



**NJ Department of Environmental Protection
Water Monitoring and Standards**



AMBIENT BIOMONITORING NETWORK



**Northeast Water Region
Passaic River Drainages
Watershed Management Areas 3, 4, 5, and 6
Round 3 Benthic Macroinvertebrate Data
Volume 1 of 2**



February 2008

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February 2008

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Volume 1 of 2

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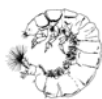
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AMBIENT BIOMONITORING NETWORK

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Northeast Water Region

Round 3 Benthic Macroinvertebrate Data

Volume 1 of 2

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TABLE 1. Biological Criteria for Screening Water Quality in New Jersey Freshwater Streams	

Ambient Biomonitoring Network Watershed Management Areas 3, 4, 5, and 6

Northeast Water Region

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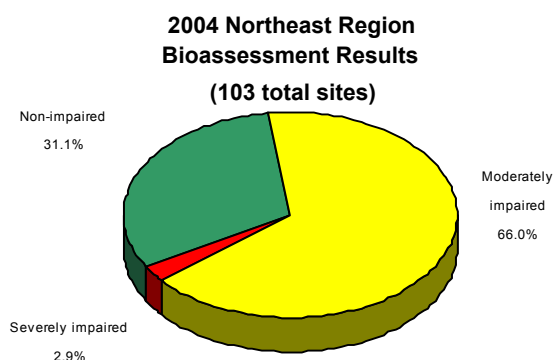
EXECUTIVE SUMMARY

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. nonimpaired, 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 305(b)/303(d) Water Quality Monitoring and Assessment Report. AMNET data are also very useful for designation of Category 1 (C1) 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 Northeast Water Region from July 2003 to October 2004. The sampling of this Region marks the third round of data collection for this basin. For the Northeast Water Region the results obtained in the current round are similar to those of the previous (second round) sampling. Currently, of 104 AMNET sites in the Northeast Water Region, 32 (31.1%) were found nonimpaired, 68 (66.0%) moderately impaired, and 3 (2.9%) severely impaired, with one site not sampled (AN02920) because the water was too deep for wading. The Passaic Water Region is situated in the northeastern corner of New Jersey. It superimposes largely on the New York/New Jersey Piedmont and Highlands, and a portion of the Reading Prong

physiographic subregions, which feature principally high-gradient terrain. The present study area includes those sub-basins that drain to the Passaic and Hackensack Rivers.

Results from the round 3 (2003/04) sampling are compared to those from the same sites sampled in the earlier two rounds (1993/94, 1999, respectively). Of the 104 total AMNET sites presently in the Northeast Water Region substantially fewer sites were assessed as severely

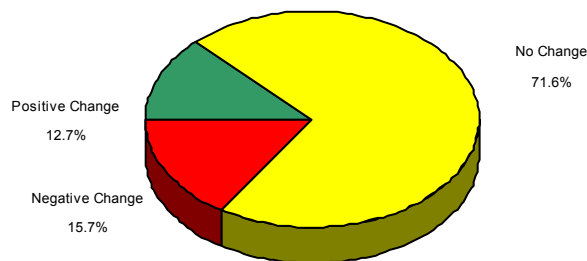


impaired in round 2 and round 3 (5.8%, 2.9% respectively) than in round 1 of sampling (13.9%); however, round 3 yielded more moderately impaired sites (66.0%) than did round 1 (54.8%). The number of nonimpaired sites had increased during round 2 of sampling (36.9%) and dropped again (31.1%) for round 3.

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.

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.

Percent Change in Rating Between the 1999 and the 2004 Monitoring (102 sites total)



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

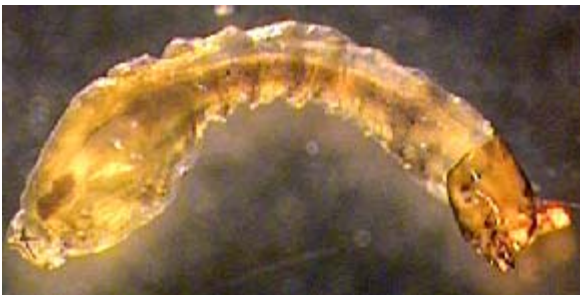


Midges (chironomids) are among the most common of aquatic invertebrates. They occupy a variety of aquatic habitats, including lakes, ponds, bogs, rivers, creeks, and marshes. They even exploit manmade habitats such as sewage treatment plants, water treatment plants, fish pools, irrigation ditches, and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

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 (see Figure 1) includes WMA #'s 3 (Pompton, Pequannock, Wanaque, and Ramapo Rivers), 4 (Lower Passaic and Saddle Rivers), 5 (Hackensack River), and 6 (Upper Passaic, Whippany and Rockaway Rivers) (also see Maps 1 – 8, 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 305(b)/303(d) 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.

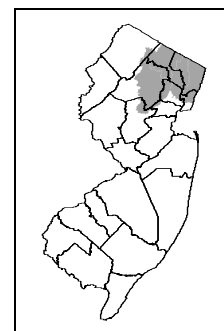


Figure 1

Map of 2004 study area

The AMNET program is designed to monitor a complete Water Region's complement of stations within a year's time, giving our 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 our 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 Northeast 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. Also considered when selecting sites is the proximity of known sources of contamination (e.g. point-source discharges, agricultural operations), either upstream or downstream; significant natural features such as wetlands, parks or wildlife management areas, are similarly considered.

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 – 8, Appendix A, Volume 2).

A total of 104 sites were established for the previous round of AMNET sampling in the Northeast Water Region (1998-1999) [4]. This area (shown in Figure 1) primarily includes all New Jersey sub-basins draining to the Passaic and Hackensack Rivers (WMA's #3, 4, 5, and 6). For the second round of AMNET (FY99), the original study area was realigned to conform with the boundary between the newly established Water Regions [5]. Deleted from the present study were the Wallkill River drainage basin (WMA 2), now included with the Upper Delaware Region, and the Rahway/Elizabeth/Woodbridge drainage basin (WMA 7), now included with the Raritan Region. The present study area comprises the Passaic Water Region, and includes only those sub-basins that drain to the Passaic and Hackensack Rivers. The present Northeast study area (Figure 1) includes a total of 104 sampling sites, AN0205 – 293 (see Table 2, Volume 2). Site AN0292O (Passaic River) in the current data set was too deep when visited and we were unable to sample this site. This site also wasn't sampled during the first round of sampling.

FIELD & LABORATORY METHODS

Benthic macroinvertebrate sampling and analysis is performed in accordance with the NJDEP Field Procedures Manual [6], Rapid Bioassessment Protocol (RBP) guidelines of the USEPA [7] and Standard Operating Procedures (SOP) of the NJDEP Aquatic Biomonitoring Laboratory [8]. As detailed in the SOP, and in the quality assurance work plan [9], 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 [7]. 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 [10] 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, 100 Meters. 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 [7] 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 [8]. 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, 11]. 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 (nonimpaired, moderately impaired, and severely impaired).

The biometrics employed, and subsequent integrated index, were developed as outlined 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, Volume 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 our 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 revised USEPA criteria [7].

The habitat assessment is separated into two basic approaches; one designed for high gradient streams and one designed for low gradient streams [7]. 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 has become another component of the DEP's suite of environmental indicators. The data helps to measure water quality use attainment and the Department's success in attaining the Clean Water Act goals as elaborated in the Department's integrated 305(b) and 303(d) Integrated 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.

Prior to third round of sampling, between 2000 and 2002, eleven IBI sites were sampled at, or near, AMNET sites in the Northeast Basin. IBI results supported AMNET assessments for seven of these sites. Three sites (AN0256A, AN0261, AN0281) were assessed as impaired with AMNET, but rated as good using the IBI assessment. The difference in assessments is likely due to the available in-stream habitat amenable to macroinvertebrates at these sites. The habitat was rated as sub-optimal for these sites and is probably impacting the macroinvertebrate community enough to cause the observed impairments, but is still adequate to support the fish community present. A fourth site (AN0267), was assessed as non-impaired with AMNET, but rated as fair using the IBI assessment. Again, this is likely due to the type of available in-stream habitat. The habitat at this site was assessed as optimal and provided ideal substrate (i.e. cobbles) for macroinvertebrates. However, the habitat consisted of mostly runs, providing limited fish habitat. AMNET samples for this round were collected one to three years after IBI sampling was performed. During this time changes in land use, stream discharge,

and stream morphology may have occurred which could account for the differences in assessments.

