: Open....Other: Water Temp. 19.0 C / pH 8.2 SU / DO 7.2 mg/L / Cond. 268 umhos; Suburban. Storm sewers present.
Station downstream of outlet of lake. Menlo Park upstream.; Fish present.

Station: AN0201
South Branch Rahway River, Merrill Park, Woodbridge Twp., Middlesex County
Perth Amboy USGS Quadrangle
Date Sampled: 10/05/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	66
Gammaridae	4	5
Tipulidae	3	4
BloodRed Chironomidae	8	4
Naididae	7	4
Chironomidae	6	3
Physidae	7	3
Tubificidae	10	2
Lumbriculidae	8	2
Sphaeriidae	8	2
Baetidae	4	1
Cambaridae	5	1
Dytiscidae	5	1
Simuliidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 66.00 % (Hydropsychidae)
Family Biotic Index: 4.71
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 67.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 131 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 35.0' / <1.0' - 1.5'
Substrate: Gravel....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Poor
Canopy: Open....Other: Water temp. 14.2 C / pH 6.5 SU / DO 7.1 mg/L / Cond. 714 umhos;
Suburban
Periphyton present;

Station: AN0202
West Br Elizabeth River, Vaux Hall Rd, Union Twp, Union County
Elizabeth USGS Quadrangle
Date Sampled: 10/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals

Not Sampled due to bridge construction work

Station: AN0204
Elizabeth River, North Ave., Union Twp., Union County
Elizabeth USGS Quadrangle
Date Sampled: 10/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	39
Tubificidae	10	38
Chironomidae	6	8
Planariidae	4	5
Tipulidae	3	2
Baetidae	4	1
Enchytraeidae	10	1
Naididae	7	1
Sphaeriidae	8	1
BloodRed Chironomidae	8	1
Tetrastemmatidae	7	1
Simuliidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 39.00 % (Hydropsychidae)
Family Biotic Index: 6.64
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 40.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 102 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 42.0' / 2.0'
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Shrubs, Grass, Trees/Poor
Canopy: Open....Other: Water Temp. 12.0 C /pH 7.7 SU / DO 8.6 mg/L / Cond. 655 umhos; Urban.
Storm sewers present.; Some trash present, fish present.

Station: AN0310
S. Br Raritan River, Smithtown Rd Near Outl Of Budd Lake, Morris County
Hackettstown USGS Quadrangle
Date Sampled: 04/06/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	16
Hydrobiidae	8	15
Planariidae	4	11
Naididae	7	11
Sphaeriidae	8	10
Gammaridae	4	7
Hydropsychidae	4	6
Plagiostomidae	4	6
Caenidae	7	4
Planorbidae	6	4
BloodRed Chironomidae	8	3
Empididae	6	3
Chironomidae	6	3
Ancylidae	6	2
Physidae	7	2
Corydalidae	0	1
Tubificidae	10	1
Valvatidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 106
% Contribution of Dominant Family: 15.09 % (Asellidae)
Family Biotic Index: 6.39
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 9.43
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 178 (Optimal) EPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 15 ' / 1.2 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Open....Other: Water temp. 7.3 C /pH 7.7 SU /DO 10.6 mg/L /Cond 278 umhos;
Suburban; small dam at upstream lake
filamentous algae; USGS gage station;

Station: AN0311
Drakes Brook , Emmans Road, Roxbury Twp., Morris County
Chester USGS Quadrangle
Date Sampled: 4/6/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	33
Elmidae	4	23
Hydropsychidae	4	17
Gammaridae	4	7
Simuliidae	6	7
Empididae	6	6
Philopotamidae	3	3
Nemouridae	2	2
Corydalidae	0	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 33.00 % (Chironomidae)
Family Biotic Index: 4.80
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 22.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 124 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 26.5' / 1-2'
Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability: Grasses, shrubs, trees/Fair
Canopy: Mostly Open....Other: Water temp. 6.4C / pH 7.5 SU / DO 10.4 mg/L / Cond. 520umhos; Rural, forested
Pond next to stream. Small weir under small foot bridge. ; Flood lamp wired to right bank below bridge.

Station: AN0312
Drakes Brook, Bartley Road, Washington Twp., Morris County
Chester USGS Quadrangle
Date Sampled: 4/6/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	53
Naididae	7	9
Philopotamidae	3	9
Empididae	6	7
BloodRed Chironomidae	8	7
Elmidae	4	6
Hydropsychidae	4	3
Planariidae	4	3
Psephenidae	4	3
Limnephilidae	4	2
Heptageniidae	4	2
Baetidae	4	1
Tipulidae	3	1
Coenagrionidae	9	1
Asellidae	8	1
Brachycentridae	1	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 109
% Contribution of Dominant Family: 48.62 % (Chironomidae)
Family Biotic Index: 5.57
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 16.51
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 153 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40.0 / <1.0-1.5
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Grasses, Trees, Shrubs/Poor
Canopy: Partly Open....Other: Suburban, forested; Water temp. 5.8C / pH 7.4 SU / DO 11.8 mg/L / Cond. 425 umhos
Downstream banks scoured and eroded. No riffles downstream - ; siltation evident. Site downstream of high school parking lot.

Station: AN0313
Stony Brook, Fairview Ave., Washington Twp., Morris County
Hackettstown USGS Quadrangle
Date Sampled: 4/6/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	27
Heptageniidae	4	21
Simuliidae	6	17
Baetidae	4	13
Perlidae	1	3
Empididae	6	3
Taeniopterygidae	2	3
Siphlonuridae	7	2
Nemouridae	2	2
Hydropsychidae	4	2
Blephariceridae	0	1
Astacidae	7	1
Tabanidae	6	1
Philopotamidae	3	1
Enchytraeidae	10	1
Chloroperlidae	1	1
Lumbriculidae	8	1
Sphaeriidae	8	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 102
% Contribution of Dominant Family: 26.47 % (Chironomidae)
Family Biotic Index: 4.90
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 48.04
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 164 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 20' / <1 -1.0'
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Partly Open....Other: Suburban, Forested; Water temp. 3.7 C / pH 7.9 SU / DO 13.7 mg/L / Cond. 159 umhos
Sampled at larger of two streams.;

Station: AN0314
Electric Brook, Fairview Ave, Washington Twp., Morris County
Hackettstown USGS Quadrangle
Date Sampled: 04/06/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	80
Ephemerellidae	1	10
Empididae	6	2
Lumbriculidae	8	2
Naididae	7	2
Tabanidae	6	1
Hydropsychidae	4	1
Dytiscidae	5	1
Leuctridae	0	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 101
% Contribution of Dominant Family: 79.21 % (Chironomidae)
Family Biotic Index: 5.45
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 11.88
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 101 (Marginal) EPA Protocol
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant -
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 19.5 ' / < 1.0 - 1.0'
Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, grass/Poor
Canopy: Partly Open....Other: Water temp. 11.0 C /pH 7.3 SU /DO 7.5 mg/L /Cond 384 umhos; Suburban; outfall pipe flowing
stream intermittent, dry upstream; very slow flow; small weir & footbridge downstream

Station: AN0315
S. Br Raritan River, Rt 517, Washington Twp, Morris County
Hackettstown USGS Quadrangle
Date Sampled: 04/06/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	25
Chironomidae	6	24
Hydropsychidae	4	11
Tubificidae	10	10
Lumbriculidae	10	7
Simuliidae	6	5
Limnephilidae	4	4
Elmidae	4	4
Empididae	6	3
Tipulidae	3	2
Enchytraeidae	10	2
Heptageniidae	4	1
Erpobdellidae	8	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 25.00 % (Ephemerellidae)
Family Biotic Index: 5.09
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 41.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 147 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 50 ' / <1.0 ' - 1 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, grass/Poor
Canopy: Open....Other: Water temp. 5.2 C /pH 7.3 SU /DO 11.5 mg/L /Cond 297 umhos;
Suburban / forested
auto repair shop adjacent to stream; historic building on left bank

Station: AN0316
S Br Raritan River, Rt 512 Off Raritan River Rd., Califon Boro, Hunterdon County
Califon USGS Quadrangle
Date Sampled: 4/7/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	39
Tubificidae	10	9
Simuliidae	6	9
Ephemerellidae	1	8
Hydropsychidae	4	5
Gammaridae	4	5
Plagiostomidae	4	4
Limnephilidae	4	4
Leptoceridae	4	3
Naididae	7	3
Nemouridae	2	2
Aeshnidae	3	2
Elmidae	4	2
Sphaeriidae	8	1
Planorbidae	6	1
BloodRed Chironomidae	8	1
Psychomyiidae	2	1
Gomphidae	1	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 39.00 % (Chironomidae)
Family Biotic Index: 5.34
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 23.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 178 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 79.0' / 1-2'
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Mostly Open....Other: Suburban and forested; Water temp. 10.0 C / pH 7.3 SU / DO 11.0 mg/L / Cond. 309 umhos
Geese observed. Trout stocked.;

Station: AN0317
S. Br. Raritan River, River Rd (Ken Lockwood Gorge), Lebanon Twp, Hunterdon County
Califon USGS Quadrangle
Date Sampled: 04/27/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	27
Baetidae	4	20
Ephemerellidae	1	18
Lumbriculidae	8	11
Simuliidae	6	6
Hydropsychidae	4	3
Siphlonuridae	7	3
Perlidae	1	2
Elmidae	4	2
Naididae	7	2
Psephenidae	4	2
Nemouridae	2	1
Gammaridae	4	1
Pleuroceridae	6	1
Tubificidae	10	1
BloodRed Chironomidae	8	1
Sphaeriidae	8	1
Limnephilidae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 104
% Contribution of Dominant Family: 25.96 % (Chironomidae)
Family Biotic Index: 4.76
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 47.12
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 183 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 50 ' / 2- 3 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Mostly Open....Other: Water temp. 12.9 C /pH 7.3 SU /DO10.9 mg/L /Cond 215 umhos; Forested (Ken Lockwood Gorge)
fish;

Station: AN0318
Spruce Run, Newport Rd. ; Lebanon Twp., Hunterton County
High Bridge USGS Quadrangle
Date Sampled: 4/7/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	20
Nemouridae	2	19
Baetidae	4	17
Ephemerellidae	1	17
Lumbriculidae	8	6
Heptageniidae	4	6
Hydropsychidae	4	3
Rhyacophilidae	0	3
Aeshnidae	3	1
Chironomidae	6	1
Dytiscidae	5	1
Gomphidae	1	1
Calopterygidae	5	1
Oligoneuriidae	2	1
Elmidae	4	1
Brachycentridae	1	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Simuliidae)
Family Biotic Index: 3.58
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 67.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 178 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20' / <1.0 - 1'
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
Canopy: Partly Open....Other: Rural, Forested; Water temp. 7.9 C / pH 7.6 SU / DO 12.0 mg/L / Cond. 140 umhos
Filamentous algae. Small water fall flowing into stream down stream.; Minnows.

Station: AN0319
Spruce Run, Route 31; Glen Gardner Boro, Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 4/7/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	59
Ephemerellidae	1	11
Tubificidae	10	11
Simuliidae	6	4
Nemouridae	2	3
Elmidae	4	3
Gammaridae	4	3
Baetidae	4	2
Hydropsychidae	4	2
Oligoneuriidae	2	2
Siphlonuridae	7	1
Ptilodactylidae	1	1
Empididae	6	1
Leptophlebiidae	2	1
Lumbriculidae	8	1
BloodRed Chironomidae	8	1
Rhyacophilidae	0	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 108
% Contribution of Dominant Family: 54.63 % (Chironomidae)
Family Biotic Index: 5.42
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 22.22
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 162 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 26.0 / 1.0-1.5 '
Substrate: Cobbles, gravel, silt....StreamBank Vegetation/Stability: Shrubs, trees/Fair
Canopy: Mostly Open....Other: Rural ; Water temp 8.1C / pH 7.4 SU/ DO 13.1 mg/L / Cond. 176 umhos
Filamentous algae; wood piles adjacent to stream (private cutting operation); Some siltation; rock wall stabilizing left and right banks for short distance

Station: AN0320
Willoughby Brook, Rt 31, Clinton Twp., Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 4/7/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Heptageniidae	4	22
Chironomidae	6	20
Baetidae	4	18
Limnephilidae	4	14
Gammaridae	4	5
Ephemerellidae	1	4
Rhyacophilidae	0	3
Simuliidae	6	3
Tubificidae	10	2
Elmidae	4	2
Taeniopterygidae	2	2
Perlidae	1	1
Hydropsychidae	4	1
Enchytraeidae	10	1
Nemouridae	2	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 99
% Contribution of Dominant Family: 22.22 % (Heptageniidae)
Family Biotic Index: 4.31
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 66.67
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 174 (Optimal) EPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 23' / <1 - 1.5'
Substrate: Cobbles, gravel, silt, snags....StreamBank Vegetation/Stability: Trees, shrubs, and grass/Good
Canopy: Partly Open....Other: Suburban; Water temp. 7.5 C, pH 7.4 SU, DO 10.4 mg/L , Cond. 179 umhos
Next to autobody repair shop. Near Spruce run reservoir; Some siltation near bridge.

Station: AN0321
Mulhockaway Creek, Van Syckel Rd (Rt 635), Union Twp, Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 04/22/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Lumbriculidae	8	53
Ephemerellidae	1	12
Baetidae	4	8
Chironomidae	6	7
Tipulidae	3	3
Empididae	6	3
Psephenidae	4	3
Heptageniidae	4	3
Hydropsychidae	4	2
Naididae	7	2
Limnephilidae	4	1
Rhyacophilidae	0	1
Elmidae	4	1
Gomphidae	1	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 53.00 % (Lumbriculidae)
Family Biotic Index: 5.92
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 27.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 177 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 28 ' / <1.0 - 1 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, vines/Good
Canopy: Mostly Open....Other: Water temp. 17.0 C /pH 9.0 SU /DO 11.8 mg/L /Cond 183 umhos; Forested. USGS gage station
trout stocked stream; filamentous algae

Station: AN0322
S. Br Raritan River, Rt 173 (Cr 513), Clinton, Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 04/22/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	37
Elmidae	4	21
Ephemerellidae	1	19
Heptageniidae	4	8
Empididae	6	5
Corbiculidae	8	3
Hydropsychidae	4	2
Naididae	7	2
Perlidae	1	1
Tipulidae	3	1
Planariidae	4	1
Oligoneuriidae	2	1
Lepidostomatidae	1	1
Tubificidae	10	1
Lumbriculidae	8	1
Nematoda	6	1
Pyralidae	5	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 107
% Contribution of Dominant Family: 34.58 % (Chironomidae)
Family Biotic Index: 4.49
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 29.91
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 111 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 115 ' / 1 - 2 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, weeds/Fair
Canopy: Open....Other: Water temp. 14.9 C /pH 8.1 SU /DO 11.3 mg/L /Cond 264 umhos; Urban; site downstream of a dam
ducks and filamentous algae;

Station: AN0323
Beaver Brook, Herman Thau Rd, Clinton Twp, Hunterdon County
Califon USGS Quadrangle
Date Sampled: 04/27/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	54
Nemouridae	2	12
Chironomidae	6	11
Baetidae	4	8
Limnephilidae	4	7
Enchytraeidae	10	3
Tipulidae	3	2
Leptophlebiidae	2	2
BloodRed Chironomidae	8	2
Gomphidae	1	1
Rhyacophilidae	0	1
Peltoperlidae	1	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 104
% Contribution of Dominant Family: 51.92 % (Ephemerellidae)
Family Biotic Index: 2.52
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 81.73
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 184 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 17 ' / 1 - 2 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, grass, shrubs/Good
Canopy: Partly Open....Other: Water temp. 11.1 C /pH 7.4 SU /DO 11.8 mg/L /Cond 160 umhos; Rural / forested
salamander and filamentous algae observed;

Station: AN0324
Beaver Brook, Lehigh St, Clinton, Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 04/22/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	75
Lumbriculidae	8	5
Naididae	7	3
Tipulidae	3	2
Baetidae	4	2
Empididae	6	2
Gammaridae	4	2
Heptageniidae	4	2
Asellidae	8	1
Philopotamidae	3	1
Ephemerellidae	1	1
Lepidostomatidae	1	1
Tetrastemmatidae	7	1
Simuliidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 75.00 % (Chironomidae)
Family Biotic Index: 5.83
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 7.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 103 (Marginal) USEPA Protocol
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 23 ' / <1.0 - 1 '
Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs, vines/Poor
Canopy: Mostly Closed....Other: Water temp. 16.2 C /pH 9.4 SU /DO 13.9 mg/L /Cond 434 umhos; Urban.
rock rip-rap on both banks;

Station: AN0324A
Sidney Brook, Rt 617 (Sidney Rd), Franklin Twp, Hunterdon County
Pittstown USGS Quadrangle
Date Sampled: 04/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	22
Elmidae	4	14
Chironomidae	6	13
Psephenidae	4	10
Hydropsychidae	4	9
Heptageniidae	4	9
Baetidae	4	4
Empididae	6	3
Tetrastemmatidae	7	3
Glossosomatidae	0	2
Hydroptilidae	4	2
Naididae	7	2
Nemouridae	2	1
Coenagrionidae	9	1
Philopotamidae	3	1
Gomphidae	1	1
Lepidostomatidae	1	1
Lumbriculidae	8	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 22.00 % (Ephemerellidae)
Family Biotic Index: 3.73
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 52.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 159 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 10-12 ' / 1-2 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Partly Open....Other: Water temp. 13.3 C /pH 7.3 SU /DO 10.7 mg/L /Cond 233 umhos; Rural / forested. Horses in a pen on right bank
deep and slow at bridge; right bank mowed and cleared; small lastic pipe on right bank upstream

Station: AN0325
Cakepoulin Creek, Lower Landsdown Rd, Franklin Twp, Hunterdon County
Pittstown USGS Quadrangle
Date Sampled: 04/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	43
Heptageniidae	4	14
Lumbriculidae	8	12
Baetidae	4	9
BloodRed Chironomidae	8	7
Oligoneuriidae	2	4
Lepidostomatidae	1	4
Hydropsychidae	4	2
Gomphidae	1	2
Psephenidae	4	2
Perlidae	1	1
Tipulidae	3	1
Corydalidae	0	1
Curculionidae	7	1
Gammaridae	4	1
Rhyacophilidae	0	1
Elmidae	4	1
Chloroperlidae	1	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 107
% Contribution of Dominant Family: 40.19 % (Ephemerellidae)
Family Biotic Index: 3.15
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 73.83
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 157 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40 ' / 1-2 '
Substrate: Cobbles, gravel/sand, mud, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Partly Open....Other: Water temp. 12.2 C /pH 7.3 SU /DO 10.4 mg/L /Cond 165 umhos; Rural / forested
trout stocked stream; salamanders, periphyton on rocks

Station: AN0325B
Cakepoulin Creek, Rt 513, Franklin Twp, Hunterdon County
Pittstown USGS Quadrangle
Date Sampled: 04/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	40
Chironomidae	6	19
Naididae	7	7
Nemouridae	2	6
Baetidae	4	6
BloodRed Chironomidae	8	6
Heptageniidae	4	6
Tipulidae	3	3
Psephenidae	4	3
Hydropsychidae	4	2
Elmidae	4	2
Rhyacophilidae	0	2
Ceratopogonidae	6	1
Perlodidae	2	1
Lepidostomatidae	1	1
Lumbriculidae	8	1
Polycentropodidae	6	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 108
% Contribution of Dominant Family: 37.04 % (Ephemerellidae)
Family Biotic Index: 3.49
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 60.19
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 150 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12 - 15 ' / 1 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Grasses, small trees, shrubs/Fair
Canopy: Partly Open....Other: Water temp. 16.2 C /pH 7.4 SU /DO 10.8 mg/L /Cond 186 umhos; Urban / rural; stormwater pipe flowing on left bank
boulder and concrete slabs on banks; salamanders, filamentous algae and macrophytes

Station: AN0326
S. Br. Raritan River, Stanton Rd., Readington Twp, Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 04/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Lepidostomatidae	1	30
Elmidae	4	21
Glossosomatidae	0	10
Heptageniidae	4	9
Hydropsychidae	4	6
Gammaridae	4	4
Ephemerellidae	1	4
Perlidae	1	3
Corbiculidae	8	3
Chironomidae	6	2
Hydroptilidae	4	2
Psephenidae	4	2
Hydrobiidae	8	1
Tipulidae	3	1
Sphaeriidae	8	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 30.00 % (Lepidostomatidae)
Family Biotic Index: 2.74
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 64.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 143 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 100 ' / 2-3 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Open....Other: Water temp. 12.7 C /pH 7.5 SU /DO 10.4 mg/L /Cond 244 umhos; Rural / forested (Nature Preserve on righ bank)
Trout stocked stream; USGS gage station;

Station: AN0327
Prescott Brook, Stanton Rd, Readington Twp, Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 04/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	18
Ephemerellidae	1	15
Psephenidae	4	15
Naididae	7	11
Chironomidae	6	10
Hydropsychidae	4	5
Philopotamidae	3	5
Nemouridae	2	4
Gammaridae	4	3
Perlidae	1	2
Glossosomatidae	0	2
Asellidae	8	2
Lepidostomatidae	1	2
Simuliidae	6	2
Heptageniidae	4	2
Leptoceridae	4	1
Gomphidae	1	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 18.00 % (Elmidae)
Family Biotic Index: 3.84
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 38.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 167 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20 ' / 1-2 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Partly Open....Other: Water temp. 16.4 C /pH 7.6 SU /DO 9.0 mg/L /Cond 234 umhos; Rural / forested. Round Valley Resv upstream
most of sample taken above trib on left bank;

Station: AN0328
Assiscong Creek, River Rd, Raritan Twp, Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/04/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Nemouridae	2	34
Hydropsychidae	4	28
Baetidae	4	16
Perlodidae	2	6
Tipulidae	3	3
Ephemerellidae	1	3
Chironomidae	6	3
Chloroperlidae	1	1
Siphlonuridae	7	1
Calopterygidae	5	1
Lumbriculidae	8	1
Enchytraeidae	10	1
Naididae	7	1
BloodRed Chironomidae	8	1
Simuliidae	6	1
Elmidae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 103
% Contribution of Dominant Family: 33.01 % (Nemouridae)
Family Biotic Index: 3.36
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 87.38
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 178 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 20 ' / 1-2.5 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, grass, shrubs/Poor
Canopy: Open....Other: Water temp. 13.5 C /pH 7.7 SU /DO 11.4 mg/L /Cond 271 umhos;
Agricultural-livestock / forested (S Br Reservation, Assiscong Marsh)
salamanders;

Station: AN0329
S. Br. Raritan River, Rt 613 (Old York Rd), Readington Twp, Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/04/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	55
Chironomidae	6	13
Naididae	7	5
Siphlonuridae	7	5
Elmidae	4	4
Corbiculidae	8	3
Sphaeriidae	8	3
Hydrobiidae	8	2
Nemouridae	2	2
Ephemerellidae	1	2
Lepidostomatidae	1	1
Tubificidae	10	1
Psephenidae	4	1
Heptageniidae	4	1
Chloroperlidae	1	1
Valvatidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 55.00 % (Gammaridae)
Family Biotic Index: 4.78
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 12.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 145 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 130 ' / 2-3 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Grasses, trees, shrubs/Fair
Canopy: Open....Other: Water temp. 14.7 C /pH 7.8 SU /DO 10.6 mg/L /Cond 235 umhos; Agriculture-livestock / suburban
crayfish, yoy fish;

Station: AN0330
First Neshanic River, Rt 31, Raritan Twp, Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 05/11/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	51
Naididae	7	26
Lumbriculidae	8	24
Ephemerellidae	1	2
Gammaridae	4	2
Empididae	6	1
Perlodidae	2	1
Nematoda	6	1
Perlidae	1	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 109
% Contribution of Dominant Family: 46.79 % (Chironomidae)
Family Biotic Index: 6.47
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 3.67
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 142 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 43 ' / 1 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, weeds/Fair
Canopy: Mostly Open....Other: Water temp. 16.8 C /pH 7.6 SU /DO 8.3 mg/L /Cond 341 umhos; Commercial. 2 storm drains
geese, fish;

Station: AN0331
Second Neshanic River, Rt 31, Raritan Twp, Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 05/11/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	41
Elmidae	4	20
Hydropsychidae	4	13
Psephenidae	4	9
Perlidae	1	8
Baetidae	4	4
Hydroptilidae	4	4
Planariidae	4	2
Naididae	7	2
Nemouridae	2	1
Asellidae	8	1
Ephemerellidae	1	1
Gammaridae	4	1
Heptageniidae	4	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 109
% Contribution of Dominant Family: 37.61 % (Chironomidae)
Family Biotic Index: 4.57
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 29.36
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 137 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 43 ' / 1-2 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Fair
Canopy: Mostly Open....Other: Water temp. 17.1 C /pH 7.6 SU /DO 7.1 mg/L /Cond 312 umhos; Commercial. Minnows and geese observed
3 absorbent oil booms in stream due to recent car fire and oil spill; slight oil sheen on water.

Station: AN0332
Third Neshanic River, Rt 31, Raritan Twp, Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 05/11/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	26
Elmidae	4	13
Hydropsychidae	4	10
Psephenidae	4	9
Ephemerellidae	1	8
Perlidae	1	7
Baetidae	4	6
Naididae	7	4
Heptageniidae	4	4
Hydrophilidae	5	2
Philopotamidae	3	2
Planariidae	4	2
Hydroptilidae	4	2
Tetrastemmatidae	7	2
Nemouridae	2	1
Helicopsychidae	3	1
Lepidostomatidae	1	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Chironomidae)
Family Biotic Index: 4.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 42.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 129 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 35 ' / 1 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Fair
Canopy: Partly Open....Other: Water temp. 17.4 C /pH 7.6 SU /DO 8.3 mg/L /Cond 245 umhos; Commercial; storm sewer flowing
periphyton, filamentous algae, minnows;

Station: AN0333
Neshanic River, Everitt Rd, East Amwell Twp, Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 05/11/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	32
Chironomidae	6	21
Elmidae	4	14
Psephenidae	4	7
Hydropsychidae	4	6
Perlidae	1	4
Baetidae	4	3
BloodRed Chironomidae	8	2
Planariidae	4	2
Heptageniidae	4	2
Hydrophilidae	5	1
Philopotamidae	3	1
Dytiscidae	5	1
Lumbriculidae	8	1
Nematoda	6	1
Cambaridae	5	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 32.00 % (Naididae)
Family Biotic Index: 5.44
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 16.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 130 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 71 ' / 1-2 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, grasses, vines/Fair
Canopy: Mostly Open....Other: Water temp. 19.5 C /pH 8.0 SU /DO 10.5 mg/L /Cond 305 umhos; Agriculture-cropland / rural
sampled downstream of weir; fish, frogs, water snake, minnows, crayfish, periphyton

Station: AN0334
Back Brook, Wertsville Rd (Rt 602), East Amwell Twp, Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 05/11/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	30
Elmidae	4	13
Hydropsychidae	4	11
Naididae	7	10
Asellidae	8	7
Philopotamidae	3	7
Planariidae	4	6
Simuliidae	6	6
Gammaridae	4	3
Perlidae	1	2
Psephenidae	4	2
Tubificidae	10	1
Caenidae	7	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 30.00 % (Chironomidae)
Family Biotic Index: 5.30
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 21.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 112 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 6 ' / 1-2 '
Substrate: Cobbles, bedrock....StreamBank Vegetation/Stability: Grasses, trees/Fair
Canopy: Open....Other: Water temp. 22.3 C /pH 8.0 SU /DO 10.5 mg/L /Cond 397 umhos;
Agriculture-livestock (horses) & Preserved farmland
drainage ditch from farm flowing into stream; lg. fish, sunfish, periphyton, filamentous algae

Station: AN0335
Back Brook, Manners Rd (Rt 609), East Amwell Twp, Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 05/11/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	25
Caenidae	7	15
Perlidae	1	15
Lumbriculidae	8	10
Naididae	7	8
Baetidae	4	4
Psephenidae	4	4
Elmidae	4	4
BloodRed Chironomidae	8	3
Hydropsychidae	4	2
Tubificidae	10	2
Heptageniidae	4	2
Nemouridae	2	1
Hydrophilidae	5	1
Asellidae	8	1
Hydroptilidae	4	1
Perlodidae	2	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 25.00 % (Chironomidae)
Family Biotic Index: 5.38
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 41.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 108 (Marginal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 33 ' / 1-2 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, grasses, weeds/Fair
Canopy: Mostly Open....Other: Water temp. 19.3 C /pH 7.8 SU /DO 10.9 mg/L /Cond 253 umhos; Rural / Agriculture-cropland (tree farm)
storm sewers; minnows, tadpoles, periphyton

Station: AN0336
Furmans Brook, Welisewitz Rd, East Amwell Twp, Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 05/11/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Nemouridae	2	22
Baetidae	4	18
Chironomidae	6	12
Perlidae	1	11
Psephenidae	4	10
Heptageniidae	4	9
Leptophlebiidae	2	4
Ephemerellidae	1	3
Caenidae	7	2
Philopotamidae	3	2
Hydropsychidae	4	2
Perlodidae	2	2
Lumbriculidae	8	1
Naididae	7	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 22.00 % (Nemouridae)
Family Biotic Index: 3.37
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 75.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 154 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15 ' / < 1.0-1.0 '
Substrate: Cobbles, gravel/sand, red shale bedrock....StreamBank Vegetation/Stability: Trees, weeds/Fair
Canopy: Mostly Closed....Other: Water temp. 20.7 C /pH 8.0 SU /DO 8.3 mg/L /Cond 160 umhos; Suburban / forested
periphyton, minnows, crayfish;

Station: AN0337
Neshanic River, Rt 514 (Old York Rd), Hillsborough Twp, Somerset County
Hopewell USGS Quadrangle
Date Sampled: 05/06/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	52
Elmidae	4	10
Lumbriculidae	8	6
Heptageniidae	4	6
Caenidae	7	5
Naididae	7	5
Perlidae	1	5
BloodRed Chironomidae	8	4
Psephenidae	4	4
Leptophlebiidae	2	2
Baetidae	4	1
Leptoceridae	4	1
Hydropsychidae	4	1
Tubificidae	10	1
Nematoda	6	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1
Tabanidae	6	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 108
% Contribution of Dominant Family: 48.15 % (Chironomidae)
Family Biotic Index: 5.58
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 19.44
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 146 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 92 ' / 1-2 '
Substrate: Gravel....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
Canopy: Partly Open....Other: Water temp. 12.2 C /pH 7.6 SU /DO 9.8 mg/L /Cond 243 umhos; Rural / forested
macrophytes;

Station: AN0338
S. Br. Raritan River, Elm St, Hillsborough Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 05/06/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	30
Elmidae	4	12
Ephemerellidae	1	7
Gammaridae	4	6
Perlidae	1	5
Baetidae	4	5
Lepidostomatidae	1	4
Psephenidae	4	4
Pleuroceridae	6	3
Enchytraeidae	10	3
Heptageniidae	4	3
Caenidae	7	2
Hydropsychidae	4	2
Lumbricidae	10	2
Leptoceridae	4	2
BloodRed Chironomidae	8	2
Sphaeriidae	8	2
Potamanthidae	4	1
Philopotamidae	3	1
Helicopsychidae	3	1
Hydroptilidae	4	1
Pyralidae	5	1
Physidae	7	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 24
Total Number of Individuals: 101
% Contribution of Dominant Family: 29.70 % (Chironomidae)
Family Biotic Index: 4.73
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 33.66
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 137 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 208 ' / 2-3 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
Canopy: Mostly Open....Other: Water temp. 13.8 C /pH 7.6 SU /DO 10.6 mg/L /Cond 264 umhos; Rural. Downstream of historic dam

Station: AN0339
Pleasant Run, Pleasant Run Rd (Rt 629), Readington Twp, Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/04/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	38
Nemouridae	2	18
Ephemerellidae	1	17
Gammaridae	4	4
Baetidae	4	3
Caenidae	7	3
Perlodidae	2	3
Naididae	7	3
Elmidae	4	3
Tubificidae	10	2
Planariidae	4	2
Heptageniidae	4	2
Tipulidae	3	1
Asellidae	8	1
Calopterygidae	5	1
Lumbriculidae	8	1
Perlidae	1	1
Sphaeriidae	8	1
Ceratopogonidae	6	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 106
% Contribution of Dominant Family: 35.85 % (Chironomidae)
Family Biotic Index: 4.23
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 44.34
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 156 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 22 ' / < 1.0 - 1.5 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Grass, few trees/shrubs/Good
Canopy: Mostly Open....Other: Water temp. 12.6 C /pH 7.6 SU /DO 11.8 mg/L /Cond 173 umhos; Suburban. storm drain flowing from right bank
minnows, snakes, salamander, periphyton;

Station: AN0340
Pleasant Run, South Branch Rd, Branchburg Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 05/06/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	21
Chironomidae	6	20
Elmidae	4	16
Hydropsychidae	4	10
Ephemerellidae	1	7
Caenidae	7	5
Perlodidae	2	4
Psephenidae	4	4
Heptageniidae	4	4
Baetidae	4	2
Nemouridae	2	2
Tipulidae	3	1
Hydrophilidae	5	1
Philopotamidae	3	1
BloodRed Chironomidae	8	1
Gammaridae	4	1
Tubificidae	10	1
Lumbriculidae	8	1
Sphaeriidae	8	1
Polycentropodidae	6	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 104
% Contribution of Dominant Family: 20.19 % (Naididae)
Family Biotic Index: 5.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 34.62
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 110 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 26 ' / 1-1.5 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Grass/Poor
Canopy: Open....Other: Water temp. 13.7 C /pH 7.7 SU /DO 11.5 mg/L /Cond 216 umhos;
Agriculture-livestock
geese, turtles, frogs;

Station: AN0341
S. Br. Raritan River, Studdiford Dr, Hillsborough Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 05/06/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	35
Elmidae	4	21
Naididae	7	8
BloodRed Chironomidae	8	8
Sphaeriidae	8	7
Potamanthidae	4	6
Hydropsychidae	4	5
Heptageniidae	4	5
Gammaridae	4	4
Lumbriculidae	8	4
Perlidae	1	2
Glossiphoniidae	8	1
Hydrophilidae	5	1
Perlodidae	2	1
Valvatidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 109
% Contribution of Dominant Family: 32.11 % (Chironomidae)
Family Biotic Index: 5.53
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 17.43
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 135 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 161 ' / 3 '
Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, grasses/Poor
Canopy: Mostly Open....Other: Water temp. 14.4 C /pH 7.7 SU /DO 10.7 mg/L /Cond 254 umhos; Rural / Agriculture-livestock; storm sewers
macrophytes, frogs, geese ;

Station: AN0342
Holland Brook, Holland Brook Rd, Readington Twp, Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/04/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	35
Nemouridae	2	23
Hydropsychidae	4	10
Ephemerellidae	1	6
Leptoceridae	4	4
Lumbriculidae	8	3
Heptageniidae	4	3
Siphlonuridae	7	2
Baetidae	4	2
Aeshnidae	3	2
Elmidae	4	2
Limnephilidae	4	2
Tipulidae	3	1
Caenidae	7	1
Philopotamidae	3	1
Planorbidae	6	1
Perlodidae	2	1
Gomphidae	1	1
Lepidostomatidae	1	1
Naididae	7	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 103
% Contribution of Dominant Family: 33.98 % (Chironomidae)
Family Biotic Index: 4.22
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 54.37
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 152 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8 ' / < 1.0 - 1.5 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, grass, shrubs/Poor
Canopy: Mostly Open....Other: Water temp. 14.2 C /pH 8.0 SU /DO 12.7 mg/L /Cond 182 umhos; Agriculture-cropland / rural / forested
minnows, salamanders, periphyton;