For more info on the Fish IBI results and reports, visit our 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) [12]. 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 anti-degradation 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.

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 generated 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. Forty-five (45) sites were designated as "non-attainment of aquatic life use" for at least one physical / chemical parameter; the most common exceedence being Total Phosphorus (TP). Of these 45 sites, 19 sites were designated as "non-attainment of aquatic life use" for two or more of the following physical / chemical parameters: Total Phosphorus (TP), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), pH, Dissolved Oxygen (DO), and Temperature. In all but eight (8) of the AMNET sites, where a physical / chemical-based use attainment exceedence occurred, the AMNET station received either a moderately or severely impaired biological assessment. The remaining 8 AMNET sites, which received a Non-Impaired biological assessment, were found to have exceeded the following criterion: Sites AN0232

(UNT to Whippany River), AN0233 (Whippany River), and AN0255C (Belchers Brook) had non attainment of the Temperature parameter; site AN0245 (Beaver Brook) had non attainment of the pH parameter; site AN0274 (Passaic River) had non attainment of the TP parameter; site AN0267 (Ramapo River) had non attainment of the DO and pH parameters; site AN0280 (W.B. Saddle River) had non attainment of the pH and Temperature parameters; and site AN0282 (Saddle River) had non attainment of the TP, TSS, TDS, and pH parameters. Special attention should be given to the Non-Impaired sites that exceeded standards since continued degradation of the water quality could downgrade those Non-Impaired assessments 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.

* 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 beginning of the third round of sampling for the Northeast 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 Northeast basin has not shown any considerable changes since the previous rounds. The table below presents the proportions of nonimpaired, moderately and severely impaired AMNET sites for all New Jersey Water Regions in the second AMNET round, plus the third round for the Northeast and Upper Delaware/Northwest Water Region.

Region	Number of sites			Total sites
	Nonimpaired	Moderately impaired	Severely impaired	
Third round				
Upper Delaware	78 (54.9%)	60 (42.3%)	4 (2.8%)	142
Northeast	32 (31.1%)	68 (66.0%)	3 (2.9%)	103
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.

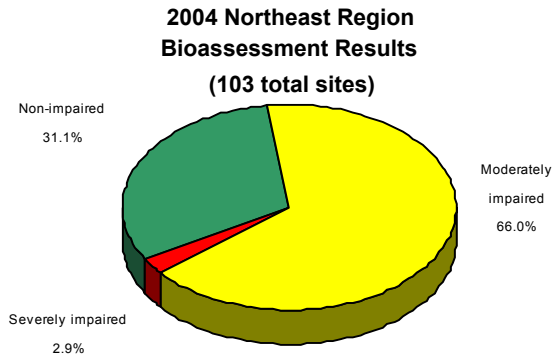


Figure 2

Figure 2 depicts the overall results for the current study in the Northeast Water Region. Of the 103 monitoring stations sampled during this study period, 32 or **31.1%** were rated as "**nonimpaired**", 68 or **66.0%** were rated as "**moderately impaired**", and 3 or **2.9%** were rated as "**severely impaired**" (see Table 2, Volume 2).

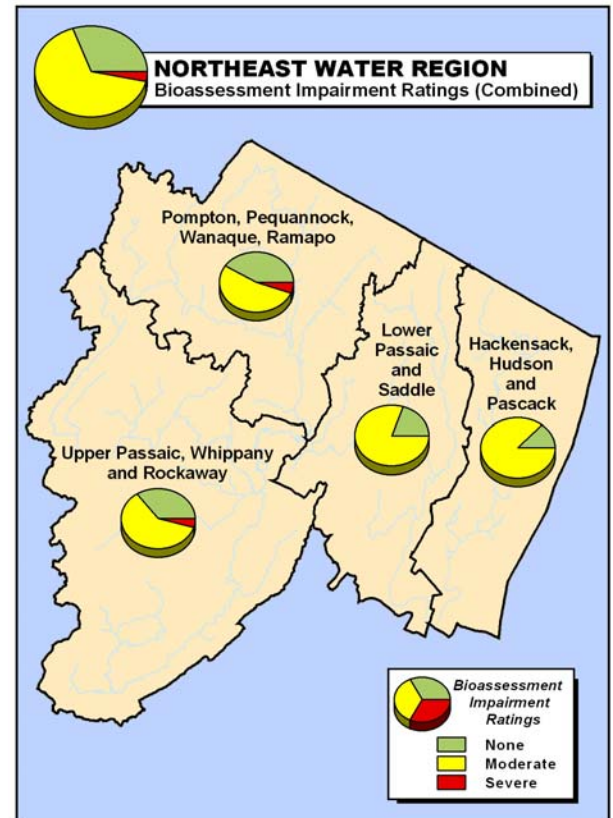


Figure 3. Map of the Northeast Water Region showing relative stream impairment levels in each Watershed Management Area.

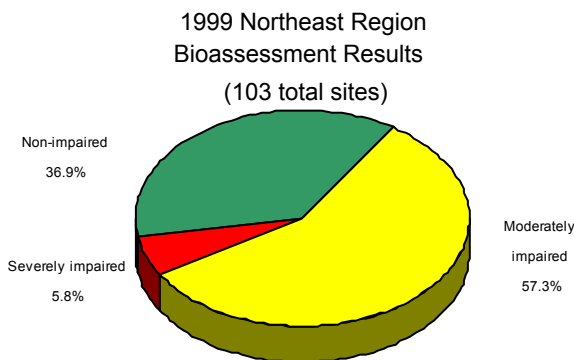


Figure 4

Figure 4 shows the results obtained from 103 AMNET sites within the Northeast Water Region that were sampled during the previous Northeast study (see "Site Selection" p.5 & Table 2, Volume 2). While the results for 2003/04 were similar to those for 1998/99, for the current sampling period the numbers of nonimpaired and severely impaired sites were slightly lower, but the number of moderately impaired sites were slightly higher. The first sampling (1992/93) of 115 sites yielded more severely impaired sites (13.9%), than in the most recent two samplings [4].

Figure 5 displays the percentage of change in rating among the same 102 AMNET sites in the Northeast Water Region that were sampled during the second (1998/99) study period [4], and again during the current (2003/04) 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).

Percent Change in Rating Between the 1999 and the 2004 Monitoring (102 sites total)

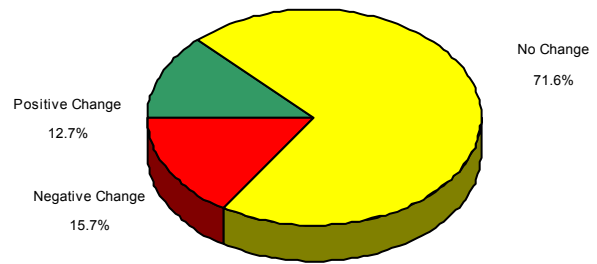


Figure 5

Regional Results

A USGS study, using data generated from NJDEP's AMNET program [14], statistically related levels of impairment to physiographic land types, corresponding land uses, and other anthropogenic factors on a statewide scale. A nonimpaired 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 [14]. The table below presents the proportion of nonimpaired, moderately impaired and severely impaired AMNET sites, based on the round 3 data, in each of the Northeast Watershed Management Areas.

WMA	Sub-basins	Nonimpaired	Moderately impaired	Severely impaired	Total sites
3	Pompton/ Wanaque/ Ramapo Rivers system	8 (42.1%)	10 (52.6%)	1 (5.3%)	19
4	Lower Passaic/ Saddle Rivers system	5 (19.2%)	21 (80.8%)	---	26
5	Hackensack/ Pascack Rivers system	1 (12.5%)	7 (87.5%)	---	8
6	Upper Passaic/ Whippany/ Rockaway Rivers system	18 (36.0%)	30 (60.0%)	2 (4.0%)	50
Totals:		32 (31.1%)	68 (66.0%)	3 (2.9%)	103

In the Northeast Water Region the majority of NJIS scores (66.0%) fall within the "moderately impaired" range; less than a third are "nonimpaired" and only three sites are rated as "severely impaired" (see Table 2, Volume 2). Figure 3 illustrates the proportions of nonimpaired, moderately and severely impaired sites in each WMA of the Northeast Water Region for the current AMNET round.

Evaluation by WMA

Watershed Management Area #3 includes a total of 19 AMNET sites in the Pequannock, Pompton, Ramapo, and Wanaque River system and several smaller streams in portions of Bergen, Morris, Passaic and Sussex Counties; these include Belcher Creek, Clinton Brook, Dam Brook, Green Brook, Kanouse Brook, Macopin River, Meadow Brook, Mossmans Brook, and Packanack Brook (see Map 2, Volume 2). Figure 6 shows the current site rating summaries for WMA #3: 42.1% (8 sites) nonimpaired, 52.6% (10 sites) moderately impaired

Watershed Management Area 3
2004 Bioassessment Results
(19 total sites)

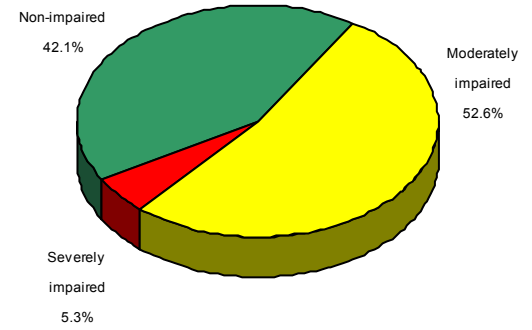


Figure 6

Watershed Management Area 3
1999 Bioassessment Results
(18 total sites)

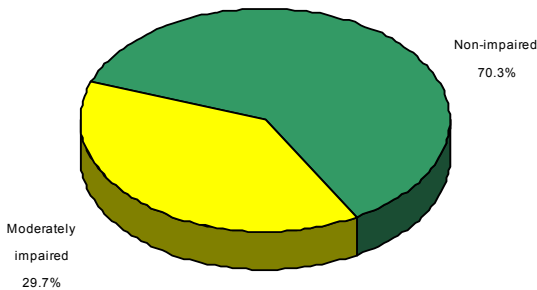


Figure 7

and 5.3% (one site) severely impaired. Figure 7 depicts the results obtained from 18 of the same sites sampled during the earlier (1998/99) survey (with one site, AN0263 having been too dry to sample) [4]. Comparing the current results to the earlier results, a significant improvement is seen at one site and a significant decline, at five sites (see Table 2, Volume 2). The number of nonimpaired sites is slightly lower than the earlier data, and the number of moderately impaired and severely impaired sites is slightly increased. The majority (57.9%) of habitat scores are in the suboptimal range, with 36.8% receiving an optimal and 5.3% receiving a marginal score. No abnormalities in chironomid larvae and other invertebrate families were found. The table below presents a synopsis of AMNET data for WMA #3; AMNET site locations and bioassessment ratings within WMA # 3 are shown in Figure 8.

Figure 7 depicts the

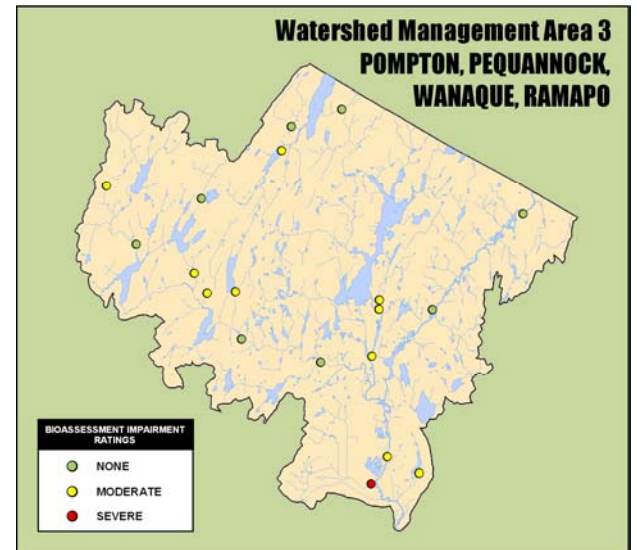


Figure 8

WMA # 3 Combined Results Table

NJIS Rating	1998/99		2003/2004		Habitat Assessment	2003/2004	
	Count	Percentage	Count	Percentage		Count	Percentage
Nonimpaired	11	61.1%	8	42.1%	Optimal	7	36.8%
Moderate	7	38.9%	10	52.6%	Suboptimal	11	57.9%
Severe	---	-----	1	5.3%	Marginal	1	5.3%
					Poor	---	-----
Total sites	18		19			19	

Watershed Management Area #4 includes a total of 27 AMNET sites in the Saddle River and its tributaries, in Bergen, Essex, and Passaic Counties (see Maps 3 & 4, Volume 2). One site AN02920 wasn't sampled this round giving a total of 26 sites sampled. Figure 9 shows the current site rating summaries for WMA # 4: 19.2% (five sites) nonimpaired and 80.8% (21 sites) moderately. Figure 10 depicts the results obtained from 27 sites sampled during the earlier (1999) survey. Comparing the current (2004) results to the earlier (1999) results, a significant improvement is apparent at three sites while two sites exhibited a decline in impairment rating (see Table 2, Volume 2). The percentage of moderately and nonimpaired sites has shown no change in rating (Figures 9 & 10). The majority (42.3%) of habitat scores are in the suboptimal range with 34.6% receiving an optimal and 23.1% receiving a marginal score. Abnormalities in chironomid larvae and other invertebrate families were found at seven sites (one each on Hohokus Creek, Passaic River, Preakness Brook, Second River, Third River, Saddle River, and W Br Saddle River) (see Table 3, Volume 2). Five of these sites displayed chronic abnormalities (see Table 3, Volume 2). The table below presents a synopsis of AMNET data for WMA #4; AMNET site locations and bioassessment ratings within WMA #4 are shown in Figure 11.

Watershed Management Area 4
2004 Bioassessment Results
(26 total sites)

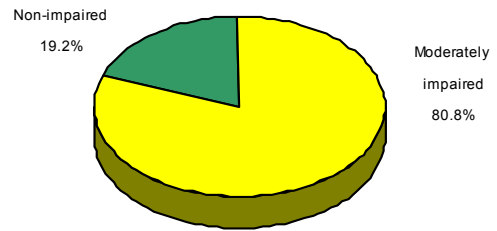


Figure 9

Watershed Management Area 4
1999 Bioassessment Results
(27 total sites)

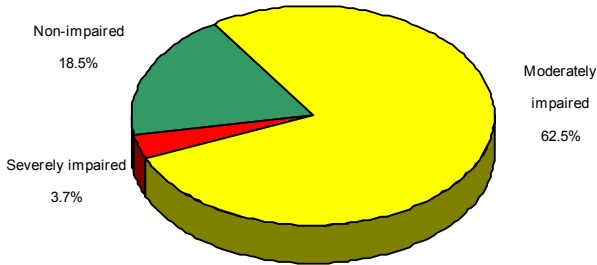


Figure 10

Comparing the current (2004) results to the earlier (1999) results, a significant improvement is apparent at three sites while two sites exhibited a decline in impairment rating (see Table 2, Volume 2). The percentage of moderately and nonimpaired sites has shown no change in rating (Figures 9 & 10). The majority (42.3%) of habitat scores are in the suboptimal range with 34.6% receiving an optimal and 23.1% receiving a marginal score. Abnormalities in chironomid larvae and other invertebrate families were found at seven sites (one each on Hohokus Creek, Passaic River, Preakness Brook, Second River, Third River, Saddle River, and W Br Saddle River) (see Table 3, Volume 2). Five of these sites displayed chronic abnormalities (see Table 3, Volume 2). The table below presents a synopsis of AMNET data for WMA #4; AMNET site locations and bioassessment ratings within WMA #4 are shown in Figure 11.