Station: AN0343
Holland Brook, South Branch Rd, Branchburg Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 05/06/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	42
Naididae	7	20
Gammaridae	4	6
Lumbriculidae	8	6
Elmidae	4	6
Tubificidae	10	5
Tetrastemmatidae	7	3
Heptageniidae	4	3
Lumbricidae	10	2
Psephenidae	4	2
Nemouridae	2	1
Caenidae	7	1
Planariidae	4	1
Empididae	6	1
Chloroperlidae	1	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 42.00 % (Chironomidae)
Family Biotic Index: 6.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 6.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 111 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 56 ' / 2-2.5 '
Substrate: Gravel/sand....StreamBank Vegetation/Stability: Grass/Poor
Canopy: Open....Other: Water temp. 14.7 C /pH 7.8 SU /DO 11.7 mg/L /Cond 252 umhos;
Agriculture-livestock
filamentous algae;

Station: AN0344
Unt To India Brook, Calais Rd, Randolph Twp, Morris County
Mendham USGS Quadrangle
Date Sampled: 05/19/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	52
Chironomidae	6	12
Philopotamidae	3	6
Elmidae	4	6
Sphaeriidae	8	6
Baetidae	4	4
Ephemerellidae	1	4
Simuliidae	6	3
Limnephilidae	4	2
Tubificidae	10	2
Perlidae	1	2
Nemouridae	2	1
Empididae	6	1
Tipulidae	3	1
Psephenidae	4	1
Leptophlebiidae	2	1
Leuctridae	0	1
BloodRed Chironomidae	8	1
Odontoceridae	0	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 107
% Contribution of Dominant Family: 48.60 % (Naididae)
Family Biotic Index: 5.79
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 20.56
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 160 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12 ' / < 1.0 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
Canopy: Mostly Closed....Other: Water temp. 18.0 C /pH 7.4 SU /DO 8.5 mg/L /Cond 265 umhos; Suburban; storm sewers
pile of leaf litter dumped on right bank;

Station: AN0344A
India Brook, Calais Rd, Randolph Twp, Morris County
Mendham USGS Quadrangle
Date Sampled: 05/19/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	19
Chironomidae	6	17
Lumbriculidae	8	16
Nemouridae	2	8
Naididae	7	7
Baetidae	4	6
Elmidae	4	6
Tipulidae	3	4
Perlodidae	2	3
Sphaeriidae	8	3
Gomphidae	1	3
Glossosomatidae	0	2
Leuctridae	0	2
Empididae	6	1
Perlidae	1	1
Planariidae	4	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 19.00 % (Ephemerellidae)
Family Biotic Index: 4.25
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 41.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 115 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 14.5 ' / < 1.0 '
Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 15.4 C /pH 7.4 SU /DO 9.3 mg/L /Cond 381 umhos; Suburban
stream channelized on both banks; sewage odor; fish

Station: AN0345
India Brook, Mountainside Rd, Mendham Twp, Morris County
Mendham USGS Quadrangle
Date Sampled: 05/19/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Philopotamidae	3	17
Ephemerellidae	1	15
Baetidae	4	13
Lumbriculidae	8	11
Glossosomatidae	0	9
Chironomidae	6	9
Elmidae	4	4
Perlidae	1	3
Psephenidae	4	3
Tipulidae	3	2
Hydropsychidae	4	2
Leuctridae	0	2
Pteronarcyidae	0	2
Nemouridae	2	1
Astacidae	5	1
Empididae	6	1
Gomphidae	1	1
Lepidostomatidae	1	1
Lumbricidae	10	1
BloodRed Chironomidae	8	1
Limnephilidae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 22
Total Number of Individuals: 101
% Contribution of Dominant Family: 16.83 % (Philopotamidae)
Family Biotic Index: 3.43
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 66.34
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 189 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 19 ' / 1 '
Substrate: Cobbles, boulders....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Closed....Other: Water temp. 16.4 C /pH 7.5 SU /DO 9.5 mg/L /Cond 237 umhos;
Rural / forested (India Bk Natural Area - Green Acres land)

Station: AN0346
N. Br. Raritan River, Rt 24, Mendham Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 05/19/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	39
Baetidae	4	32
Chironomidae	6	19
Philopotamidae	3	6
Lumbriculidae	8	4
Tipulidae	3	2
Asellidae	8	1
Ephemerellidae	1	1
Glossosomatidae	0	1
Hydroptilidae	4	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 107
% Contribution of Dominant Family: 36.45 % (Naididae)
Family Biotic Index: 5.52
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 38.32
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 162 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25 ' / < 1.0'
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 16.7 C /pH 7.5 SU /DO 8.5 mg/L /Cond 297 umhos; Forested / suburban / agriculture-cropland
storm sewers; nursery/tree farm adj to right bank;

Station: AN0347
Dawsons Brook, Ironia Rd (Off South Rd), Mendham Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 05/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	18
Baetidae	4	12
Heptageniidae	4	12
Hydropsychidae	4	9
Ephemerellidae	1	7
Philopotamidae	3	6
Nemouridae	2	5
Tipulidae	3	5
Lepidostomatidae	1	4
Limnephilidae	4	4
Perlidae	1	3
Elmidae	4	3
Psephenidae	4	3
Gomphidae	1	2
Rhyacophilidae	0	2
Glossosomatidae	0	1
Ptilodactylidae	1	1
Astacidae	5	1
Lumbricidae	10	1
Lumbriculidae	8	1
Psychomyiidae	2	1
Pteronarcyidae	0	1

Statistical Analysis

Number of Taxa: 22
Total Number of Individuals: 102
% Contribution of Dominant Family: 17.65 % (Chironomidae)
Family Biotic Index: 3.58
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 13
% EPT: 65.69
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 145 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10 ' / < 1.0'
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Good
Canopy: Partly Open....Other: Water temp. 15.4 C /pH 8.0 SU /DO 9.0 mg/L /Cond 241 umhos; Suburban / forested
homes and yards adjacent to stream;

Station: AN0348
Burnett Brook, Old Mill Rd, Mendham Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 05/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	18
Lumbriculidae	8	15
Philopotamidae	3	14
Ephemerellidae	1	14
Baetidae	4	6
Nemouridae	2	5
Tipulidae	3	5
Psephenidae	4	4
Elmidae	4	3
Perlodidae	2	2
Leuctridae	0	2
Naididae	7	2
Simuliidae	6	2
Glossosomatidae	0	1
Empididae	6	1
Hydropsychidae	4	1
Gomphidae	1	1
Limnephilidae	4	1
Peltoperlidae	1	1
Pteronarcyidae	0	1
Rhyacophilidae	0	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 100
% Contribution of Dominant Family: 18.00 % (Chironomidae)
Family Biotic Index: 4.07
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 49.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 163 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 12 ' / < 1.0 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, weeds/Good
Canopy: Mostly Closed....Other: Water temp. 14.4 C /pH 8.1 SU /DO 10.4 mg/L /Cond 276 umhos; Suburban / forested
salamanders, water snakes (mating - 8);

Station: AN0349
Peapack Brook, Fox Chase Rd Off Rt 512, Chester Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 05/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	19
Limnephilidae	4	15
Lumbriculidae	8	10
Naididae	7	8
Chironomidae	6	8
Baetidae	4	7
Philopotamidae	3	5
Gammaridae	4	5
Tipulidae	3	3
Brachycentridae	1	3
Elmidae	4	3
Glossosomatidae	0	2
Leuctridae	0	2
Planariidae	4	2
Rhyacophilidae	0	2
Heptageniidae	4	2
BloodRed Chironomidae	8	1
Hydroptilidae	4	1
Lepidostomatidae	1	1
Polycentropodidae	6	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 19.00 % (Ephemerellidae)
Family Biotic Index: 3.85
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 60.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 167 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 24 ' / < 1.0 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Good
Canopy: Mostly Closed....Other: Water temp. 14.8 C /pH 8.0 SU /DO 8.7 mg/L /Cond 288 umhos; Suburban
small pond feeding stream; lg fish, frogs

Station: AN0350
Peapack Brook, Old Dutch Rd, Off Rt 512, Bedminster Twp, Somerset County
Gladstone USGS Quadrangle
Date Sampled: 05/13/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	36
Elmidae	4	17
Baetidae	4	13
Ephemerellidae	1	12
Hydropsychidae	4	8
Naididae	7	5
Psephenidae	4	4
Philopotamidae	3	2
Simuliidae	6	2
Heptageniidae	4	2
Perlidae	1	1
Nemouridae	2	1
Tipulidae	3	1
Asellidae	8	1
Gammaridae	4	1
Nematoda	6	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 108
% Contribution of Dominant Family: 33.33 % (Chironomidae)
Family Biotic Index: 4.53
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 36.11
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 142 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20 ' / 1.5 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Partly Open....Other: Water temp. 18.6 C /pH 7.8 SU /DO 9.6 mg/L /Cond 344 umhos; Suburban / rural / forested

Station: AN0351
N. Br Raritan River, Rt 202, Far Hills Boro, Somerset County
Gladstone USGS Quadrangle
Date Sampled: 05/13/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	30
Elmidae	4	19
Ephemerellidae	1	14
Baetidae	4	12
Lumbriculidae	8	8
Naididae	7	5
Perlidae	1	2
Philopotamidae	3	2
Limnephilidae	4	2
Psephenidae	4	2
Heptageniidae	4	2
Planariidae	4	1
Lumbricidae	10	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 30.00 % (Chironomidae)
Family Biotic Index: 4.63
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 34.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 147 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 64 ' / 3 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Open....Other: Water temp. 20.1 C /pH 7.8 SU /DO 9.2 mg/L /Cond 265 umhos; Suburban; storm sewers

Station: AN0352
Mine Brook, Old Quarry Rd, Bernardsville Boro, Somerset County
Bernardsville USGS Quadrangle
Date Sampled: 05/13/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	34
Lumbriculidae	8	25
Naididae	7	19
Chironomidae	6	9
Planariidae	4	4
Gammaridae	4	2
Sphaeriidae	8	2
Baetidae	4	1
BloodRed Chironomidae	8	1
Philopotamidae	3	1
Enchytraeidae	10	1
Hydroptilidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 34.00 % (Simuliidae)
Family Biotic Index: 6.60
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 3.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 147 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 9 ' / 1 '
Substrate: Cobbles, gravel/sand, concrete....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Mostly Closed....Other: Water temp. 18.3 C/pH 7.6 SU /DO 8.6 mg/L /Cond 426 umhos; Industrial / suburban; baseball field adj to right bank
storm sewers and possible sports field drainage pipe;

Station: AN0353
Mine Brook, Far Hills Rd, Far Hills Boro, Somerset County
Gladstone USGS Quadrangle
Date Sampled: 06/24/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	32
Gammaridae	4	14
Chironomidae	6	14
BloodRed Chironomidae	8	7
Baetidae	4	6
Hydropsychidae	4	6
Tubificidae	10	5
Philopotamidae	3	3
Planariidae	4	3
Psephenidae	4	3
Asellidae	8	2
Naididae	7	2
Athericidae	2	1
Lepidostomatidae	1	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 32.00 % (Elmidae)
Family Biotic Index: 4.92
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 17.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 115 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27 ' / 1.5 '
Substrate: Gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
Canopy: Mostly Closed....Other: Water temp. 20.6 C /pH 7.4 SU /DO 8.5 mg/L /Cond 378 umhos; Suburban; storm sewers
pipe for pump in water & sand bags in stream; rock wall on left bank; fish

Station: AN0354
Middle Brook, Spook Hollow Rd, Bedminster Twp, Somerset County
Gladstone USGS Quadrangle
Date Sampled: 05/13/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	70
Naididae	7	19
BloodRed Chironomidae	8	3
Baetidae	4	2
Elmidae	4	2
Caenidae	7	1
Lumbriculidae	8	1
Tetrastemmatidae	7	1
Simuliidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 101
% Contribution of Dominant Family: 69.31 % (Chironomidae)
Family Biotic Index: 6.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 3.96
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 136 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 9.5 ' / 1 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 18.6 C /pH 7.7 SU /DO 9.4 mg/L /Cond 210 umhos; Forested / agriculture-cropland

Station: AN0355
Middle Brook, Cutting Witney Road (River Road); Bedminster Twp., Somerset County
Glandstone USGS Quadrangle
Date Sampled: 04/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	25
Elmidae	4	22
Hydropsychidae	4	8
Psephenidae	4	5
Tipulidae	3	4
Empididae	6	4
Lepidostomatidae	1	4
Lumbriculidae	8	4
Tetrastemmatidae	7	4
Simuliidae	6	4
Philopotamidae	3	3
Tubificidae	10	3
Ephemerellidae	1	2
Hydroptilidae	4	2
BloodRed Chironomidae	8	2
Planariidae	4	1
Gomphidae	1	1
Lumbricidae	10	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 25.00 % (Chironomidae)
Family Biotic Index: 4.98
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 20.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 130 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 16' / 1'
Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Partly Open....Other: Rural, Forested; Water temp. 16.8 C / pH 7.7 SU / DO 11.2 mg/L / Cond. 210 umhos
Filamentous Algae; Fish;

Station: AN0356
Lamington River, Ironia Rd, Chester Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 05/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	86
Asellidae	8	9
Chironomidae	6	2
Naididae	7	1
Leptoceridae	4	1
Tubificidae	10	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 100
% Contribution of Dominant Family: 86.00 % (Gammaridae)
Family Biotic Index: 4.49
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 119 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid, cedar colored....Flow: Slow....Width/Depth (ft): 33 ' / 2 '
Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Fair
Canopy: Open....Other: Water temp. 18.7 C /pH 7.8 SU /DO 7.9 mg/L /Cond 473 umhos; Suburban / forested. USGS gage station
geese;

Station: AN0357
Tanners Brook, Tanners Brook Rd, Chester Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 05/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	34
Sphaeriidae	8	16
Chironomidae	6	10
Limnephilidae	4	10
Lumbriculidae	8	7
Baetidae	4	5
Elmidae	4	4
Heptageniidae	4	4
Simuliidae	6	3
Ephemerellidae	1	2
Tubificidae	10	2
Nemouridae	2	1
Hydropsychidae	4	1
BloodRed Chironomidae	8	1
Glossosomatidae	0	1
Lumbricidae	10	1
Naididae	7	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 104
% Contribution of Dominant Family: 32.69 % (Gammaridae)
Family Biotic Index: 5.28
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 23.08
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 106 (Marginal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8 ' / < 1.0'
Substrate: Sand, silt....StreamBank Vegetation/Stability: Shrubs, vines, weeds/Poor
Canopy: Mostly Open....Other: Water temp. 16.3 C /pH 8.0 SU /DO 8.2 mg/L /Cond 175 umhos; Forested / suburban (new housing development under construction-left bank) both banks eroded; frogs, minnows, macrophytes

Station: AN0358
Lamington River, Rt 24 (Cooper Mill Park), Chester Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 05/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	33
Gammaridae	4	22
Hydropsychidae	4	14
Simuliidae	6	5
Elmidae	4	5
Baetidae	4	4
Asellidae	8	4
Brachycentridae	1	3
Naididae	7	2
Sphaeriidae	8	2
Hydrobiidae	8	1
Nemouridae	2	1
Cambaridae	5	1
Planariidae	4	1
Leptoceridae	4	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 33.00 % (Chironomidae)
Family Biotic Index: 5.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 23.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 191 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 24 ' / 2 '
Substrate: Cobbles, boulders....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Mostly Closed....Other: Water temp. 19.3 C /pH 7.7 SU /DO 7.4 mg/L /Cond 322 umhos; Suburban / forested
periphyton, macrophytes, many emerged stonefly exoskeletons;

Station: AN0359
Trout Brook, State Park Rd (Near Hacklebarney Sp), Chester Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 05/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	25
Lumbriculidae	8	13
Philopotamidae	3	12
Ephemerellidae	1	11
Baetidae	4	10
Naididae	7	6
Hydroptilidae	4	4
Gammaridae	4	3
Tipulidae	3	2
Leuctridae	0	2
Elmidae	4	2
Nemouridae	2	1
Perlidae	1	1
Psephenidae	4	1
Gomphidae	1	1
Hydropsychidae	4	1
Perlodidae	2	1
Lepidostomatidae	1	1
Lumbricidae	10	1
Polycentropodidae	6	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 100
% Contribution of Dominant Family: 25.00 % (Chironomidae)
Family Biotic Index: 4.62
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
% EPT: 45.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 166 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 11 ' / < 1.0'
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Good
Canopy: Closed....Other: Water temp.15.4 C /pH 7.8 SU / DO 9.7 mg/L /Cond 211 umhos;
Forested / suburban

Station: AN0360
Lamington River, Rt 512, Tewksbury Twp, Hunterdon/Somerset County
Gladstone USGS Quadrangle
Date Sampled: 05/25/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	22
Elmidae	4	21
Brachycentridae	1	12
Ephemerellidae	1	9
Baetidae	4	7
Perlidae	1	6
Hydropsychidae	4	4
Lepidostomatidae	1	4
Limnephilidae	4	3
Psephenidae	4	3
Chloroperlidae	1	1
Blephariceridae	0	1
Gammaridae	4	1
Glossosomatidae	0	1
Perlodidae	2	1
Lumbricidae	10	1
Naididae	7	1
Pteronarcyidae	0	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 22.00 % (Chironomidae)
Family Biotic Index: 3.45
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
% EPT: 49.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 157 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 38 ' / < 1.0 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, weeds, shrubs/Good
Canopy: Mostly Closed....Other: Water temp. 20.0 C /pH 7.9 SU /DO 8.9 mg/L /Cond 298 umhos; Suburban
frogs, fish;