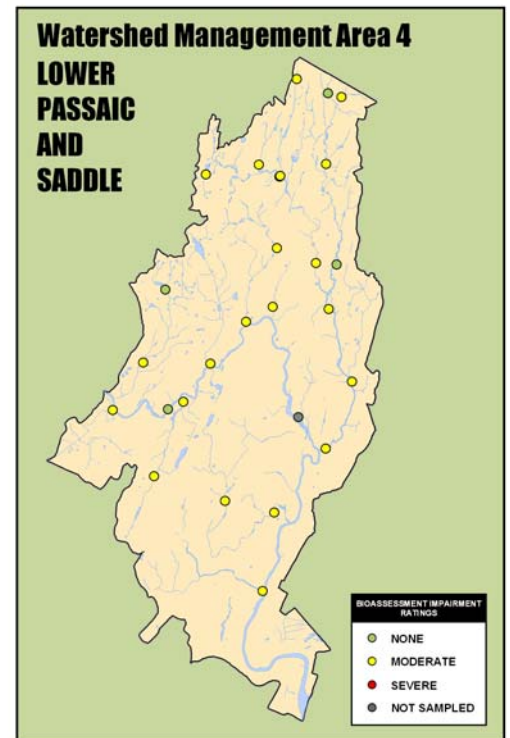


Figure 11

WMA # 4 Combined Results Table

NJIS Rating	1998/99		2003/2004		Habitat Assessment	2003/2004	
	Count	Percentage	Count	Percentage		Count	Percentage
Nonimpaired	5	18.5%	5	19.2%	Optimal	9	34.6%
Moderate	21	77.8%	21	80.8%	Suboptimal	11	42.3%
Severe	1	3.7%	---	-----	Marginal	6	23.1%
					Poor	---	-----
Total sites	27		26			26	

Watershed Management Area #5 includes a total of 8 AMNET sites in the Hackensack River and several smaller sub-basins in Bergen County (see Maps 6 and 7, Volume 2). Figure 12 shows the current site rating summaries: 12.5% (1 site) nonimpaired and 87.5% (7 sites) moderately impaired. Figure 13 depicts the results obtained from 8 of the same sites sampled during the earlier (1999) survey. Comparing the current 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 moderately impaired sites increased slightly from that of the earlier sampling, and the number nonimpaired and severely impaired of sites is slightly reduced (see Table 2, Volume 2). The majority of sites (75.0%) received a sub-optimal habitat score, with 25.0%

Watershed Management Area 5
2004 Bioassessment Results
(8 total sites)

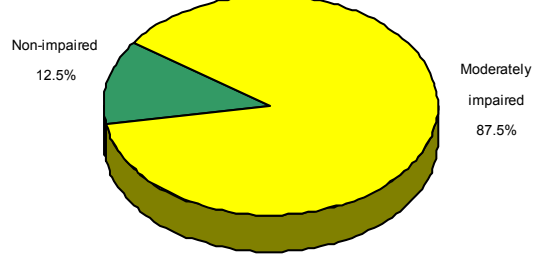


Figure 12

Watershed Management Area 5
1999 Bioassessment Results
(8 total sites)

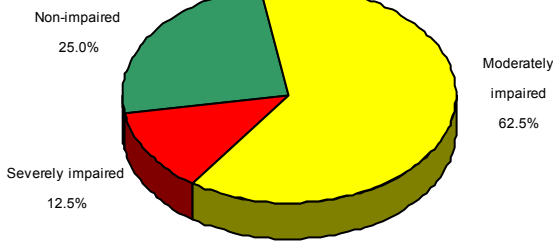


Figure 13

receiving an optimal score. Abnormalities in chironomid larvae and other invertebrate families were found at three sites in Bergen County: one each on Pascack Brook, Tenakill Brook and Van Saun Brook

(see Map 5, 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 #5; AMNET site locations and bioassessment ratings within WMA # 5 are shown in Figure 14.

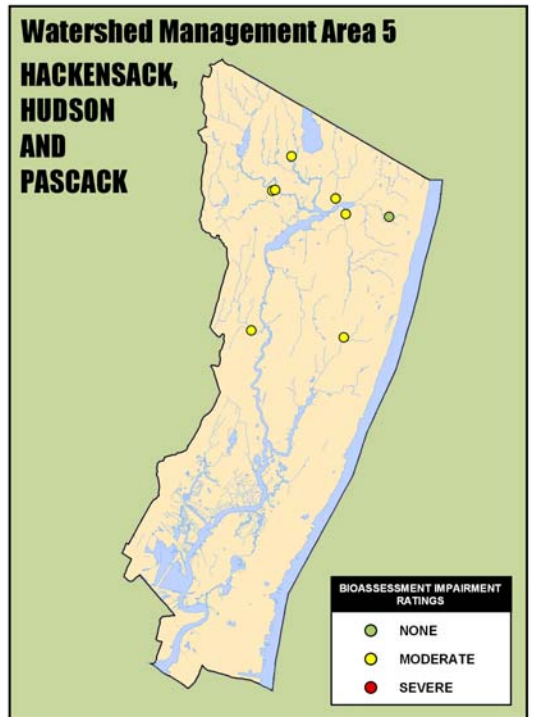


Figure 14

WMA # 5 Combined Results Table

NJIS Rating	1998/99		2003/2004		Habitat Assessment	2003/2004	
	Count	Percentage	Count	Percentage		Count	Percentage
Nonimpaired	2	25.0%	1	12.5%	Optimal	2	25.0%
Moderate	5	62.5%	7	87.5%	Suboptimal	6	75.0%
Severe	1	12.5%	---	-----	Marginal	---	-----
					Poor	---	-----
Total sites	8		8			8	

Watershed Management Area #6 includes a total of 50 AMNET sites in the Passaic, Rockaway, and Whippany Rivers and several smaller sub-basins in Essex, Morris and Somerset Counties (see Maps 6, 7 and 8, Volume 2). Figure 12 shows the current site rating summaries: 36.0% (18 sites) nonimpaired, 60.0% (30 sites) moderately impaired and 4.0% (two sites) severely impaired. Figure 13 depicts the results obtained from 50 of the same sites sampled during the earlier survey. Comparing the current to the earlier results, a significant improvement is seen at six 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, and the number of nonimpaired and severely impaired sites is slightly reduced (see

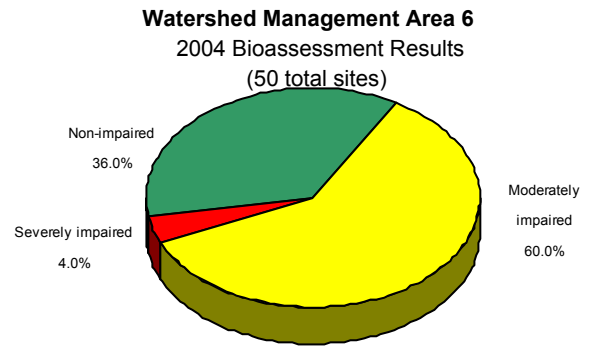


Figure 12

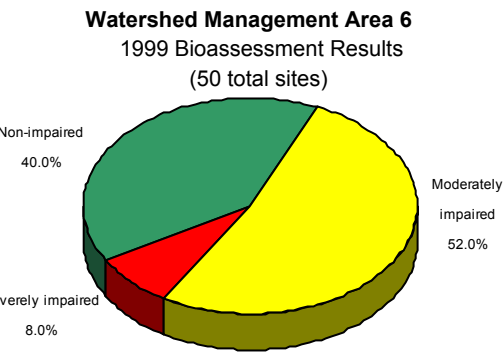


Figure 13

reduced (see Table 2, Volume 2). The majority of sites (56.0%) received a sub-optimal habitat score, with 36.0% receiving an optimal

score and 8.0% receiving a marginal score. Abnormalities in chironomid larvae and other invertebrate families were found at nine sites in Morris and Somerset Counties: one each on Great Brook, Mill Brook, Passaic River, Rockaway River, Troy Brook, unnamed tributary to Dead River, and Whippany River; two each on Dead River (see Maps 6 & 7, Table 3, Volume 2). Five of these sites displayed chronic abnormalities (see Table 3, Volume 2). The table below presents a synopsis of AMNET data for WMA #6;

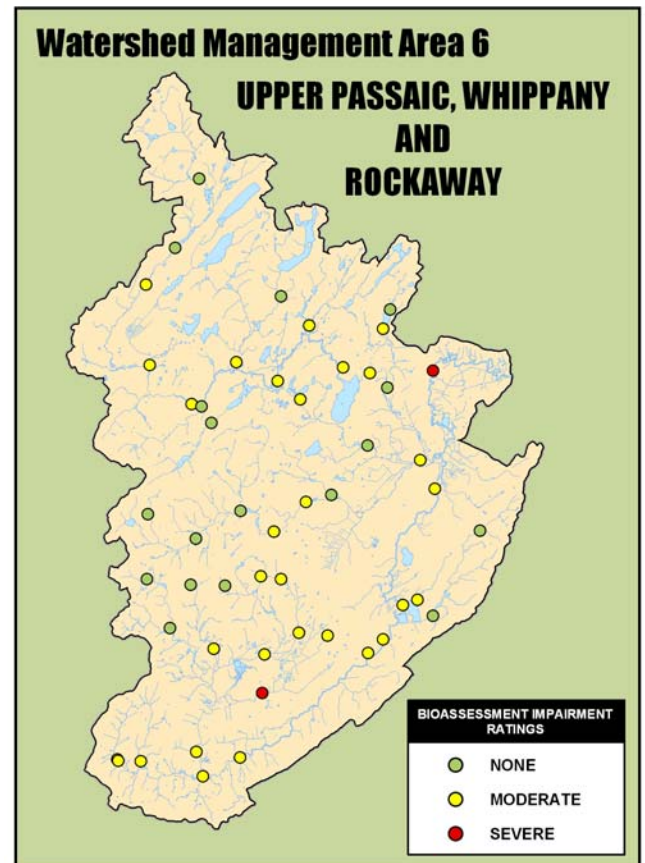


Figure 14

AMNET site locations and bioassessment ratings within WMA # 6 are shown in Figure 14.

WMA # 6 Combined Results Table

NJIS Rating	1998/99		2003/2004		Habitat Assessment	2003/2004	
	Count	Percentage	Count	Percentage		Count	Percentage
Nonimpaired	20	40.0%	18	36.0%	Optimal	18	36.0%
Moderate	26	52.0%	30	60.0%	Suboptimal	28	56.0%
Severe	4	8.0%	2	4.0%	Marginal	4	8.0%
					Poor	---	-----
Total sites	50		50			50	

Macroinvertebrate Abnormalities

Occasionally, morphological abnormalities have been found in individual macroinvertebrates recovered in our 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 [15].

Hamilton and Saether [16] 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 [17]. Most of the research has been focused on a few genera. The North Carolina Division of Environmental Management [18] has developed an index to evaluate deformities, using the frequency and severity of deformities observed in Chironomidae larvae of just the genus *Chironomus*. Secondly, 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 [17]. 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 [19].

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 Northeast 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 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 103 sites, 19 (18.4%) contained organisms with abnormalities (Maps 3, 4, 5, 6, 7 & 8, Volume 2). Eleven of the sites exhibited a "chronic" presence of abnormalities (Table 3, Volume 2). Notably, these "chronic" sites are situated in WMA # 4, 5, and 6 where a higher percentage of urban land use occurs (Maps 3, 4, 5, 6, 7 & 8, 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)
 - 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 contributing to degraded stream quality:

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 source)
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 Northeast Water Region, an overall R^2 value of 0.27 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 27% of the

time. An R^2 value was also calculated, individually, for the four WMA's in this Water Region. The R^2 values for WMA 3, 4, 5, and 6, were 0.44, 0.30, 0.40, and 0.30 respectively. Again, this indicates that a strong direct correlation between habitat and biological impairment existed 30% - 44% 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 nonimpaired 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 [14]. 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 [14]. 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. Recent data analysis from Ayers et al., 2000 [20] 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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TABLE 1

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

Scoring Criteria for Rapid Bioassessments¹

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
Nonimpaired	24-30
Moderately Impaired	9-21
Severely Impaired	0-6

Attributes

Nonimpaired: 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.

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



**NJ Department of Environmental Protection
Water Monitoring and Standards**



AMBIENT BIOMONITORING NETWORK



**Northeast Water Region
Passaic River Drainages
Watershed Management Areas 3, 4, 5, and 6
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

Northeast Water Region

Passaic River Drainages

Watershed Management Areas 3, 4, 5, and 6

Round 3 Benthic Macroinvertebrate Data

Volume 2 of 2

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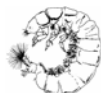
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AMBIENT BIOMONITORING NETWORK

Watershed Management Areas 3, 4, 5, and 6

Northeast Water Region

Round 3 Benthic Macroinvertebrate Data

Volume 2 of 2

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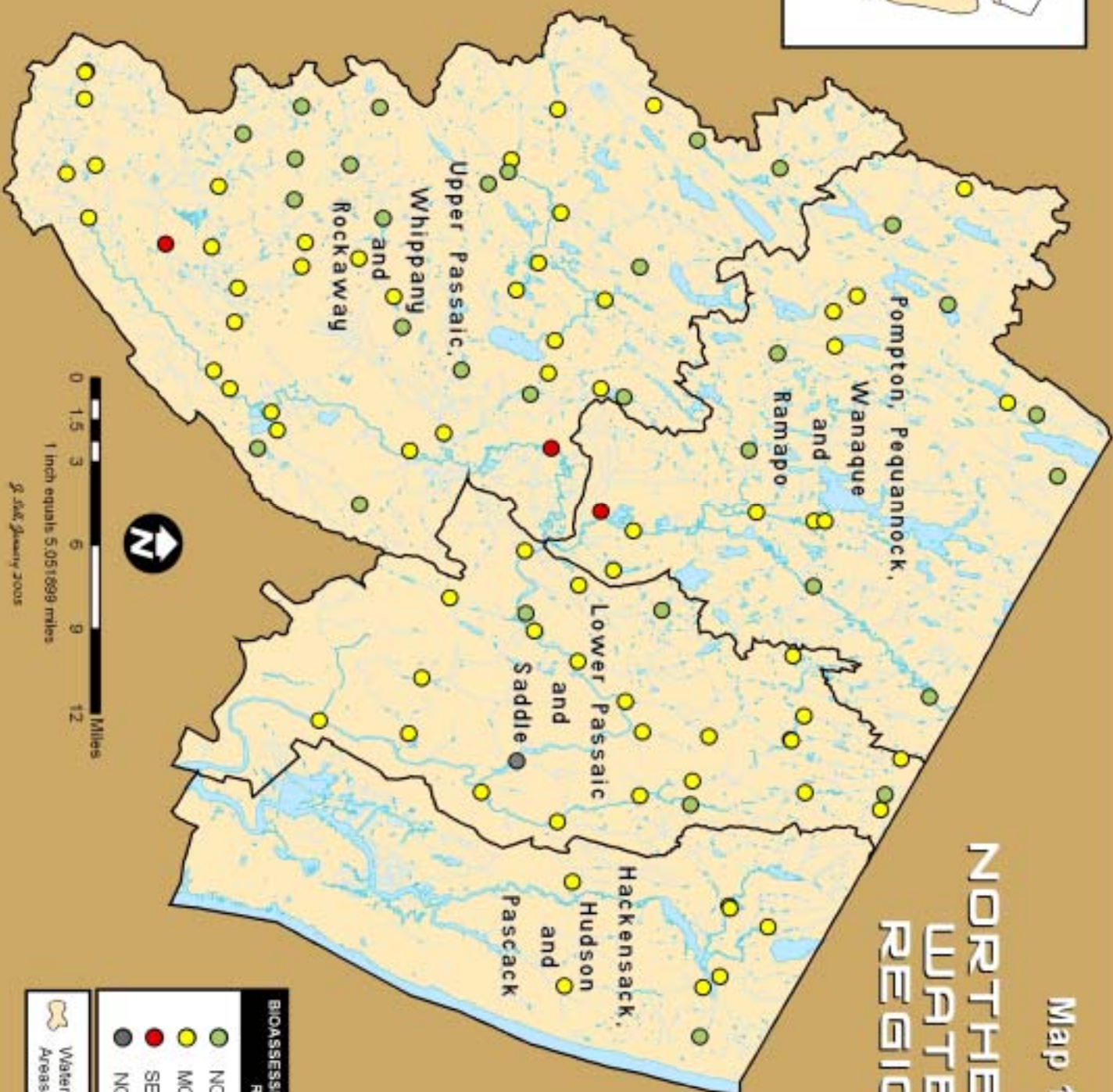
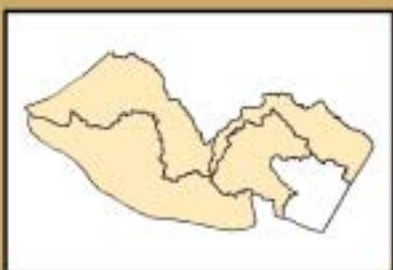
MAPS

Round 3 Northeast Region AMNET Study WMA's 3, 4, 5, & 6

AMNET site locations and their respective biological ratings, for each major sub-basin, are shown in maps 1- 8. Also identified are sites that exhibited significant and chronic macroinvertebrate abnormalities.