Station: AN0361
Unt To Lamington River, Black River Rd, Bedminster Twp, Somerset County
Gladstone USGS Quadrangle
Date Sampled: 05/25/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Baetidae	4	38
Chironomidae	6	25
Simuliidae	6	6
Lumbriculidae	8	5
Ephemerellidae	1	4
Hydropsychidae	4	4
Philopotamidae	3	3
Elmidae	4	3
Perlidae	1	3
Nemouridae	2	2
Heptageniidae	4	2
Glossosomatidae	0	1
Tipulidae	3	1
Empididae	6	1
Leuctridae	0	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 38.00 % (Baetidae)
Family Biotic Index: 4.50
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 58.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 161 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 24 ' / < 1.0 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, weeds, shrubs/Fair
Canopy: Mostly Open....Other: Water temp. 18.2 C /pH 7.9 SU /DO 8.1 mg/L /Cond 205 umhos; Rural / forested
fish, yoy minnows;

Station: AN0362
Cold Brook, Vliettown Road, Tewksbury Twp, Hunterdon County
Gladstone USGS Quadrangle
Date Sampled: 05/25/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	28
Chironomidae	6	18
Baetidae	4	13
Hydropsychidae	4	10
Simuliidae	6	8
Ephemerellidae	1	6
Gammaridae	4	5
Limnephilidae	4	4
Psephenidae	4	3
Philopotamidae	3	2
Gomphidae	1	2
Lumbriculidae	8	2
Rhyacophilidae	0	2
Perlodidae	2	1
Naididae	7	1
Tetrastemmatidae	7	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 107
% Contribution of Dominant Family: 26.17 % (Elmidae)
Family Biotic Index: 4.27
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 35.51
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 137 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 31 ' / 1 - 3 '
Substrate: Silt, gravel....StreamBank Vegetation/Stability: Shrubs, trees, grasses/Fair
Canopy: Mostly Closed....Other: Water temp. 16.7 C /pH 7.6 SU /DO 8.3 mg/L /Cond 293 umhos; Rural / Agriculture-livestock (horses)
macrophytes, green frogs;

Station: AN0363
Lamington River, Rt 523, Bedminster Twp, Somerset/Hunterdon County
Gladstone USGS Quadrangle
Date Sampled: 05/25/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	24
Baetidae	4	23
Chironomidae	6	16
Ephemerellidae	1	7
Heptageniidae	4	7
Hydropsychidae	4	4
Gammaridae	4	4
Perlidae	1	3
Glossosomatidae	0	2
Helicopsychidae	3	2
Lumbricidae	10	2
Limnephilidae	4	2
Psephenidae	4	2
Leuctridae	0	1
Ceratopogonidae	6	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 24.00 % (Elmidae)
Family Biotic Index: 4.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 51.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 156 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear, cedar....Flow: Moderate....Width/Depth (ft): 64 ' / < 1.0 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, grasses/Good
Canopy: Partly Open....Other: Water temp. 19.8 C /pH 7.5 SU /DO 7.3 mg/L /Cond 289 umhos; Rural / forested
macrophytes, large fish;

Station: AN0364
N. Br. Rockaway Creek, Fairmount Rd (Rt 512), Tewksbury Twp, Hunterdon County
Califon USGS Quadrangle
Date Sampled: 04/27/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	43
Nemouridae	2	13
Baetidae	4	6
Lumbriculidae	8	6
Chironomidae	6	6
Tipulidae	3	4
Glossosomatidae	0	2
Ptilodactylidae	1	2
Hydropsychidae	4	2
Perlodidae	2	2
Leuctridae	0	2
Brachycentridae	1	2
Naididae	7	2
Simuliidae	6	2
Dryopidae	5	1
Lepidostomatidae	1	1
Limnephilidae	4	1
Elmidae	4	1
Chloroperlidae	1	1
Peltoperlidae	1	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 43.00 % (Ephemerellidae)
Family Biotic Index: 2.47
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 76.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 154 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 11 ' / 1 - 2 '
Substrate: Sand, silt....StreamBank Vegetation/Stability: Shrubs, trees/Fair
Canopy: Mostly Open....Other: Water temp. 13.8 C /pH 7.3 SU /DO 6.2 mg/L /Cond 132 umhos; Rural / Agriculture-livestock
periphyton, fish and salamanders observed;

Station: AN0365
N. Br. Rockaway Creek, Rockaway Rd, Tewksbury Twp, Hunterdon County
Califon USGS Quadrangle
Date Sampled: 04/27/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	36
Baetidae	4	23
Nemouridae	2	6
Psephenidae	4	5
Chironomidae	6	4
Simuliidae	6	4
Tubificidae	10	3
Peltoperlidae	1	3
BloodRed Chironomidae	8	3
Lumbriculidae	8	2
Naididae	7	2
Glossosomatidae	0	1
Hydropsychidae	4	1
Tipulidae	3	1
Chloroperlidae	1	1
Empididae	6	1
Brachycentridae	1	1
Limnephilidae	4	1
Pteronarcyidae	0	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 36.00 % (Ephemerellidae)
Family Biotic Index: 3.18
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
% EPT: 75.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 144 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 47.5 ' / 1-2 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Grasses, trees, shrubs/Fair
Canopy: Mostly Open....Other: Water temp. 12.0 C /pH 7.3 SU /DO 11.5 mg/L /Cond 200 umhos; Rural
organic yard debris dumped on bank;

Station: AN0366
N. Br Rockaway Creek, Rockaway Rd / Taylor's Mill Rd, Readington Twp, Hunterdon County
Califon USGS Quadrangle
Date Sampled: 04/27/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	34
Baetidae	4	12
Chironomidae	6	11
Nemouridae	2	8
Simuliidae	6	5
Hydropsychidae	4	4
Gammaridae	4	3
Lepidostomatidae	1	3
Lumbriculidae	8	3
Philopotamidae	3	2
Tubificidae	10	2
Planorbidae	6	2
Siphlonuridae	7	2
Glossosomatidae	0	1
Empididae	6	1
Heptageniidae	4	1
Perlidae	1	1
Sphaeriidae	8	1
Polycentropodidae	6	1
Psephenidae	4	1
Limnephilidae	4	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 22
Total Number of Individuals: 100
% Contribution of Dominant Family: 34.00 % (Ephemerellidae)
Family Biotic Index: 3.38
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 13
% EPT: 71.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 180 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40 ' / 1.5 - 2 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, grasses, shrubs/Good
Canopy: Partly Open....Other: Water temp. 13.0 C /pH 7.3 SU /DO 10.9 mg/L /Cond 130 umhos; Forested / industrial (downstream of quarry)
salamander, fish, & crayfish. ; fresh creosote on bridge

Station: AN0367
S. Br. Rockaway Creek, Windy Acres Farm, Lebanon Boro, Hunterdon County
Califon USGS Quadrangle
Date Sampled: 05/04/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	42
Naididae	7	13
Ephemerellidae	1	7
Elmidae	4	6
Asellidae	8	5
Gammaridae	4	5
Hydropsychidae	4	5
Lumbriculidae	8	3
Tipulidae	3	2
Tubificidae	10	2
Heptageniidae	4	2
Perlidae	1	1
Calopterygidae	5	1
Philopotamidae	3	1
Empididae	6	1
BloodRed Chironomidae	8	1
Psephenidae	4	1
Simuliidae	6	1
Siphlonuridae	7	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 42.00 % (Chironomidae)
Family Biotic Index: 5.52
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 17.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 165 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 12.5 ' / 1-1.5 '
Substrate: Cobbles, bedrock....StreamBank Vegetation/Stability: Grasses, trees, shrubs/Poor
Canopy: Mostly Open....Other: Water temp. 10.9 C /pH 7.6 SU /DO 11.7 mg/L /Cond 333 umhos; Suburban / Agriculture-cropland
fish;

Station: AN0368
S. Br. Rockaway Creek, Rt 22, Readington Twp, Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/04/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	31
Gammaridae	4	17
Asellidae	8	15
Naididae	7	9
Simuliidae	6	7
Sphaeriidae	8	6
Elmidae	4	6
Planorbidae	6	2
BloodRed Chironomidae	8	2
Psephenidae	4	2
Planariidae	4	1
Ephemerellidae	1	1
Ephydridae	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 31.00 % (Chironomidae)
Family Biotic Index: 5.98
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 171 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 22 ' / < 1.0 - 1.5 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, grass, shrubs/Good
Canopy: Mostly Open....Other: Water temp. 13.3 C /pH 7.5 SU /DO 10.3 mg/L /Cond 310 umhos; Suburban. Storm drain flowing
minnows, trash; extremely turbid water;

Station: AN0369
Rockaway Creek, Island Road; Readington Twp., Hunterdon County
Raritan USGS Quadrangle
Date Sampled: 04/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	45
Elmidae	4	19
BloodRed Chironomidae	8	9
Tubificidae	10	8
Psephenidae	4	4
Potamanthidae	4	2
Gammaridae	4	2
Hydropsychidae	4	2
Lepidostomatidae	1	2
Perlidae	1	1
Tipulidae	3	1
Tabanidae	6	1
Planariidae	4	1
Lumbricidae	10	1
Lumbriculidae	8	1
Naididae	7	1
Sphaeriidae	8	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 102
% Contribution of Dominant Family: 44.12 % (Chironomidae)
Family Biotic Index: 5.79
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 7.84
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 104 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 80' / 2'
Substrate: Cobbles, gravel, sand, silt....StreamBank Vegetation/Stability: Grasses, trees/Poor
Canopy: Open....Other: Agriculture-livestock; Water temp. 16.3 C / pH 7.6 SU / DO 11.8 mg/L / Cond. 218 umhos
Fish;

Station: AN0370
Lamington River, Cowperthwaite Road, Branchburg Twp., Somerset County
Gladstone USGS Quadrangle
Date Sampled: 4/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	37
Hydropsychidae	4	15
Chironomidae	6	10
Psephenidae	4	5
Empididae	6	4
Ephemerellidae	1	4
Glossosomatidae	0	4
Limnephilidae	4	4
Perlidae	1	3
Gammaridae	4	3
Naididae	7	3
Potamanthidae	4	2
Tipulidae	3	2
Philopotamidae	3	1
Lepidostomatidae	1	1
Lumbricidae	10	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 37.00 % (Elmidae)
Family Biotic Index: 4.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 35.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 137 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 105' / 2'
Substrate: Gravel, sand....StreamBank Vegetation/Stability: Trees, grass/Poor
Canopy: Mostly open....Other: Suburban; Water temp. 10.6 C / pH 7.7 SU / DO 16.5 mg/L / Cond. 245 umhos
Fish;

Station: AN0371
Chambers (B) Brook, Love Rd, Bedminster Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 04/20/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	39
Elmidae	4	21
Chironomidae	6	15
Psephenidae	4	9
Tetrastemmatidae	7	3
Coenagrionidae	9	2
Hydropsychidae	4	2
BloodRed Chironomidae	8	2
Gomphidae	1	2
Philopotamidae	3	1
Planariidae	4	1
Gammaridae	4	1
Lumbriculidae	8	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 39.00 % (Tubificidae)
Family Biotic Index: 6.92
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 3.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 128 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 21 ' / < 1.0 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, weeds/Fair
Canopy: Partly Open....Other: Water temp. 17.0 C /pH 8.1 SU /DO 13.8 mg/L /Cond 597 umhos; Rural / forested
fish;

Station: AN0372
Chambers (A) Brook, Coddington Rd, Readington Twp, Hunterdon County
Raritan USGS Quadrangle
Date Sampled: 06/02/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Psephenidae	4	20
Elmidae	4	20
Hydropsychidae	4	17
Chironomidae	6	13
Perlidae	1	11
BloodRed Chironomidae	8	9
Glossosomatidae	0	4
Heptageniidae	4	3
Dytiscidae	5	2
Gomphidae	1	2
Hydroptilidae	4	1
Philopotamidae	3	1
Corixidae	9	1
Gyrinidae	3	1
Gerridae	8	1
Tetrastemmatidae	7	1
Sialidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 108
% Contribution of Dominant Family: 18.52 % (Psephenidae & Elmidae)
Family Biotic Index: 4.18
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 34.26
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 139 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 19 ' / < 1.0 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
Canopy: Mostly Closed....Other: Water temp. 15.2 C /pH 7.6 SU /DO 9.7 mg/L /Cond 272 umhos; Rural
salamanders;

Station: AN0373
Chambers (A) Brook, Station Rd, Branchburg Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 06/02/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	45
Hydropsychidae	4	14
Elmidae	4	9
Naididae	7	8
Philopotamidae	3	7
Gammaridae	4	4
Tipulidae	3	2
Erpobdellidae	8	2
Simuliidae	6	2
Sphaeriidae	8	2
Coenagrionidae	9	1
Planariidae	4	1
Nematoda	6	1
Perlidae	1	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Chironomidae)
Family Biotic Index: 5.29
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 22.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 163 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20 ' / < 1.0 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Mostly Closed....Other: Water temp. 16.3 C /pH 7.5 SU /DO 8.7 mg/L /Cond 340 umhos; Rural
storm sewers;

Station: AN0374
N Br Raritan River, Rt 202, Branchburg Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 06/02/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	20
Elmidae	4	17
Potamanthidae	4	14
Perlidae	1	13
Hydropsychidae	4	12
Psephenidae	4	6
Heptageniidae	4	4
Chironomidae	6	4
Baetidae	4	3
Tetrastemmatidae	7	2
Caenidae	7	1
Planariidae	4	1
Ephemerellidae	1	1
Tubificidae	10	1
Nematoda	6	1
BloodRed Chironomidae	8	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 102
% Contribution of Dominant Family: 19.61 % (Gammaridae)
Family Biotic Index: 3.86
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 47.06
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 156 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 120 ' / 3 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Open....Other: Water temp. 16.6 C /pH 7.7 SU /DO 9.0 mg/L /Cond 204 umhos; Suburban
storm sewers;

Station: AN0375
Dukes Brook, Dukes Parkway, Hillsborough Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 06/02/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	61
Asellidae	8	17
BloodRed Chironomidae	8	11
Chironomidae	6	5
Sphaeriidae	8	4
Hydrobiidae	8	3
Coenagrionidae	9	2
Physidae	7	2
Corixidae	9	1
Cambaridae	5	1
Elmidae	4	1
Valvatidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 109
% Contribution of Dominant Family: 55.96 % (Gammaridae)
Family Biotic Index: 5.58
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 130 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 22 ' / < 1.0 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
Canopy: Mostly Closed....Other: Water temp. 19.5 C /pH 7.6 SU /DO 7.2 mg/L /Cond 293 umhos; Suburban
fish;

Station: AN0376
Peters Brook, Route 28, Somerville Boro, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 06/02/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	25
BloodRed Chironomidae	8	24
Tubificidae	10	14
Chironomidae	6	13
Elmidae	4	8
Coenagrionidae	9	5
Naididae	7	4
Tipulidae	3	1
Asellidae	8	1
Calopterygidae	5	1
Cambaridae	5	1
Libellulidae	9	1
Lumbriculidae	8	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 25.00 % (Gammaridae)
Family Biotic Index: 6.60
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 113 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 46' / 1'
Substrate: Gravel/sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Partly Open....Other: Water temp. 18.3 C / pH 7.5 SU / DO 7.9 mg/L / Cond. 540 umhos; Urban
Storm sewers present; park on right bank

Station: AN0377
Raritan River, Abv Millstone River Confluence, Manville Boro, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 06/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	86
Elmidae	4	3
Tubificidae	10	2
Hydrobiidae	8	1
Asellidae	8	1
Corixidae	9	1
Hydropsychidae	4	1
Cambaridae	5	1
Haliplidae	5	1
Perlidae	1	1
Sphaeriidae	8	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 86.00 % (Gammaridae)
Family Biotic Index: 4.28
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 118 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): > 100 ' / 1 - 2 '
Substrate: Cobbles, gravel, mud....StreamBank Vegetation/Stability: Grasses, trees, shrubs/Poor
Canopy: Open....Other: Water temp. 21.2 C /pH 7.4 SU /DO 7.7 mg/L /Cond 266 umhos; Suburban / forested / light industrial
periphyton, filamentous algae, macrophytes;

Station: AN0378
Millstone River, Baird Rd., Millstone Twp., Monmouth County
Roosevelt USGS Quadrangle
Date Sampled: 08/05/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Heptageniidae	4	39
Chironomidae	6	17
Sphaeriidae	8	11
Elmidae	4	7
Tubificidae	10	6
Hydropsychidae	4	5
Tipulidae	3	3
BloodRed Chironomidae	8	2
Gomphidae	1	2
Sialidae	4	2
Calopterygidae	5	1
Cambaridae	5	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 97
% Contribution of Dominant Family: 40.21 % (Heptageniidae)
Family Biotic Index: 5.22
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 45.36
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 112 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 12.5' / <1.0'
Substrate: Sand, Silt, Snags....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Partly Open....Other: Water temp. 22.3 C / pH 7.1 SU / DO 7.3 mg/L / Cond. 128 umhos; Agriculture-cropland & livestock, Forested
Frogs present;

Station: AN0379
Millstone River, Route 33, Millstone Twp., Monmouth County
Jamesburg USGS Quadrangle
Date Sampled: 06/15/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	92
Tubificidae	10	4
BloodRed Chironomidae	8	3
Sphaeriidae	8	3
Sialidae	4	3
Cambaridae	5	2
Gomphidae	1	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 109
% Contribution of Dominant Family: 84.40 % (Chironomidae)
Family Biotic Index: 6.11
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 150 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 12.0' / 2.5'
Substrate: Mud....StreamBank Vegetation/Stability: Shrubs, Grass/Good
Canopy: Open....Other: Water temp. 20.6 C / pH 7.2 SU / DO 6.5 mg/L / Cond. 158 umhos; Suburban
site sampled between Rt 33 and adjacent to side road and U-turn exit;

Station: AN0380
Rocky Brook, Perrineville Rd., Millstone Twp., Monmouth County
Roosevelt USGS Quadrangle
Date Sampled: 09/16/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	26
Hydropsychidae	4	25
Chironomidae	6	23
Gammaridae	4	9
Leptoceridae	4	4
Planariidae	4	3
Coenagrionidae	9	3
Asellidae	8	3
Simuliidae	6	2
Philopotamidae	3	1
Glossiphoniidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Sphaeriidae)
Family Biotic Index: 5.84
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 30.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 148 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 37.0' / <1.0 - 2.0'
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Closed....Other: Water Temp. 23.2 C / pH 7.0 SU / DO 7.3 mg/L / Cond. 170 umhos; Suburban.
Weir upstream.; Fish and turtle present.