Map 1

NORTHEAST WATER REGION



BIOASSESSMENT IMPAIRMENT RATINGS

- NONE
- MODERATE
- SEVERE
- NOT SAMPLED

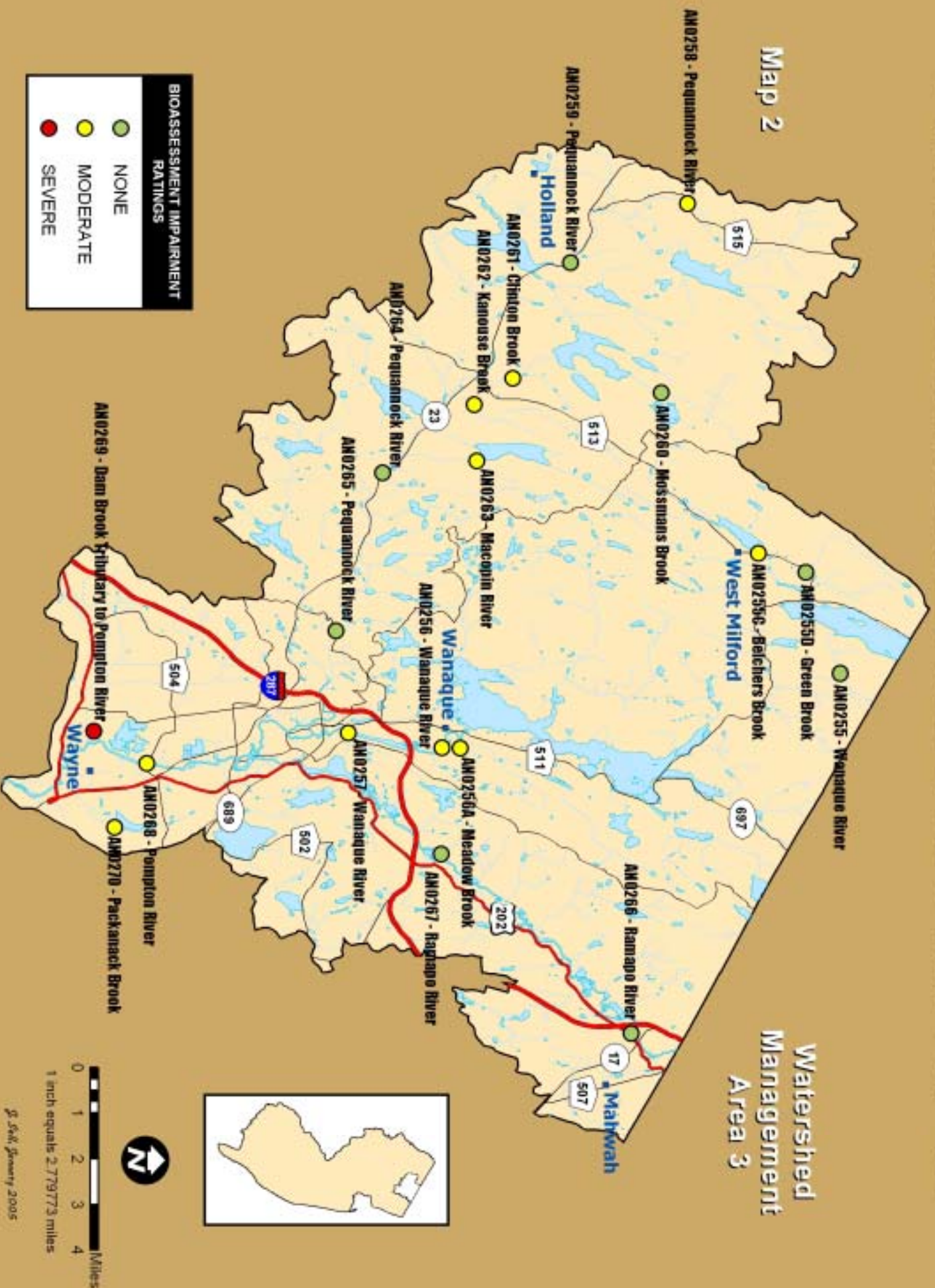
Watershed Management Areas

J. Dale Quainy 2005

POMPTON, PEQUANNOCK, WANAUQUE AND RAMAPO RIVERS

Map 2

Watershed
Management
Area 3



BIOASSESSMENT IMPAIRMENT RATINGS

- NONE
- MODERATE
- SEVERE

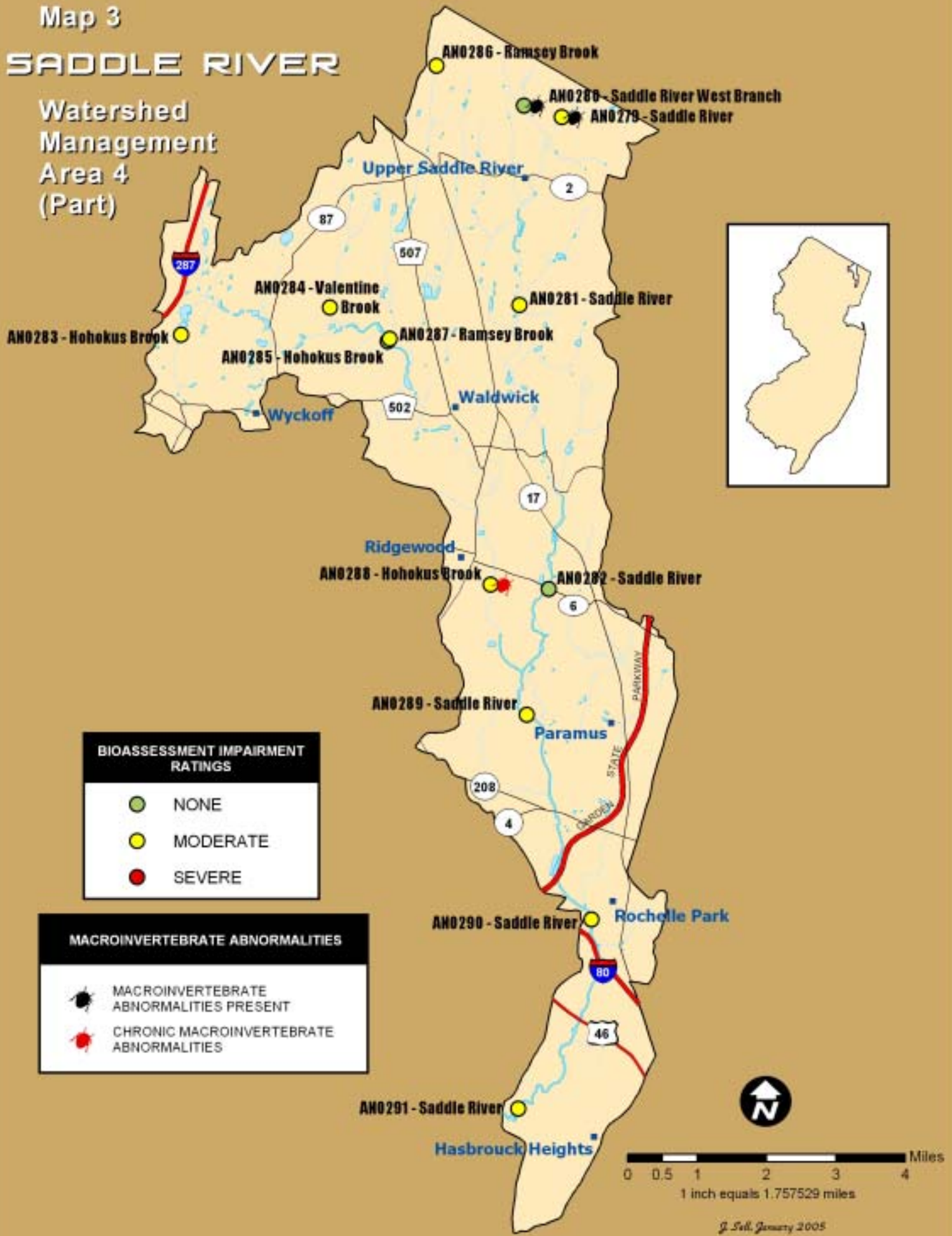


0 1 2 3 4 Miles
1 inch equals 2.779773 miles

Map 3

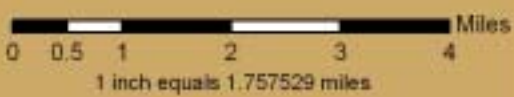
SADDLE RIVER

Watershed Management Area 4 (Part)



BIOASSESSMENT IMPAIRMENT RATINGS	
	NONE
	MODERATE
	SEVERE

MACROINVERTEBRATE ABNORMALITIES	
	MACROINVERTEBRATE ABNORMALITIES PRESENT
	CHRONIC MACROINVERTEBRATE ABNORMALITIES



J. Sell, January 2005

Map 4 LOWER PASSAIC RIVER

Watershed Management Area 4 (Part)



BIOASSESSMENT IMPAIRMENT RATINGS	
	NONE
	MODERATE
	SEVERE
	NOT SAMPLED

MACROINVERTEBRATE ABNORMALITIES	
	MACROINVERTEBRATE ABNORMALITIES PRESENT
	CHRONIC MACROINVERTEBRATE ABNORMALITIES



Map 5 HACKENSACK RIVER

Watershed Management Area 5



BIOASSESSMENT IMPAIRMENT RATINGS	
	NONE
	MODERATE
	SEVERE

MACROINVERTEBRATE ABNORMALITIES	
	MACROINVERTEBRATE ABNORMALITIES PRESENT
	CHRONIC MACROINVERTEBRATE ABNORMALITIES



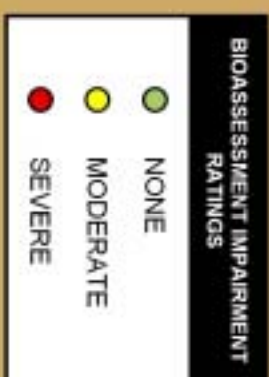
0 0.5 1 2 3 4 Miles
1 inch equals 87.822217 miles

J. Sell, January 2005

Map 6

ROCKAWAY RIVER

Watershed Management
Area 6
(Part)



WHIPPANY RIVER

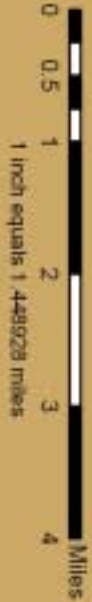
Watershed Management

Map 7
Area 6
(Part)



MACROINVERTEBRATE ABNORMALITIES

- MACROINVERTEBRATE ABNORMALITIES PRESENT
- CHRONIC MACROINVERTEBRATE ABNORMALITIES



J. Paul January 2005

BIOASSESSMENT IMPAIRMENT RATINGS

- NONE
- MODERATE
- SEVERE

UPPER PASSAIC RIVER

Watershed Management
Area 6
(Part)

Map 8



BIOASSESSMENT IMPAIRMENT RATINGS

- NONE
- MODERATE
- SEVERE

MACROINVERTEBRATE ABNORMALITIES

- MACROINVERTEBRATE ABNORMALITIES PRESENT
- CHRONIC MACROINVERTEBRATE ABNORMALITIES



Table 2

Comparative Scores / Ratings (see notes)

Watershed Management Areas 3, 4, 5 and 6

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
	98 / 99	03 / 04					98 / 99	023 / 04					98 / 99	03 / 04			
205	18	15	/-	128	5	240	30	24	/-	188	6	277	12	18	/+	135	4
206	15	15	/	147	5	241	15	9	/-	155	6	277A	9	21	/+	144	4
207	24	21	—	143	5	242	15	15	/	148	6	278	12	9	/-	119	4
208	30	30	/	168	5	243	27	21	—	160	6	279	24	21	—	191	4
209	6	12	+	111	5	244	15	27	+	168	6	280	21	24	+	168	4
210	18	15	/-	169	5	245	30	30	/	188	6	281	21	18	/-	145	4
211	15	12	/-	113	5	246	15	18	/+	103	6	282	24	24	/	175	4
212	15	9	/-	137	5	247	30	30	/	186	6	283	24	21	—	186	4
213	24	24	/	175	6	248	27	9	—	161	6	284	15	15	/	168	4
214	30	30	/	197	6	249	9	12	/+	150	6	285	21	27	+	170	4
215	30	30	/	180	6	250	18	21	/+	166	6	286	6	18	+	179	4
216	30	21	—	121	6	251	12	21	/+	159	6	287	18	12	/-	154	4
217	30	27	/-	139	6	252	30	30	/	175	6	288	18	12	/-	119	4
218	12	15	/+	113	6	253	21	21	/	122	6	289	18	18	/	180	4
219	9	12	/+	164	6	254	27	24	/-	125	6	290	12	12	/	110	4
220	15	12	/-	158	6	255	30	24	/-	181	3	291	21	18	/-	140	4
221	9	15	/+	131	6	255C	15	12	/-	119	3	292	21	9	/-	85	4
222	3	12	+	139	6	255D	30	30	/	181	3	292A	12	15	/+	101	4
223	12	6	—	151	6	256	12	12	/	116	3	292O	15	-	nd	nd	4
224	30	18	—	154	6	256A	18	21	/+	134	3	293	21	9	/-	87	4
225	18	15	/-	173	6	257	24	18	—	107	3						
226	27	15	—	171	6	258	15	18	/+	124	3						
227	18	9	/-	96	6	259	21	30	+	180	3						
227A	21	18	/-	138	6	260	30	30	/	196	3						
228	18	18	/	125	6	261	24	12	—	122	3						
229	15	15	/	141	6	262	24	21	—	182	3						
230	12	21	/+	154	6	263	-	18	nd	152	3						
231	6	15	+	121	6	264	24	27	/+	149	3						
231A	3	9	+	116	6	265	27	30	/+	153	3						
231C	6	12	+	148	6	266	27	24	/-	141	3						
231D	12	24	+	164	6	267	27	30	/+	170	3						
231E	15	27	+	153	6	268	24	15	—	148	3						
232	30	30	/	180	6	269	15	3	—	145	3						
233	21	24	+	153	6	270	18	18	/	124	3						
234	27	21	—	151	6	271	9	12	/+	99	4						
234A	24	24	/	140	6	272	24	24	/	121	4						
235	9	15	/+	133	6	273	18	9	/-	121	4						
236	15	21	/+	176	6	274	24	27	/+	149	4						
237	27	24	/-	153	6	274A	18	6	—	92	6						
238	12	12	/	71	6	275	15	21	/+	76	4						
238B	27	27	/	154	6	275A	15	15	/	168	4						
239	30	24	/-	164	6	276	9	12	/+	94	4						

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)

<u>NJ Impairment Score</u>	<u>Value</u>	<u>Habitat Score</u>	<u>Value</u>
Non-Impaired	24 - 30	Optimal	160 - 200
Moderately Impaired	9 - 21	Sub-optimal	110 - 159
Severely Impaired	0 - 6	Marginal	60 - 109
		Poor	<60

Table 3**Macroinvertebrate Abnormalities** (see notes)