Station: AN0381
Rocky Brook, Main St., Hightstown Boro., Mercer
Hightstown USGS Quadrangle
Date Sampled: 09/14/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	38
Sphaeriidae	8	11
Hydropsychidae	4	8
Corbiculidae	8	7
Chironomidae	6	7
BloodRed Chironomidae	8	6
Naididae	7	5
Tetrastemmatidae	7	5
Planorbidae	6	4
Coenagrionidae	9	2
Planariidae	4	2
Hydrobiidae	8	1
Calopterygidae	5	1
Plagiostomidae	4	1
Physidae	7	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 38.00 % (Gammaridae)
Family Biotic Index: 5.66
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 8.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 108 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 20.0'-25.0' / 1.0'
Substrate: Cobbles, Gravel/Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Partly Open....Other: Water Temp. 22.7 C / pH 7.0 SU / DO 8.3 mg/L / Cond. 231 umhos; Urban. Downstream of Peddie Lake outlet.
Storm sewers present and flowing. ; Water fowl present.

Station: AN0382
Millstone River, Grovers Mill Rd., West Windsor Twp., Mercer/Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 08/31/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	26
Coenagrionidae	9	18
Elmidae	4	14
Planorbidae	6	7
Physidae	7	6
Sphaeriidae	8	6
Tubificidae	10	4
Chironomidae	6	4
Glossiphoniidae	8	2
Gomphidae	1	2
Naididae	7	2
Corixidae	9	2
Hydrobiidae	8	1
Planariidae	4	1
Gerridae	8	1
Hydracarina	6	1
Hydroptilidae	4	1
Pleidae	9	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Gammaridae)
Family Biotic Index: 6.15
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 158 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear, grayish green....Flow: Slow....Width/Depth (ft): 77.0' / 2.0' - 3.0'
Substrate: Sand, Mud....StreamBank Vegetation/Stability: Shrubs, Grass, Trees/Good
Canopy: Mostly Open....Other: Water temp. 24.4 C / pH 7.2 SU / DO 5.8 mg/L / Cond. 281 umhos; Suburban, Forested
minnows and crayfish present;

Station: AN0382B
Millstone River, Rt. 535, East Windsor Twp., Mercer/Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 09/14/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	41
Corbiculidae	8	13
Tubificidae	10	11
Elmidae	4	9
Chironomidae	6	7
Heptageniidae	4	4
BloodRed Chironomidae	8	3
Leptoceridae	4	3
Corixidae	9	2
Sphaeriidae	8	2
Tetrastemmatidae	7	2
Glossiphoniidae	8	1
Ancylidae	6	1
Calopterygidae	5	1
Tabanidae	6	1
Plagiostomidae	4	1
Coenagrionidae	9	1
Isotomidae	10	1
Planorbidae	6	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 105
% Contribution of Dominant Family: 39.05 % (Gammaridae)
Family Biotic Index: 5.81
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 6.67
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 133 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 33.0' / 2.5'
Substrate: Cobbles, Mud, Silt, Snags....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Partly Open....Other: Water temp. 21.0 C / pH 7.4 SU / DO 7.7 mg/L / Cond. 244 umhos; Suburban, forested

Station: AN0382D
Millstone River, Applegarth Rd, Monroe Twp, Middlesex County
Jamesburg USGS Quadrangle
Date Sampled: 8/31/04

Family	Family Tolerance Value (FTV)	Number of Individuals

Not Sampled due to bridge construction work

Station: AN0383
Big Bear Brook, Old Trenton Rd., West Windsor Twp., Mercer County
Hightstown USGS Quadrangle
Date Sampled: 08/31/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydrobiidae	8	34
Coenagrionidae	9	11
Elmidae	4	9
Chironomidae	6	8
Sphaeriidae	8	8
Physidae	7	6
Planorbidae	6	5
Tubificidae	10	3
Calopterygidae	5	3
Hydropsychidae	4	3
Naididae	7	2
Haliplidae	5	2
Corbiculidae	8	1
Culicidae	8	1
Lymnaeidae	6	1
BloodRed Chironomidae	8	1
Nepidae	8	1
Corduliidae	5	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 34.00 % (Hydrobiidae)
Family Biotic Index: 7.15
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 160 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 29' 3" / 1.0'-1.5'
Substrate: Gravel/Sand, Snags, Root Mats....StreamBank Vegetation/Stability: Grasses, Shrubs, Trees/Fair
Canopy: Mostly Closed....Other: Water Temp. 24.9 C / pH 7.2 SU / DO 4.4 mg/L / Cond. 295 umhos; Agriculture-cropland and livestock, Suburban.
Storm sewers present, Drainage pipe on right bank. ; Frogs, fish, filamentous algae present.

Station: AN0384
Bear Brook, Cranbury Rd., West Windsor Twp., Mercer County
Hightstown USGS Quadrangle
Date Sampled: 08/31/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	52
Hydropsychidae	4	14
Elmidae	4	11
Gammaridae	4	8
Naididae	7	6
Sphaeriidae	8	6
Simuliidae	6	4
Baetidae	4	3
Tubificidae	10	2
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 107
% Contribution of Dominant Family: 48.60 % (Chironomidae)
Family Biotic Index: 5.59
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 15.89
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 170 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10.0' / <1.0' - 1.5'
Substrate: Gravel....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Closed....Other: Water temp. 22.7 C / pH 7.4 SU / DO 6.9 mg/ L / Cond. 191 umhos; Suburban, Forested
storm sewers present; macrophytes, fish, and crayfish present

Station: AN0385
Cranbury Brook, Applegarth Rd., Monroe Twp., Middlesex County
Jamesburg USGS Quadrangle
Date Sampled: 09/14/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	66
Tubificidae	10	21
BloodRed Chironomidae	8	5
Asellidae	8	2
Coenagrionidae	9	2
Naididae	7	2
Sphaeriidae	8	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 66.00 % (Chironomidae)
Family Biotic Index: 7.09
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 146 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant -
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 18.0' / 1.0'-2.0'
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Closed....Other: Water Temp. 17.4 C / pH 6.9 SU / DO 8.5 mg/L / Cond. 199 umhos; Agriculture-cropland, Forested.
Storm sewers present, recent work on storm sewers upstream.; Macrophytes, filamentous algae, frogs present.

Station: AN0386
Cranbury Brook, Maple Ave., Plainsboro Twp. , Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 08/31/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	59
BloodRed Chironomidae	8	19
Naididae	7	15
Gammaridae	4	3
Coenagrionidae	9	3
Hydropsychidae	4	2
Planariidae	4	2
Hydroptilidae	4	2
Tubificidae	10	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 106
% Contribution of Dominant Family: 55.66 % (Chironomidae)
Family Biotic Index: 6.45
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 3.77
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 158 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 31.0' / 2.0' - 3.0'
Substrate: Gravel/Sand, Mud....StreamBank Vegetation/Stability: Shrubs, Trees/Fair
Canopy: Partly Open....Other: Water temp. 24.6 C / pH 7.3 SU / DO 6.3 mg/L / Cond. 188 umhos; Suburban, Forested
banks stabilized with rip rap and fencing; fish and water snakes present

Station: AN0387
Devils Brook, New Rd., South Brunswick Twp., Middlesex County County
Hightstown USGS Quadrangle
Date Sampled: 09/16/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	30
Chironomidae	6	25
Sphaeriidae	8	15
Hydropsychidae	4	9
Tubificidae	10	9
Gerridae	8	3
Glossiphoniidae	8	2
Caenidae	7	1
Elmidae	4	1
Gyrinidae	3	1
Dytiscidae	5	1
Physidae	7	1
BloodRed Chironomidae	8	1
Corixidae	9	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 30.00 % (Asellidae)
Family Biotic Index: 7.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 10.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 166 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 10.0' / 0.5' - 2.5'
Substrate: Gravel, Sand, Silt, Snags....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Closed....Other: Water Temp. 19.3 C / pH 6.5 SU / DO 5.2 mg/L / Cond. 111 umhos; Suburban.

Station: AN0388
Shallow Brook, Scotts Corner Rd., South Brunswick Twp., Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 09/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	24
Coenagrionidae	9	22
Tubificidae	10	13
Chironomidae	6	10
Asellidae	8	10
Talitridae	8	7
Caenidae	7	3
Libellulidae	9	3
Planariidae	4	3
Hydrophilidae	5	1
Ceratopogonidae	6	1
Elmidae	4	1
Glossiphoniidae	8	1
Erpobdellidae	8	1
Haliplidae	5	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 101
% Contribution of Dominant Family: 23.76 % (BloodRed Chironomidae)
Family Biotic Index: 8.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.97
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 146 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 17.0' / 2.0'
Substrate: Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Grass/Good
Canopy: Mostly Open....Other: Water Temp. 18.3 C / pH 6.6 SU / DO 6.3 mg/L / Cond. 146 umhos; Suburban. Storm sewers present.
Downstream of beaver dam. Macrophytes present.; Houses on left bank, high tension lines crossing stream.

Station: AN0389
Devils Bk, Schalks Crossing Rd (Rt 683), Plainsboro Twp, Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 9/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals

Not Sampled due to bridge construction work

Station: AN0390
Camp Harmony Br. Of Stony Bk., Vandyke Rd., Hopewell Twp., Mercer County
Hopewell USGS Quadrangle
Date Sampled: 09/09/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	29
Hydropsychidae	4	16
Chironomidae	6	9
Philopotamidae	3	7
Elmidae	4	7
Psephenidae	4	5
Baetidae	4	4
Calopterygidae	5	3
Tipulidae	3	3
Dixidae	3	2
Talitridae	8	2
Tubificidae	10	2
Belostomatidae	9	1
Aeshnidae	3	1
Asellidae	8	1
BloodRed Chironomidae	8	1
Naididae	7	1
Gerridae	8	1
Dytiscidae	5	1
Lumbriculidae	8	1
Veliidae	9	1
Leptophlebiidae	2	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 23
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Sphaeriidae)
Family Biotic Index: 5.72
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 29.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 162 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30.0' / <1.0'-1.5'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Grasses, Trees, Shrubs/Fair
Canopy: Partly Open....Other: Water Temp. 21.3 C / pH 7.2 SU / DO 7.2 mg/L / Cond. 206 umhos; Rural, Forested.
Macrophytes, filamentous algae, crayfish, and fish present.;

Station: AN0391
Stony Brook, Mine Rd., Hopewell Twp., Mercer County
Pennington USGS Quadrangle
Date Sampled: 09/09/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	19
Psephenidae	4	17
Gammaridae	4	11
Baetidae	4	10
Heptageniidae	4	10
Chironomidae	6	8
Asellidae	8	4
Philopotamidae	3	4
Planariidae	4	4
Veliidae	9	3
Planorbidae	6	2
Elmidae	4	1
Coenagrionidae	9	1
Calopterygidae	5	1
Corydalidae	0	1
BloodRed Chironomidae	8	1
Leptophlebiidae	2	1
Naididae	7	1
Gomphidae	1	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 19.00 % (Hydropsychidae)
Family Biotic Index: 4.51
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 44.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 167 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 51.0' / 1.0' - 1.5'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Grasses, Trees, Shrubs/Good
Canopy: Mostly Open....Other: Water temp. 18.5 C / pH 7.3 SU / DO 6.3 mg/L / Cond. 240 umhos; Agriculture- livestock (horses)
open grated bridge; crayfish and macrophytes present

Station: AN0392
Stony Brook, Old Mill Rd., Pennington Boro, Mercer
Pennington USGS Quadrangle
Date Sampled: 09/09/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	18
Philopotamidae	3	15
Elmidae	4	15
Hydropsychidae	4	8
Planariidae	4	7
Gammaridae	4	6
Sphaeriidae	8	6
Heptageniidae	4	6
Psephenidae	4	4
Asellidae	8	3
Culicidae	8	2
Baetidae	4	2
Coenagrionidae	9	1
Oligoneuriidae	2	1
Lumbriculidae	8	1
Erpobdellidae	8	1
Naididae	7	1
Planorbidae	6	1
BloodRed Chironomidae	8	1
Veliidae	9	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 18.00 % (Chironomidae)
Family Biotic Index: 4.90
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 32.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 154 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 66.0' / 1.0'-1.5'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Open....Other: Water Temp. 23.4 C / pH 7.1 SU / DO 6.6 mg/L / Cond. 423 umhos; Agriculture-cropland (cornfield), Rural
Minnows and crayfish present.;

Station: AN0393
Stony Brook, Rt. 206, Princeton Twp., Mercer County
Princeton USGS Quadrangle
Date Sampled: 09/09/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	16
Chironomidae	6	14
Hydrobiidae	8	12
Psephenidae	4	12
Hydropsychidae	4	10
Philopotamidae	3	10
Physidae	7	5
Heptageniidae	4	4
Pleuroceridae	6	3
Gammaridae	4	3
Planorbidae	6	3
Aeshnidae	3	2
Simuliidae	6	2
Baetidae	4	1
Erpobdellidae	8	1
Sphaeriidae	8	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 16.00 % (Elmidae)
Family Biotic Index: 5.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 25.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 173 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 56.0' / <1.0'-1.0'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Mostly Open....Other: Water Temp. 24.7 C / pH 7.2 SU / DO 7.0 mg/L / Cond. 314 umhos; Suburban.
Downstream of weir, USGS gauge present.; Crayfish, minnows, macrophytes, water snake present.

Station: AN0394
Duck Pond Run, Route 1, West Windsor Twp., Mercer County
Princeton USGS Quadrangle
Date Sampled: 09/16/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	45
Chironomidae	6	20
Gammaridae	4	11
Asellidae	8	7
BloodRed Chironomidae	8	7
Sphaeriidae	8	3
Glossiphoniidae	8	2
Culicidae	8	1
Corixidae	9	1
Elmidae	4	1
Plagiostomidae	4	1
Phryganeidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Tubificidae)
Family Biotic Index: 7.95
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 141 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 27.0' / 3.0'
Substrate: Mud, Silt, Snags....StreamBank Vegetation/Stability: Trees, Grass, Shrubs/Fair
Canopy: Mostly Closed....Other: Water Temp. 19.0 C / pH 6.5 SU / DO 6.9 mg/L / Cond. 223 umhos; Urban.
Storm sewers present.; Organic matter/leaf litter on bottom.

Station: AN0395
Heathcote Brook, Stouts Ln., South Brunswick Twp., Middlesex County
Monmouth Jct USGS Quadrangle
Date Sampled: 09/16/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	38
Sphaeriidae	8	14
Hydropsychidae	4	9
Gammaridae	4	7
Hydrobiidae	8	6
BloodRed Chironomidae	8	4
Naididae	7	4
Elmidae	4	4
Chironomidae	6	4
Asellidae	8	3
Coenagrionidae	9	2
Planorbidae	6	2
Glossiphoniidae	8	1
Physidae	7	1
Dendrocoelidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 38.00 % (Tubificidae)
Family Biotic Index: 7.77
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 9.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 126 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 11.0' / < 1.0'
Substrate: Gravel, Mud, Silt....StreamBank Vegetation/Stability: Grasses, Trees, Shrubs/Poor
Canopy: Closed....Other: Water temp. 20.1 C / pH 6.8 SU / DO 4.4 mg/L / Cond. 405 umhos; Suburban, forested
two stream confluences, one on each bank; fish present

Station: AN0396
Heathcote Brook, Academy St., South Brunswick Twp., Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 09/09/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	34
Chironomidae	6	33
Naididae	7	6
Hydrobiidae	8	5
Elmidae	4	5
Hydropsychidae	4	4
BloodRed Chironomidae	8	3
Philopotamidae	3	2
Corixidae	9	2
Tubificidae	10	2
Planorbidae	6	2
Sphaeriidae	8	2
Planariidae	4	1
Leptoceridae	4	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 103
% Contribution of Dominant Family: 33.01 % (Gammaridae)
Family Biotic Index: 5.46
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 6.80
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 168 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 51.0' / <1.0'-1.5'
Substrate: Gravel/ Sand, Mud....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Partly Open....Other: Water Temp. 21.0 C / pH 7.2 SU / DO 6.6 mg/L / Cond. 311 umhos; Suburban.
Macrophytes, crayfish, eels, fish, and periphyton present.;

Station: AN0397
Millstone River, Outlet Of Carnegie Lake, Route 27, South Brunswick Twp., Middlesex & Mercer County
Hightstown USGS Quadrangle
Date Sampled: 09/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	27
Hydropsychidae	4	13
Corbiculidae	8	11
Gammaridae	4	9
BloodRed Chironomidae	8	9
Elmidae	4	9
Sphaeriidae	8	8
Naididae	7	5
Planariidae	4	4
Tubificidae	10	3
Pleuroceridae	6	2

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 27.00 % (Chironomidae)
Family Biotic Index: 6.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 13.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 170 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Fast....Width/Depth (ft): 31.0' / 2.0'
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Partly Open....Other: Water Temp. 19.4 C / pH 7.6 SU / DO 8.7 mg/L / Cond. 296 umhos; Suburban, Forested, D&R Canal Park.
Station downstream of Carnegie Lake.;

Station: AN0398
Bedens Brook, Aunt Molly Rd., Hopewell Twp., Mercer County
Rocky Hill USGS Quadrangle
Date Sampled: 09/09/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	13
Coenagrionidae	9	12
Physidae	7	12
BloodRed Chironomidae	8	10
Hydropsychidae	4	8
Tubificidae	10	8
Hydrophilidae	5	7
Gammaridae	4	5
Sphaeriidae	8	5
Planorbidae	6	4
Planariidae	4	3
Elmidae	4	3
Glossiphoniidae	8	3
Haliplidae	5	2
Corixidae	9	1
Dytiscidae	5	1
Psephenidae	4	1
Naididae	7	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 13.00 % (Chironomidae)
Family Biotic Index: 6.68
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 9.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 165 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 15.0' / 1.0' - 3.0'
Substrate: Cobbles, Gravel, Shale....StreamBank Vegetation/Stability: Grasses, Shrubs, Trees/Good
Canopy: Mostly Open....Other: Water Temp. 22.5 C / pH 7.3 SU / DO 6.1 mg/L / Cond. 228 umhos; Agriculture - cropland and livestock.
Upstream of sewage pumping station.; Algae, macrophytes, fish, tadpoles, crayfish, salamanders present.

Station: AN0399
Rock Brook, Long Hill Rd., Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 09/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	37
Psephenidae	4	20
Chironomidae	6	16
Philopotamidae	3	7
Elmidae	4	6
Perlidae	1	3
Tipulidae	3	3
Glossosomatidae	0	2
Naididae	7	2
Baetidae	4	1
Empididae	6	1
Lumbricidae	10	1
Veliidae	9	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 37.00 % (Hydropsychidae)
Family Biotic Index: 4.24
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 50.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 171 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27.0' / <1.0 '
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Partly Open....Other: Water Temp. 17.8 C / pH 7.7 SU / DO 8.3 mg/L / Cond. 181 umhos; Suburban, Forested.
Fish present.;

Station: AN0400
Rock Brook, Burnt Mill Rd., Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 09/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	40
Philopotamidae	3	16
Heptageniidae	4	10
Psephenidae	4	6
Chironomidae	6	6
Caenidae	7	4
Elmidae	4	4
Baetidae	4	2
Planariidae	4	2
Lumbriculidae	8	2
Tubificidae	10	1
Asellidae	8	1
Corixidae	9	1
Gammaridae	4	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1
Simuliidae	6	1
Libellulidae	9	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 40.00 % (Hydropsychidae)
Family Biotic Index: 4.45
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 72.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 128 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 78.0' / 1.0'
Substrate: Cobbles, Silt....StreamBank Vegetation/Stability: Trees, Grass/Fair
Canopy: Mostly Open....Other: Water Temp. 19.5 C / pH 7.8 SU / DO 8.3 mg/L / Cond. 235 umhos; Suburban.
Fish and frogs present.;

Station: AN0401
Bedens Brook, Route 206, Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 09/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Heptageniidae	4	36
Elmidae	4	19
Philopotamidae	3	12
Hydropsychidae	4	11
Chironomidae	6	6
Planariidae	4	3
Gammaridae	4	3
Baetidae	4	1
Hydrophilidae	5	1
Planorbidae	6	1
Erpobdellidae	8	1
BloodRed Chironomidae	8	1
Sphaeriidae	8	1
Polycentropodidae	6	1
Tetrastemmatidae	7	1
Psephenidae	4	1
Veliidae	9	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 36.00 % (Heptageniidae)
Family Biotic Index: 4.25
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 61.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 143 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 56.0' / <1.0'
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Poor
Canopy: Mostly Closed....Other: Water Temp. 18.3 C / pH 7.6 SU / DO 7.8 mg/L / Cond. 320 umhos; Suburban, Forested.
Fish and macrophytes present.;

Station: AN0402
Pike Run, Route 206, Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 09/30/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	22
Elmidae	4	20
Sphaeriidae	8	11
Hydropsychidae	4	8
Corixidae	9	7
Heptageniidae	4	7
Psephenidae	4	6
Calopterygidae	5	4
Philopotamidae	3	4
Chironomidae	6	3
Leptoceridae	4	3
Veliidae	9	2
Baetidae	4	1
Plagiostomidae	4	1
Gomphidae	1	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 22.00 % (Gammaridae)
Family Biotic Index: 4.92
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 23.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 161 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 29.0' / <1.0' - 2.0'
Substrate: Gravel/Sand, Mud, Snags ....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Partly Open....Other: Water temp. 16.7 C / pH 7.5 SU / DO 8.4 mg/L / Cond. 201 umhos; Suburban
small flowing tributary on right bank; fish present; upstream blocked by fallen trees, causing stream to pool

Station: AN0403
Cruser Brook, Route 206, Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 09/30/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	26
Gammaridae	4	19
BloodRed Chironomidae	8	15
Elmidae	4	14
Tipulidae	3	7
Tubificidae	10	6
Caenidae	7	3
Corixidae	9	3
Chironomidae	6	3
Physidae	7	2
Psephenidae	4	2
Heptageniidae	4	2
Baetidae	4	1
Empididae	6	1
Plagiostomidae	4	1
Coenagrionidae	9	1
Planorbidae	6	1
Sphaeriidae	8	1
Sialidae	4	1
Corduliidae	5	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 110
% Contribution of Dominant Family: 23.64 % (Hydropsychidae)
Family Biotic Index: 5.26
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 29.09
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 153 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Turbid, grayish green....Flow: Moderate....Width/Depth (ft): 59.0' / 2.5'
Substrate: Gravel, Silt....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Poor
Canopy: Partly Open....Other: Water temp. 16.2 C / pH 8.0 SU / DO 9.0 mg/L / Cond. 216 umhos; Suburban
side channel flowing in on left bank; fish present

Station: AN0404
Back Brook, Rt. 206, Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 09/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	25
Chironomidae	6	21
Sphaeriidae	8	11
Heptageniidae	4	11
Hydrobiidae	8	6
Tubificidae	10	6
Hydropsychidae	4	5
Asellidae	8	4
Psephenidae	4	4
Coenagrionidae	9	3
Naididae	7	3
Tetrastemmatidae	7	3
Planariidae	4	2
Gomphidae	1	2
Philopotamidae	3	1
Nematoda	6	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 109
% Contribution of Dominant Family: 22.94 % (Elmidae)
Family Biotic Index: 5.74
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 16.51
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 121 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 30.0' / <1.0'
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees/Poor
Canopy: Mostly Closed....Other: Water Temp. 16.4 C / pH 7.3 SU / DO 7.5 mg/L / Cond. 380 umhos; Suburban.
Fish present.;

Station: AN0405
Pike Run, Route 533, Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 09/23/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	33
Chironomidae	6	25
Elmidae	4	13
Hydrobiidae	8	3
Asellidae	8	3
Coenagrionidae	9	3
BloodRed Chironomidae	8	3
Heptageniidae	4	3
Tubificidae	10	2
Hydrophilidae	5	2
Baetidae	4	2
Sialidae	4	2
Libellulidae	9	2
Corixidae	9	1
Psephenidae	4	1
Planorbidae	6	1
Physidae	7	1
Sphaeriidae	8	1
Naididae	7	1
Veliidae	9	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 103
% Contribution of Dominant Family: 32.04 % (Gammaridae)
Family Biotic Index: 5.43
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.85
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 150 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40 / <1.0
Substrate: Gravel / Silt....StreamBank Vegetation/Stability: Trees / Shrubs/Fair
Canopy: Mostly Closed....Other: Water Temp 20.1C / pH 7.7SU / DO 8.1mg/L / Cond 450umhos; Suburban / storm sewers present / small ditch drains on right bank / banks very eroded downstream / recent bridge; construction / periphyton, fish, crayfish present.

Station: AN0406
Simonson Bk, Canal Road, Franklin Twp., Somerset County
Monmouth Jct. USGS Quadrangle
Date Sampled: 09/23/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	37
Physidae	7	24
Naididae	7	17
Gammaridae	4	9
BloodRed Chironomidae	8	4
Elmidae	4	3
Baetidae	4	2
Psephenidae	4	2
Lymnaeidae	6	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 37.00 % (Chironomidae)
Family Biotic Index: 6.15
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 3.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 112 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 4.0 / <1.0
Substrate: Cobbles/ Gravel/ Sand....StreamBank Vegetation/Stability: Grass/ Trees/ Shrubs/Fair
Canopy: Partly Open....Other: Water temp. 24.9C / pH 7.5 SU / DO 6.9mg/L / Cond 199 umhos; Suburban / very slow flow, if at all / puddled / ponded & algae overgrown downstream / gravel "dam" present.;

Station: AN0407
Ten Mile Run, Canal Road, Franklin Twp., Somerset County
Monmouth Jct. USGS Quadrangle
Date Sampled: 09/23/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	48
Hydropsychidae	4	12
Psephenidae	4	9
Philopotamidae	3	5
Tanyderidae	5	5
Gammaridae	4	4
Veliidae	9	4
Naididae	7	4
Heptageniidae	4	4
Elmidae	4	4
Tipulidae	3	3
BloodRed Chironomidae	8	2
Ancylidae	6	1
Coenagrionidae	9	1
Baetidae	4	1
Chironomidae	6	1
Tetrastemmatidae	7	1
Libellulidae	9	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 110
% Contribution of Dominant Family: 43.64 % (Chironomidae)
Family Biotic Index: 5.36
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 20.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 155 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 12.0/<1.0-2.0
Substrate: Gravel/ Mud....StreamBank Vegetation/Stability: Trees/ Shrubs/ Grass/Good
Canopy: Mostly Closed....Other: Water temp 19.4 C / pH 7.7 SU / DO 7.8 mg/L / Cond 407 umhos; Agriculture / Rural
fish present;

Station: AN0408
Six Mile Run, Route 27, Franklin Twp., Somerset & Middlesex County
Monmouth Junction USGS Quadrangle
Date Sampled: 10/05/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Coenagrionidae	9	43
Gammaridae	4	24
Sphaeriidae	8	17
Hydropsychidae	4	9
Tetrastemmatidae	7	3
Calopterygidae	5	2
Tubificidae	10	2
Curculionidae	7	1
Planariidae	4	1
BloodRed Chironomidae	8	1
Erpobdellidae	8	1
Planorbidae	6	1
Elmidae	4	1
Libellulidae	9	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 107
% Contribution of Dominant Family: 40.19 % (Coenagrionidae)
Family Biotic Index: 7.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 8.41
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 149 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 37.0' / <1.0' - 2.0'
Substrate: Cobbles, Gravel/Sand, Snags....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Closed....Other: Water Temp. 15.4 C / pH 6.9 SU / DO 6.9 mg/L / Cond. 343 umhos; Agriculture-cropland, Suburban.
Storm sewers present and flowing. ; Sewage odor.

Station: AN0409
Six Mile Run, Canal Road, Franklin Twp., Somerset County
Monmouth Jct. USGS Quadrangle
Date Sampled: 09/23/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	48
Chironomidae	6	38
Hydrobiidae	8	9
Elmidae	4	2
Asellidae	8	2
Hydropsychidae	4	2
Baetidae	4	1
Calopterygidae	5	1
Lepidostomatidae	1	1
Chironomidae	6	1
Physidae	7	1
Tubificidae	10	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 107
% Contribution of Dominant Family: 44.86 % (Gammaridae)
Family Biotic Index: 5.21
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 3.74
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 140 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40.0/ <1.0-1.5
Substrate: Gravel/ Silt....StreamBank Vegetation/Stability: Trees/ Shrubs/ Grass/Fair
Canopy: Mostly Closed....Other: Water temp 17.2C / pH 7.5 SU / DO 8.2mg/L / Cond 316 umhos; Rural, forested / orange, slimy residue along right bank / frogs and fish present;

Station: AN0410
Millstone River, Blackwells Mills Road, Hillsboro Twp., Somerset County
Monmouth Jct. USGS Quadrangle
Date Sampled: 09/23/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	25
Tubificidae	10	19
Elmidae	4	13
Gammaridae	4	11
Chironomidae	6	11
Hydrobiidae	8	7
BloodRed Chironomidae	8	3
Pleuroceridae	6	3
Heptageniidae	4	3
Corbiculidae	8	2
Polycentropodidae	6	2
Coenagrionidae	9	1
Nematoda	6	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 102
% Contribution of Dominant Family: 24.51 % (Asellidae)
Family Biotic Index: 6.98
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.90
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 157 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 100.0 / 3.0
Substrate: Gravel / sand, mud....StreamBank Vegetation/Stability: Trees / Shrubs /Good
Canopy: Open....Other: Water temp. 19.6 C / pH 7.2 SU / DO 7.1mg/L / Cond 387 umhos;
Suburban
adjacent to small park or pull off area; upstream of USGS gauge

Station: AN0411
Royce Brook, Route 206, Hillsborough Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 09/30/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	47
Elmidae	4	19
Hydropsychidae	4	14
Philopotamidae	3	7
Coenagrionidae	9	4
Corbiculidae	8	2
Veliidae	9	2
Tipulidae	3	1
Chironomidae	6	1
Planariidae	4	1
Ancylidae	6	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 47.00 % (Gammaridae)
Family Biotic Index: 4.37
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 21.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 160 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 36.0' / <1.0' - 2.5'
Substrate: Cobbles, Gravel, Mud....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Closed....Other: Water Temp. 18.0 C / pH 7.6 SU / DO 7.9 mg/L / Cond. 228 umhos; Suburban.
Two storm sewers flowing. ; Light Rain. Fish present.

Station: AN0412
Royce Brook Branch, Route 206, Hillsborough Twp., Somerset County
Raritan USGS Quadrangle
Date Sampled: 09/30/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	78
Hydropsychidae	4	5
Chironomidae	6	4
Calopterygidae	5	3
BloodRed Chironomidae	8	3
Enchytraeidae	10	3
Coenagrionidae	9	2
Baetidae	4	1
Naididae	7	1
Gerridae	8	1
Lumbricidae	10	1
Planorbidae	6	1
Physidae	7	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 106
% Contribution of Dominant Family: 73.58 % (Gammaridae)
Family Biotic Index: 4.72
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 5.66
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 162 (Optimal) USEPA Protocol
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 25.0' / 2.5'
Substrate: Cobbles, Gravel/sand, Snags....StreamBank Vegetation/Stability: Grasses, Trees, Shrubs/Fair
Canopy: Partly Open....Other: Water temp. 18.5 C / pH 7.7 SU / DO 7.9 mg/L / Cond. 189 umhos; Suburban

Station: AN0413
Royce Brook, Rt. 533, Manville Boro, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/23/04

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	33
Tubificidae	10	26
Chironomidae	6	19
Gammaridae	4	14
Culicidae	8	5
Elmidae	4	4
Tetrastemmatidae	7	2
Ancylidae	6	1
Glossiphoniidae	8	1
Lumbriculidae	10	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 106
% Contribution of Dominant Family: 31.13 % (BloodRed Chironomidae)
Family Biotic Index: 7.43
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 131 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 58.0' / <1.0' - 1.5'
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Closed....Other: Water temp. 18.6 C / pH 7.5 SU / DO 8.7 mg/L / Cond. 263 umhos; Urban; much litter present
storm sewers present; periphyton, ducks, fish present; sheen on surface, gasoline smell

Station: AN0414
Millstone River, Abv. Raritan Confl., Manville Boro, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 10/07/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	35
Heptageniidae	4	13
Asellidae	8	11
Sphaeriidae	8	8
Elmidae	4	5
Hydrobiidae	8	5
Valvatidae	4	5
Chironomidae	6	3
Planorbidae	6	3
BloodRed Chironomidae	8	3
Coenagrionidae	9	2
Tubificidae	10	2
Philopotamidae	3	1
Tabanidae	6	1
Erpobdellidae	8	1
Leptoceridae	4	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 35.00 % (Gammaridae)
Family Biotic Index: 5.50
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 15.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 123 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 200' / >4.0'
Substrate: Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Open....Other: Water Temp. 15.0 C / pH 8.0 SU / DO 7.0 mg/L / Cond. 233 umhos; Suburban
Upstream of pumping facility. Recent flooding. ; Macrophytes present

Station: AN0415
Cuckles Brook, Rt 28 (E. Main St), Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 06/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	26
Chironomidae	6	23
Coenagrionidae	9	19
Physidae	7	18
Naididae	7	6
Hydropsychidae	4	3
Aeshnidae	3	2
Calopterygidae	5	1
Corduliidae	5	1
Tubificidae	10	1
Planorbidae	6	1
Haliplidae	5	1
Sphaeriidae	8	1
Veliidae	9	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 105
% Contribution of Dominant Family: 24.76 % (BloodRed Chironomidae)
Family Biotic Index: 7.18
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.86
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 134 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid, grayish color....Flow: Moderate....Width/Depth (ft): 8 ' / < 1.0 '
Substrate: Gravel....StreamBank Vegetation/Stability: Trees, shrubs, grasses/Fair
Canopy: Closed....Other: Water temp. 18.6 C /pH 7.1 SU /DO 6.3 mg/L /Cond 635 umhos; Suburban / light industrial (adj to Recycling facility)
3 storm drains on right bank; fathead and other minnows, trash

Station: AN0416
West Branch Middle Brook, Crim Road, Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 06/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	64
BloodRed Chironomidae	8	8
Simuliidae	6	5
Gammaridae	4	4
Baetidae	4	3
Planariidae	4	3
Naididae	7	3
Elmidae	4	3
Aeshnidae	3	1
Tipulidae	3	1
Coenagrionidae	9	1
Tubificidae	10	1
Lumbriculidae	8	1
Psephenidae	4	1
Gerridae	8	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 64.00 % (Chironomidae)
Family Biotic Index: 5.96
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 158 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear, grayish color....Flow: Slow....Width/Depth (ft): 10' / 1-2'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Mostly Closed....Other: Water temp. 16.9 C / pH 7.6 SU / DO 7.7 mg/L / Cond. 320 umhos; Suburban, Forested
Storm Sewers present and flowing; Fish present, USGS flood monitoring sensor # 1570 present

Station: AN0417
West Branch Middle Brook, Chimney Rock Rd, Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 05/25/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	47
Simuliidae	6	15
Hydropsychidae	4	13
Gammaridae	4	6
BloodRed Chironomidae	8	4
Elmidae	4	4
Coenagrionidae	9	2
Caenidae	7	2
Physidae	7	2
Aeshnidae	3	1
Asellidae	8	1
Leptoceridae	4	1
Naididae	7	1
Psephenidae	4	1
Pteronarcyidae	0	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 102
% Contribution of Dominant Family: 46.08 % (Chironomidae)
Family Biotic Index: 5.65
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 16.67
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 152 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 32 ' / < 1.0'
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, weeds/Fair
Canopy: Mostly Open....Other: Water temp. 25.8 C /pH 7.8 SU /DO 7.0 mg/L Cond 255 umhos;
Forested; downstream of reservoir
yoy minnows;

Station: AN0418
E Br. Middle Brook, Top Of World Way (Formerly Green Valley Rd), Warren Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 06/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	38
Gammaridae	4	25
Asellidae	8	9
Planariidae	4	6
Chironomidae	6	6
Elmidae	4	5
Hydropsychidae	4	4
Psephenidae	4	3
Tubificidae	10	1
Baetidae	4	1
Physidae	7	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 38.00 % (Simuliidae)
Family Biotic Index: 5.36
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 5.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 157 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 5 ' / <= 1.0 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Shrubs, trees, grasses/Good
Canopy: Mostly Open....Other: Water temp. 18.6 C /pH 7.4 SU /DO 6.8 mg/L /Cond 500 umhos; Suburban
frogs, fish, crayfish, salamanders;

Station: AN0419
E Br Middle Brook, Gilbride Rd, Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 05/25/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	42
Elmidae	4	27
Psephenidae	4	12
Hydropsychidae	4	6
Naididae	7	6
Baetidae	4	5
Gammaridae	4	2
Philopotamidae	3	1
Cambaridae	5	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 103
% Contribution of Dominant Family: 40.78 % (Chironomidae)
Family Biotic Index: 5.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 11.65
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 157 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 29 ' / 1-2 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, weeds/Fair
Canopy: Mostly Open....Other: Water temp. 20.9 C /pH 7.7 SU /DO 8.6 mg/L /Cond 355 umhos; Forested (Washington Valley Park)
rip rap stone wall by bridge; minnows, fish, frogs, water snake

Station: AN0420
Middle Brook, Rt 28 (Talmidge Rd), Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 06/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	28
Naididae	7	24
Chironomidae	6	12
Hydropsychidae	4	9
Baetidae	4	8
Gammaridae	4	5
Tipulidae	3	2
Asellidae	8	2
Hydrophilidae	5	2
Veliidae	9	2
Philopotamidae	3	1
Collembola	10	1
Corixidae	9	1
Coenagrionidae	9	1
BloodRed Chironomidae	8	1
Physidae	7	1
Tetrastemmatidae	7	1
Simuliidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 103
% Contribution of Dominant Family: 27.18 % (Chironomidae)
Family Biotic Index: 5.91
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 18.45
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 169 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 80 ' / < 1.0 '
Substrate: Cobbles, gravel, silt....StreamBank Vegetation/Stability: Trees, shrubs, grasses/Fair
Canopy: Open....Other: Water temp. 19.1 C /pH 7.5 SU /DO 9.1 mg/L /Cond 313 umhos; Suburban
periphyton, filamentous algae, minnow, crayfish; storm sewers

Station: AN0421
Green Brook, Raymond Rd, Watchung Twp, Somerset/Union County
Chatham USGS Quadrangle
Date Sampled: 06/08/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	40
Stratiomyidae	10	17
Gammaridae	4	15
BloodRed Chironomidae	8	11
Chironomidae	6	8
Elmidae	4	3
Naididae	7	3
Baetidae	4	2
Tetrastemmatidae	7	2
Tipulidae	3	1
Asellidae	8	1
Hydropsychidae	4	1
Planariidae	4	1
Physidae	7	1
Psephenidae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 108
% Contribution of Dominant Family: 37.04 % (Tubificidae)
Family Biotic Index: 7.92
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 3.70
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 118 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 38 ' / < 1.0 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, grass, shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 18.6 C /pH 7.7 SU /DO 7.5 mg/L /Cond 646 umhos; Urban / light industrial (car dealer, shopping mall)
flowing storm sewers; trash in stream; minnows, crayfish, filamentous algae

Station: AN0422
Stony Brook, West End Ave, North Plainfield Boro, Union County
Plainfield USGS Quadrangle
Date Sampled: 06/08/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	20
Gammaridae	4	16
Elmidae	4	13
BloodRed Chironomidae	8	12
Chironomidae	6	8
Tubificidae	10	8
Simuliidae	6	7
Hydropsychidae	4	4
Planariidae	4	4
Physidae	7	3
Baetidae	4	1
Erpobdellidae	8	1
Empididae	6	1
Naididae	7	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Sphaeriidae)
Family Biotic Index: 6.23
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 5.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 158 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 28 ' / < 1.0 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, grass, shrubs/Good
Canopy: Partly Open....Other: Water temp. 18.4 C /pH 7.6 SU /DO 7.9 mg/L /Cond 431 umhos; Suburban
storm sewer flowing; minnows, darters

Station: AN0423
Green Brook, Clinton Avenue, Plainfield, Union/Somerset County
Plainfield USGS Quadrangle
Date Sampled: 06/08/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	22
BloodRed Chironomidae	8	21
Hydropsychidae	4	12
Tubificidae	10	12
Simuliidae	6	11
Baetidae	4	8
Gammaridae	4	7
Naididae	7	6
Asellidae	8	2
Elmidae	4	2
Tipulidae	3	1
Physidae	7	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 106
% Contribution of Dominant Family: 20.75 % (Chironomidae)
Family Biotic Index: 6.40
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 18.87
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 122 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30' / <0.5' - 1.0'
Substrate: Cobbles, Gravel, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Poor Canopy: Mostly Open....Other: Water temp. 19.6 C / pH 7.6 SU / DO 8.3 mg/L / Cond. 516 umhos; Suburban storm sewers present; soft bottom containing clay

Station: AN0424
Bound Brook, Bound Brook Road (Route 28), Middlesex Boro, Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 06/08/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	46
Tubificidae	10	17
Hydropsychidae	4	13
Chironomidae	6	6
Naididae	7	5
Sphaeriidae	8	4
Corbiculidae	8	3
Elmidae	4	2
Planorbidae	6	2
Physidae	7	1
BloodRed Chironomidae	8	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 101
% Contribution of Dominant Family: 45.54 % (Gammaridae)
Family Biotic Index: 5.69
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 12.87
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 134 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 47.5' / <1' - 1.0'
Substrate: Cobbles, Gravel, Silt....StreamBank Vegetation/Stability: Trees, Grass, Shrubs/Poor
Canopy: Mostly Open....Other: Water temp. 21.5 C / pH 7.5 SU / DO 6.8 mg/ L / Cond. 526 umhos; Suburban
minnows present;

Station: AN0424B
Bound Brook, Woodbrook Road, So. Plainfield Boro, Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 06/17/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	27
Gammaridae	4	24
Tubificidae	10	19
Sphaeriidae	8	11
Physidae	7	8
Planorbidae	6	4
Chironomidae	6	3
Erpobdellidae	8	3
Lumbriculidae	10	3
Glossiphoniidae	8	1
Planariidae	4	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 104
% Contribution of Dominant Family: 25.96 % (Asellidae)
Family Biotic Index: 7.25
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 82 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 16' / 3'
Substrate: Mud....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Partly Open....Other: Water temp. 21.3 C / pH 7.3 SU / DO 4.6 mg/L / Cond. 612 umhos; Rural, Forested
PCB contaminated, "Superfund Site", Woodbrook Park dump site; bull frog, macrophytes present

Station: AN0425
Ambrose Brook, Raritan Avenue (Route 514 Spur), Middlesex Boro, Middlesex County
Bound Brook USGS Quadrangle
Date Sampled: 06/08/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	71
Hydropsychidae	4	8
Physidae	7	5
Tubificidae	10	3
Sphaeriidae	8	3
Chironomidae	6	2
BloodRed Chironomidae	8	2
Tipulidae	3	2
Asellidae	8	1
Lymnaeidae	6	1
Elmidae	4	1
Valvatidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 71.00 % (Gammaridae)
Family Biotic Index: 4.61
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 8.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 168 (Optimal) USEPA Protocol
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 42' / 1.0'
Substrate: Cobbles, Gravel/Sand, Snags....StreamBank Vegetation/Stability: Shrubs, Trees, Grass/Good
Canopy: Partly Open....Other: Water temp. 21.8 C / pH 7.6 SU / DO 6.0 mg/L / Cond. 475 umhos; Suburban
storm sewers, sewage pump, small ditch culvert; minnows

Station: AN0425A
Ambrose Brook, Behmer Road, Piscataway Twp, Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 06/17/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	39
Gammaridae	4	32
Elmidae	4	6
Planorbidae	6	5
Physidae	7	5
Tubificidae	10	4
Asellidae	8	2
Ancylidae	6	2
Empididae	6	2
Hydropsychidae	4	1
Coenagrionidae	9	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 39.00 % (Chironomidae)
Family Biotic Index: 5.52
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 100 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 28' / 1'
Substrate: Gravel/sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Poor
Canopy: Mostly Closed....Other: Water temp. 23.6 C / pH 7.1 SU / DO 5.3 mg/L / Cond. 453 umhos; Rural / Forested
fish, car parts in stream; pipe with flowing water; Trucking company adjacent to stream, dumpsters on left bank

Station: AN0426
Green Brook, Lincoln Blvd., Bound Brook Boro, Middlesex/Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 07/08/04

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	63
Tubificidae	10	22
Gammaridae	4	8
Chironomidae	6	7
Corbiculidae	8	1

Statistical Analysis

Number of Taxa: 5
Total Number of Individuals: 101
% Contribution of Dominant Family: 62.38 % (BloodRed Chironomidae)
Family Biotic Index: 7.98
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 105 (Marginal) USEPA Protocol
Deficiency(s) noted: BloodRed Chironomidae Family Overwhelmingly Dominant -
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 73' / 3'
Substrate: Sand, Mud, Silt....StreamBank Vegetation/Stability: Shrubs, Grass, Trees/Fair
Canopy: Open....Other: Water temp. 23.0 C / pH 7.3 SU / DO 6.9 mg/L / Cond. 406 umhos;
Urban
fish present; new bridge constructed in 2002;

Station: AN0427
Unt To Raritan River, Route 527 (Main Street), So. Bound Brook Boro, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 06/17/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	50
Chironomidae	6	11
Empididae	6	8
BloodRed Chironomidae	8	8
Hydropsychidae	4	7
Gammaridae	4	5
Corbiculidae	8	4
Asellidae	8	3
Sphaeriidae	8	3
Tubificidae	10	2
Naididae	7	2
Planariidae	4	1
Erpobdellidae	8	1
Planorbidae	6	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 107
% Contribution of Dominant Family: 46.73 % (Elmidae)
Family Biotic Index: 5.28
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 6.54
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 134 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 21' / <1'
Substrate: Gravel/sand, Silt....StreamBank Vegetation/Stability: Trees, Weeds, Vines/Poor
Canopy: Mostly Closed....Other: Water temp. 27.2 C / pH 7.5 SU / DO 6.5 mg/L / Cond. 423 umhos; Suburban
Storm sewer - flowing downstream of brook; geese, trash, recyclables present

Station: AN0428
Raritan River, Bakelite Park (Fieldville Dam), Edison Twp, Somerset/Middlesex County
Bound Brook USGS Quadrangle
Date Sampled: 07/08/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	29
Chironomidae	6	18
Elmidae	4	11
BloodRed Chironomidae	8	10
Corixidae	9	8
Hydrobiidae	8	7
Hydropsychidae	4	3
Glossosomatidae	0	3
Sphaeriidae	8	3
Planariidae	4	2
Tubificidae	10	2
Potamanthidae	4	1
Asellidae	8	1
Ancylidae	6	1
Viviparidae	6	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Gammaridae)
Family Biotic Index: 5.64
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 7.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 135 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 150' / 3.0'
Substrate: Cobble, Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Grass, Shrubs/Fair
Canopy: Open....Other: Water Temp. 27.8 C / pH 7.4 SU/ DO 5.9 mg/L / Cond. 338 umhos; Urban
Station downstream of Fieldville Dam;

Station: AN0429
Mile Run, Franklin Blvd, New Brunswick, Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 06/17/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	64
Hydropsychidae	4	15
BloodRed Chironomidae	8	10
Asellidae	8	4
Chironomidae	6	4
Physidae	7	3
Tubificidae	10	2
Erpobdellidae	8	1
Empididae	6	1
Nematoda	6	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 106
% Contribution of Dominant Family: 60.38 % (Naididae)
Family Biotic Index: 6.72
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 14.15
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 126 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Naididae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25' / < 1'
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees/Fair
Canopy: Closed....Other: Water temp. 23.1 C / pH 7.6 SU / DO 7.9 mg/L / Cond. 493 umhos;
Urban / Suburban
fish; trash in stream; adj to Franklin Twp water pumping station

Station: AN0430
Lawrence Brook, Ridge Rd, South Brunswick Twp, Middlesex County
Monmouth Junction USGS Quadrangle
Date Sampled: 08/05/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	33
Tubificidae	10	24
Sphaeriidae	8	24
Chironomidae	6	9
BloodRed Chironomidae	8	9
Lumbriculidae	8	3
Naididae	7	2
Glossiphoniidae	8	2
Physidae	7	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 107
% Contribution of Dominant Family: 30.84 % (Asellidae)
Family Biotic Index: 8.25
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 156 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 6 ' < 1.0 '
Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Partly Open....Other: Water temp. 21.6 C /pH 6.8 SU /DO 3.5 mg/L Cond 132 umhos; Suburban
macrophytes, filamentous algae, fish;

Station: AN0431
Lawrence Brook, Davidson Mill Rd., South Brunswick Twp. , Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 07/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	43
Chironomidae	6	13
Caenidae	7	10
Sphaeriidae	8	6
BloodRed Chironomidae	8	5
Coenagrionidae	9	5
Hydrobiidae	8	4
Viviparidae	6	3
Gammaridae	4	2
Gomphidae	1	2
Planorbidae	6	2
Heptageniidae	4	2
Glossiphoniidae	8	1
Leptoceridae	4	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 43.00 % (Asellidae)
Family Biotic Index: 7.24
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 13.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 115 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 30.0' / 1 - 1.5'
Substrate: Mud, Silt....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Partly Open....Other: Water temp. 21.8 C / pH 7.3 SU / DO NA / Cond. 125 umhos; Suburban
storm Sewers present; frogs, macrophytes, crayfish present

Station: AN0432
Oakeys Brook, Davidson Mill Rd., South Brunswick Twp., Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 07/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	41
Planorbidae	6	10
Physidae	7	9
Sphaeriidae	8	6
Chironomidae	6	6
Tipulidae	3	6
Hydrobiidae	8	4
Hydropsychidae	4	4
BloodRed Chironomidae	8	3
Baetidae	4	2
Asellidae	8	2
Planariidae	4	2
Psephenidae	4	2
Philopotamidae	3	1
Dryopidae	5	1
Veliidae	9	1
Leptoceridae	4	1
Naididae	7	1
Tetrastemmatidae	7	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 104
% Contribution of Dominant Family: 39.42 % (Elmidae)
Family Biotic Index: 5.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 8.65
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 167 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 15.0' / 1.0' - 1.5'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Mostly Closed....Other: Water Temp. 20.5 C / pH 7.3 SU / DO NA / Cond. 301 umhos; Suburban
Storm sewers present.; Frogs and salamanders present.

Station: AN0433
Ireland Brook, Riva Rd, North Brunswick Twp, Middlesex County
North Brunswick USGS Quadrangle
Date Sampled: 07/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	34
Sphaeriidae	8	27
Hydropsychidae	4	7
BloodRed Chironomidae	8	7
Chironomidae	6	7
Gammaridae	4	4
Asellidae	8	2
Enchytraeidae	10	2
Plagiostomidae	4	2
Naididae	7	2
Planorbidae	6	2
Glossiphoniidae	8	1
Ceratopogonidae	6	1
Aeshnidae	3	1
Lumbriculidae	8	1
Cambaridae	5	1
Haliplidae	5	1
Phryganeidae	4	1
Physidae	7	1
Veliidae	9	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 106
% Contribution of Dominant Family: 32.08 % (Elmidae)
Family Biotic Index: 5.87
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 7.55
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 183 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear, brownish-grey color....Flow: Moderate....Width/Depth (ft): 20 ' / 1.0 - 1.5 '
Substrate: Cobble, gravel, bedrock....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Mostly Closed....Other: Water temp. 22.3 C / pH 7.2 SU / DO N/A / Cond. 147 umhos; Suburban
Trout stocked stream; frogs, salamanders, fish, crayfish, macrophytes

Station: AN0434
Lawrence Brook, Riva Rd., Milltown Twp. , Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 07/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	41
Planariidae	4	9
Chironomidae	6	8
BloodRed Chironomidae	8	8
Tubificidae	10	7
Valvatidae	4	6
Asellidae	8	5
Hydropsychidae	4	4
Planorbidae	6	3
Ceratopogonidae	6	2
Coenagrionidae	9	2
Tetrastemmatidae	7	2
Sphaeriidae	8	2
Tipulidae	3	1
Hydrobiidae	8	1
Hydroptilidae	4	1
Libellulidae	9	1
Corduliidae	5	1
Haliplidae	5	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 106
% Contribution of Dominant Family: 38.68 % (Gammaridae)
Family Biotic Index: 5.48
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.72
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 149 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 50' / 2.0' - 3.0'
Substrate: Gravel/ Sand, Silt....StreamBank Vegetation/Stability: Shrubs, Trees/Fair
Canopy: Mostly Open....Other: Water temp. 26.8 C / pH 7.1 SU / DO N/A / Cond. 200 umhos;
Suburban; adjacent to office complex
storm sewers present; banks silty; macrophytes, geese present

Station: AN0435
Sawmill Brook, Ryders Lane, Milltown Boro, Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 07/29/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	48
Naididae	7	12
Planorbidae	6	10
BloodRed Chironomidae	8	9
Coenagrionidae	9	6
Chironomidae	6	5
Sphaeriidae	8	4
Physidae	7	2
Planariidae	4	1
Enchytraeidae	10	1
Ancylidae	6	1
Glossiphoniidae	8	1
Haliplidae	5	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 101
% Contribution of Dominant Family: 47.52 % (Tubificidae)
Family Biotic Index: 8.50
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 76 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 20' / <1.0'
Substrate: Silt....StreamBank Vegetation/Stability: Grasses, Shrubs, Trees/Poor
Canopy: Mostly Closed....Other: Water Temp. 23.5 C / pH 7.0 SU / DO NA / Cond. 430 umhos; Urban
Storm sewers present.; Purple loostrife and painted turtles present.

Station: AN0436
Mill Brook, Woodbridge Ave Off Nj Tpk., Edison Twp, Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 07/08/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	41
Chironomidae	6	22
Baetidae	4	15
Lumbricidae	10	7
BloodRed Chironomidae	8	4
Tubificidae	10	3
Tipulidae	3	3
Enchytraeidae	10	2
Naididae	7	2
Tetrastemmatidae	7	2
Gammaridae	4	1
Lumbriculidae	8	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 104
% Contribution of Dominant Family: 39.42 % (Hydropsychidae)
Family Biotic Index: 5.39
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 54.81
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 155 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 23.5' / <1'-1.5'
Substrate: Cobbles, Gravel, Snags....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 22.7 C / pH 7.5 SU / DO 7.3 mg/L / Cond. 682 umhos; Urban
Pumping station; oily sheen, sewage smell,; two storm sewers flowing; water cloudy below pipes

Station: AN0437
Manalapan Brook, Route 524, Millstone Twp, Monmouth County
Roosevelt USGS Quadrangle
Date Sampled: 06/15/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	36
Sphaeriidae	8	25
Brachycentridae	1	10
Polycentropodidae	6	8
Elmidae	4	6
Leuctridae	0	4
Tipulidae	3	3
Tubificidae	10	2
Corixidae	9	2
BloodRed Chironomidae	8	2
Aeshnidae	3	1
Curculionidae	7	1
Hydropsychidae	4	1
Lepidostomatidae	1	1
Lumbriculidae	8	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 104
% Contribution of Dominant Family: 34.62 % (Chironomidae)
Family Biotic Index: 5.65
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 24.04
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 158 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 7.0' / <1' - 1.0'
Substrate: Gravel/Sand, Mud....StreamBank Vegetation/Stability: Shrubs, Trees, Grass/Good
Canopy: Mostly Open....Other: Water temp. 17.7 C / pH 7.2 SU / DO 8.7 mg/L / Cond. 267 umhos; Rural, Forested
frogs present;

Station: AN0438
Manalapan Brook, Route 33, Manalapan Twp, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 06/15/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	41
Hydropsychidae	4	23
Elmidae	4	20
Heptageniidae	4	10
BloodRed Chironomidae	8	3
Tetrastemmatidae	7	2
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 7
Total Number of Individuals: 100
% Contribution of Dominant Family: 41.00 % (Chironomidae)
Family Biotic Index: 5.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 33.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 143 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 13.0' / <1' - 2.0'
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Closed....Other: Water temp. 22.4 C / pH 7.3 SU / DO 7.3 mg/L / Cond. 235 umhos; Agriculture - cropland, Rural
storm sewers present; farm adjacent to stream on left bank; fish present

Station: AN0439
Manalapan Brook, Federal Rd, Monroe Twp, Middlesex County
Jamesburg USGS Quadrangle
Date Sampled: 08/05/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	51
Chironomidae	6	20
Heptageniidae	4	14
Tipulidae	3	9
Elmidae	4	3
Corydalidae	0	3
Tubificidae	10	1
Psychomyiidae	2	1
Leptoceridae	4	1
BloodRed Chironomidae	8	1
Simuliidae	6	1
Sphaeriidae	8	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 107
% Contribution of Dominant Family: 47.66 % (Hydropsychidae)
Family Biotic Index: 4.34
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 62.62
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 110 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 17 ' / 1 '
Substrate: Mud, clay....StreamBank Vegetation/Stability: Trees, shrubs, grasses/Poor
Canopy: Partly Open....Other: Water temp. 21.7 C /pH 6.9 SU /DO 7.7 mg/L /Cond 226 umhos; Agriculture-cropland, rural
drainage ditch, trash in stream;

Station: AN0440
Manalapan Brook, Old Forge Rd, Helmetta Boro, Middlesex County
Jamesburg USGS Quadrangle
Date Sampled: 08/05/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	57
Tubificidae	10	20
Sphaeriidae	8	5
Heptageniidae	4	4
Tabanidae	6	3
Brachycentridae	1	2
Calopterygidae	5	2
BloodRed Chironomidae	8	2
Hydropsychidae	4	2
Leptoceridae	4	2
Plagiostomidae	4	1
Sialidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 101
% Contribution of Dominant Family: 56.44 % (Chironomidae)
Family Biotic Index: 6.61
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 9.90
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 138 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 33 ' / 1 '
Substrate: Sand, mud, silt....StreamBank Vegetation/Stability: Trees, shrubs/Poor
Canopy: Mostly Closed....Other: Water temp. 23.0 C /pH 7.0 SU /DO 6.6 mg/L /Cond 191 umhos; Surburban
storm sewers, macrophytes, fish;

Station: AN0441
Weamaconk Creek, Route 9, Freehold Twp. , Monmouth County
Freehold USGS Quadrangle
Date Sampled: 08/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	50
Chironomidae	6	19
BloodRed Chironomidae	8	9
Tubificidae	10	5
Veliidae	9	4
Tipulidae	3	3
Calopterygidae	5	2
Lumbriculidae	8	2
Physidae	7	2
Sphaeriidae	8	2
Aeshnidae	3	1
Curculionidae	7	1
Naididae	7	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 102
% Contribution of Dominant Family: 49.02 % (Gammaridae)
Family Biotic Index: 5.50
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 134 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8.0' / <1' - 1.0'
Substrate: Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Closed....Other: Water Temp. 21.0 C / pH 7.1 SU / DO 7.0 mg/L / Cond. 280 umhos; Urban
Storm sewers present; Frogs present, garbage abundant

Station: AN0442
Wemrock Brook, Wemrock Road, Freehold Twp., Monmouth County
Freehold USGS Quadrangle
Date Sampled: 06/15/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	34
Sphaeriidae	8	15
Chironomidae	6	14
Gammaridae	4	11
BloodRed Chironomidae	8	10
Physidae	7	4
Elmidae	4	3
Corydalidae	0	2
Hydropsychidae	4	2
Gyrinidae	3	1
Enchytraeidae	10	1
Hydrophilidae	5	1
Naididae	7	1
Lumbriculidae	10	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 34.00 % (Tubificidae)
Family Biotic Index: 7.51
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 148 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 6' / 3'
Substrate: Mud, Snags....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Partly Open....Other: Water temp. 23.5 C / pH 7.0 SU / DO 4.4 mg/L / Cond. 374 umhos; Agriculture - cropland (orchards), Rural, Forested
barely flowing under bridge; access to stream hazardous; dug out area connected to stream flooded for pump

Station: AN0443
Weamaconk Creek, Water St., Englishtown Boro, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 08/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	23
Gammaridae	4	16
Tubificidae	10	16
BloodRed Chironomidae	8	13
Elmidae	4	8
Naididae	7	8
Corduliidae	5	3
Sphaeriidae	8	2
Corixidae	9	2
Caenidae	7	1
Planariidae	4	1
Coenagrionidae	9	1
Veliidae	9	1
Leptoceridae	4	1
Physidae	7	1
Glossiphoniidae	8	1
Sialidae	4	1
Libellulidae	9	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 23.00 % (Chironomidae)
Family Biotic Index: 6.64
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 141 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 15 ' / 1 - 2 '
Substrate: Mud....StreamBank Vegetation/Stability: Trees, shrubs, grass/Poor
Canopy: Partly Open....Other: Water temp. 23.1 C /pH 7.1 SU /DO 6.3 mg/L /Cond 266 umhos; Suburban
storm sewers, filamentous algae;

Station: AN0444
McGellairds Brook, Route 9, Freehold Twp., Monmouth County
Freehold USGS Quadrangle
Date Sampled: 08/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	37
Chironomidae	6	18
Hydropsychidae	4	11
Elmidae	4	11
Gammaridae	4	8
Sphaeriidae	8	7
Hydrobiidae	8	3
Viviparidae	6	3
BloodRed Chironomidae	8	3
Planariidae	4	2
Calopterygidae	5	2
Leptoceridae	4	2
Gerridae	8	2
Caenidae	7	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 110
% Contribution of Dominant Family: 33.64 % (Tubificidae)
Family Biotic Index: 6.99
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 12.73
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 134 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 10.0' / 1.0'
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: Shrubs, trees, vines/Fair
Canopy: Mostly closed....Other: Water temp. 27.7 C / pH 7.1 SU / DO 4.5 mg/L / Cond. 205 umhos; Urban; storm sewers present
fish, frogs, crayfish observed; trash in stream

Station: AN0445
Tepehemus Brook, Tennent Rd., Manalapan Twp., Monmouth County
Freehold USGS Quadrangle
Date Sampled: 08/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	64
BloodRed Chironomidae	8	15
Elmidae	4	9
Tubificidae	10	6
Calopterygidae	5	3
Cambaridae	5	3
Aeshnidae	3	2
Hydropsychidae	4	2
Enchytraeidae	10	1
Lampyridae	6	1
Veliidae	9	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 108
% Contribution of Dominant Family: 59.26 % (Chironomidae)
Family Biotic Index: 6.22
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.85
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 122 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 13.0' / <1' - 1.5'
Substrate: Sand, Mud, Silt....StreamBank Vegetation/Stability: Grasses, Shrubs, Trees/Poor
Canopy: Partly Open....Other: Water Temp. 22.2 C / pH 7.0 SU / DO 6.3 mg/L / Cond. 269 umhos; Agriculture-cropland, Suburban
Minnows and crayfish present;

Station: AN0446
Milford Brook, Pease Rd., Manalapan Twp., Monmouth County
Freehold USGS Quadrangle
Date Sampled: 08/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	32
Chironomidae	6	18
BloodRed Chironomidae	8	11
Tubificidae	10	6
Lumbriculidae	8	5
Calopterygidae	5	4
Tipulidae	3	4
Aeshnidae	3	3
Elmidae	4	3
Phryganeidae	4	3
Physidae	7	2
Pleuroceridae	6	2
Veliidae	9	2
Corydalidae	0	1
Empididae	6	1
Hydropsychidae	4	1
Cordulegastridae	3	1
Enchytraeidae	10	1
Coenagrionidae	9	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 102
% Contribution of Dominant Family: 31.37 % (Sphaeriidae)
Family Biotic Index: 6.85
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 3.92
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 127 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 11 ' / 1 '
Substrate: Gravel/Sand, Mud, Silt, Concrete, Large Rocks....StreamBank
Vegetation/Stability: Trees, Shrubs/Poor
Canopy: Mostly Closed....Other: Water Temp. 21.5 C / pH 7.1 SU / DO 7.6 mg/L / Cond. 261 umhos; Suburban, new construction upstream
Creosote smell, Fish and Frogs present;

Station: AN0447
Mcgellairds Brook, Rt. 527, Englishtown Boro, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 08/03/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	41
Chironomidae	6	13
Calopterygidae	5	10
Hydrobiidae	8	9
Elmidae	4	6
Gammaridae	4	6
Cambaridae	5	6
Sphaeriidae	8	5
Coenagrionidae	9	3
Viviparidae	6	1
Corduliidae	5	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 101
% Contribution of Dominant Family: 40.59 % (Tubificidae)
Family Biotic Index: 7.58
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 127 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear, greyish color....Flow: Moderate....Width/Depth (ft): 10.0' / 2.0'
Substrate: Sand, Mud, Silt....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Poor
Canopy: Partly Open....Other: Water temp. 22.2 C / pH 7.0 SU / DO 6.9 mg/L / Cond. 253 umhos; Suburban
storm sewers; minnows, crayfish present

Station: AN0448
Matchaponix Brook, Route 527, Manalapan Twp., Monmouth County
Freehold USGS Quadrangle
Date Sampled: 08/24/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydrobiidae	8	32
Chironomidae	6	20
Gammaridae	4	10
Elmidae	4	8
Calopterygidae	5	5
Tubificidae	10	5
Tetrastemmatidae	7	5
Sphaeriidae	8	5
Hydropsychidae	4	3
Aeshnidae	3	1
BloodRed Chironomidae	8	1
Planariidae	4	1
Gomphidae	1	1
Corydalidae	0	1
Physidae	7	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 32.00 % (Hydrobiidae)
Family Biotic Index: 6.40
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 133 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 23.0' / 2.0'
Substrate: Sand, Silt, Snags....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Poor
Canopy: Mostly Closed....Other: Water temp. 20.8 C / pH 5.9 SU / DO 8.2 mg/L / Cond. 250 umhos; Suburban; Englistown Auction on right bank
fish present;

Station: AN0449
Pine Brook, Pension Rd., Manalapan Twp. , Monmouth County
Freehold USGS Quadrangle
Date Sampled: 08/24/04

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	49
Tubificidae	10	25
Chironomidae	6	15
Coenagrionidae	9	4
Aeshnidae	3	3
Elmidae	4	1
Enchytraeidae	10	1
Libellulidae	9	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 49.00 % (BloodRed Chironomidae)
Family Biotic Index: 8.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 115 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid, greenish-grey color....Flow: Moderate....Width/Depth (ft): 20.0' / 1.0'
Substrate: Gravel/Sand, Silt, Snag, Root Mats....StreamBank Vegetation/Stability: Trees/Poor
Canopy: Mostly Closed....Other: Water temp. 19.3 C / pH 3.4 SU / DO 7.8 mg/L / Cond. 445 umhos; Suburban
storm sewers present; iron precipitate present

Station: AN0450
Barclay Brook, Rt. 527, Madison Twp., Middlesex County
Freehold USGS Quadrangle
Date Sampled: 08/24/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Calopterygidae	5	33
Tubificidae	10	27
Chironomidae	6	22
Tipulidae	3	9
Sialidae	4	8
Polycentropodidae	6	4
Corydalidae	0	2
Phryganeidae	4	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 107
% Contribution of Dominant Family: 30.84 % (Calopterygidae)
Family Biotic Index: 6.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.67
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 146 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 19.0' / <1.0'
Substrate: Gravel, Sand, Mud, Snags....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Partly Open....Other: Water Temp. 20.0 C / pH 3.6 SU / DO 8.2 mg/L / Cond. 320 umhos; Agriculture - cropland, Suburban.
Fish, frogs, and macrophytes present. ;

Station: AN0451
Matchaponix Brook, Texas Rd., Madison Twp. , Middlesex County
Freehold USGS Quadrangle
Date Sampled: 08/24/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	46
Tubificidae	10	26
BloodRed Chironomidae	8	24
Calopterygidae	5	4
Elmidae	4	2
Gammaridae	4	1
Hydropsychidae	4	1
Coenagrionidae	9	1
Lumbricidae	10	1
Veliidae	9	1
Sphaeriidae	8	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 109
% Contribution of Dominant Family: 42.20 % (Chironomidae)
Family Biotic Index: 7.40
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.92
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 113 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 48.0' / 1.0'
Substrate: Mud, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Poor
Canopy: Mostly Closed....Other: Water Temp. 22.5 C / pH 7.9 SU / DO 8.1 mg/L / Cond. 441 umhos; Suburban, Forested
Storm sewers present.; Macrophytes, fish, frogs present.

Station: AN0452
Iresick Brook, Route 527, Madison Twp., Middlesex County
South Amboy USGS Quadrangle
Date Sampled: 09/02/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	52
Sphaeriidae	8	21
Lumbriculidae	8	10
BloodRed Chironomidae	8	6
Tubificidae	10	5
Asellidae	8	2
Phryganeidae	4	2
Dytiscidae	5	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 52.00 % (Chironomidae)
Family Biotic Index: 6.94
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 78 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid/Red....Flow: Slow....Width/Depth (ft): 20.0' / <1.0'
Substrate: Gravel/Sand, Mud, Silt, Snags....StreamBank Vegetation/Stability: Grasses, Trees/Poor
Canopy: Open....Other: Water Temp. 20.7 C / pH 6.9 SU / DO 6.4 mg/L / Cond. 189 umhos; Suburban.
storm sewers, abundant iron floc present; majority of right bank cemented, garbage in stream

Station: AN0453
Deep Run, Route 9, Madison Twp., Middlesex County
South Amboy USGS Quadrangle
Date Sampled: 09/02/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	59
Tubificidae	10	17
BloodRed Chironomidae	8	6
Sialidae	4	4
Enchytraeidae	10	3
Calopterygidae	5	2
Aeshnidae	3	1
Elmidae	4	1
Curculionidae	7	1
Corydalidae	0	1
Phryganeidae	4	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 96
% Contribution of Dominant Family: 61.46 % (Chironomidae)
Family Biotic Index: 6.73
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.04
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 122 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 32.0' / 4.0'
Substrate: Gravel/Sand, Mud, Silt....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Poor
Canopy: Closed....Other: Water Temp. 21.3 C / pH 4.7 SU / DO 7.7 mg/L / Cond. 257 umhos; Urban. Storm sewers and drainage ditch present.

Station: AN0454
Deep Run, Rt 516, Madison Twp, Middlesex County
South Amboy USGS Quadrangle
Date Sampled: 9/2/04

Family	Family Tolerance Value (FTV)	Number of Individuals

Not sampled due to bridge construction.

Station: AN0455
Tennent Bk, Old Bridge-South Amboy Rd, Madison Twp, Middlesex County
South Amboy USGS Quadrangle
Date Sampled: 9/2/04

Family	Family Tolerance Value (FTV)	Number of Individuals

Not Sampled. Site was determined to be tidal and this violates our sampling protocol therefore it will be dropped from our program.