Watershed Management Areas 3, 4, 5, and 6

Station	1998 / 99	2003 / 04	WMA		Station	1998 / 99	2003 / 04	WMA				
205	4/23		5		274	1/11	+1	4				
206	+2		5		274A	1/18		6				
207		+2	5		275	2/36		4				
208	2/26		5		275A	1/11		4				
209		+1	5		276	1/24		4				
210	1/14		5		277	5/26		4				
211	1/29	2/44	5		278	2/25		4				
213	1/10		6		279		+1	4				
218	1/24		6		280		1/29	4				
219	+1	+2	6		281	1/22		4				
221	+1		6		282	1/11, +2		4				
223	3/25		6		283	1/18, +1		4				
224	1/20		6		285	+1		4				
225	+3	+1	6		286	3/15		4				
226		+1	6		287	1/8		4				
227	1/20, +1	+1	6		288	1/8, +2	+1	4				
231A	2/13, 5/53	1/15	6		289	2/40		4				
231C	2/27		6		290	+1		4				
234	+2		6		291	4/21		4				
236	+1		6		292A	2/14	+1	4				
237		+1	6		292O	2/32		4				
238	+2	+1	6		293	+5	2/34	4				
243	1/5		6									
244		+1	6									
247	4/25		6									
250		+1	6									
254	+1		6									
256	2/30, +1		3									
259	3/34		3									
264	+1		3									
268	+6		3									
269	3/16		3									
271	7/44		4									
272	+1	1/10	4									
273	1/24		4									

NOTES:

chironomids with deformities / # chironomids examined

+ — indicates the number of non-chironomids having abnormalities

abnormalities are considered chronic if they appear in both the 1998 / 99 and the 2003 / 04 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 <u>not</u> new fall and <u>not</u> 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 <u>not</u> new fall and <u>not</u> 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 Parameters that did not attain standards:

Amnet#	Stream Name	Station Location	Non-Attaining Parameter(s)
AN0205	Hackensack R	Old Tappan Rd	Tot Phos
AN0206	Musquapsink R	Harrington Ave	TDS
AN0207	Pascack Bk	Westwood Ave	TDS
AN0210	Dorotockeys Run	Tappan Rd	Tot Phos
AN0212	Overpeck Ck	Dean Dr	pH, TDS
AN0222	Black Bk	Southern Blvd	Tot Phos
AN0223	Black Bk	New Vernon Rd	Tot Phos
AN0225	UNT to Dead R	off Somerville Rd	Tot Phos, TSS
AN0226	Dead R	off Somerville Rd Opp Shannon Hill Rd	Tot Phos, TSS
AN0228	Passaic R	S Main Ave Myers Rd	Tot Phos, TSS
AN0229	Passaic R	Stanley Ave	Tot Phos, TSS
AN0230	Passaic R	Summit Ave Chatham Rd	Tot Phos, TSS
AN0231	Passaic R	Eagle Rock Ave	Tot Phos, TSS, TDS
AN0231A	Passaic R	Passaic Ave	Tot Phos, TSS, TDS
AN0231C	Slough Bk	Parsonage Hill Rd	Tot Phos, TSS, TDS
AN0232*	UNT to Whippany R	Mt Pleasant Rd	Temp
AN0233*	Whippany R	Whitehead Rd	Temp
AN0234	Whippany R	Ridgedale Ave W of Rt I-287	Tot Phos
AN0235	Whippany R	Jefferson Rd E of Rt I-287	Tot Phos
AN0238	Whippany R	end of Edwards Rd	Tot Phos, DO
AN0245*	Beaver Bk	Meriden Rd	pH
AN0246	Beaver Bk	Morris Ave	pH
AN0251	Rockaway R	Green Bank Rd nr Vreeland & River Rd	Tot Phos
AN0255C*	Belchers Bk	Union Valley Rd	Temp
AN0255D	Green Bk	Union Valley Rd	Temp
AN0256	Wanaque R	Highland Ave	Tot Phos
AN0257	Wanaque R	Wanaque Ave otft of Lk Inez	Tot Phos
AN0267*	Ramapo R	Lenape Lane	DO, pH
AN0268	Pompton R	Rt 504 Newark Pompton Tpk	Tot Phos
AN0269	Dam Bk Trib to Pompton R	Ryerson Rd	Tot Phos
AN0270	Packanack Bk	Osbourne Rd	Tot Phos
AN0274*	Passaic R	River View Dr	Tot Phos
AN0274A	Passaic R	end of Willard Lane	Tot Phos
AN0277	Goffle Bk	Wagaraw Rd	TDS
AN0277A	Goffle Bk	Wyckoff Ave	TDS
AN0278	Diamond Bk	Harristown Rd.	Tot Phos
AN0279	Saddle R	Old Stone Church Rd	pH, Temp
AN0280*	Saddle R W Br	Old Stone Church Rd	pH, Temp
AN0281	Saddle R	E Allendale Ave	pH, Temp
AN0282*	Saddle R	E Ridgewood Ave	Tot Phos, TSS, TDS, pH
AN0283	Hohokus Bk	Old Mill Rd	TDS
AN0289	Saddle R	Dunkerhook Rd at Dead End	Tot Phos, TSS, TDS, pH
AN0290	Saddle R	Railroad Ave	Tot Phos, TSS, TDS
AN0291	Saddle R	Marsellus Place & Saddle River Ave	Tot Phos, TSS, TDS
AN0293	Second R	Between McCarter Hwy & Main St	Tot Phos, pH

* non impaired AMNET site

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

Site	Stream	Latitude Longitude	Watershed Management Area
AN0205	Hackensack River	41 00'44.424"N 74 00'30.309"W	5
AN0206	Musquapsink Bk	40 59'32.334"N 74 01'23.666"W	5
AN0207	Pascack Bk	40 59'34.383"N 74 01'16.377"W	5
AN0208	Dwars Kill	40 58'35.789"N 73 56'03.629"W	5
AN0209	Tenakill Bk	40 58'42.631"N 73 58'02.310"W	5
AN0210	Dorotockeys Run	40 59'14.940"N 73 58'29.353"W	5
AN0211	Van Saun Bk	40 54'39.982"N 74 02'23.981"W	5
AN0212	Overpeck Ck	40 54'23.957"N 73 58'08.911"W	5
AN0213	Passaic River	40 46'18.419"N 74 34'11.609"W	6
AN0214	Indian Grave Bk	40 44'29.142"N 74 33'04.278"W	6
AN0215	Primrose Bk	40 46'05.653"N 74 32'02.405"W	6
AN0216	Primrose Bk	40 43'43.275"N 74 30'55.475"W	6
AN0217	Great Bk	40 46'04.205"N 74 30'22.521"W	6
AN0218	Great Bk	40 46'27.754"N 74 28'33.747"W	6
AN0219	Great Bk	40 43'30.447"N 74 28'26.628"W	6
AN0220	Loantaka Bk	40 46'18.454"N 74 27'38.650"W	6
AN0221	Loantaka Bk	40 44'18.732"N 74 26'45.324"W	6
AN0222	Black Bk	40 44'12.731"N 74 25'21.871"W	6
AN0223	Black Bk	40 42'04.382"N 74 28'33.316"W	6
AN0224	Passaic River	40 39'53.202"N 74 31'46.870"W	6
AN0225	UNT to Dead River	40 39'36.389"N 74 35'38.236"W	6
AN0226	Dead River	40 39'33.466"N 74 35'35.139"W	6
AN0227	Dead River	40 38'59.057"N 74 31'27.144"W	6
AN0227A	Harrison Bk	40 39'32.735"N 74 34'29.289"W	6
AN0228	Passaic River	40 39'40.260"N 74 29'38.065"W	6
AN0229	Passaic River	40 43'33.889"N 74 23'23.214"W	6
AN0230	Passaic River	40 44'03.526"N 74 22'39.059"W	6
AN0231	Passaic River	40 49'39.456"N 74 20'06.290"W	6
AN0231A	Passaic River	40 45'20.634"N 74 21'41.356"W	6
AN0231C	Slough Bk	40 45'30.980"N 74 20'54.443"W	6
AN0231D	Canoe Bk	40 44'55.573"N 74 20'13.149"W	6
AN0231E	Canoe Bk	40 48'05.809"N 74 17'54.170"W	6

Site	Stream	Latitude Longitude	Watershed Management Area
AN0232	Whippany River	40 48'43.679"N 74 34'09.368"W	6
AN0233	Whippany River	40 47'48.489"N 74 31'47.506"W	6
AN0234	Whippany River	40 48'04.916"N 74 27'58.620"W	6
AN0234A	Watnong Ck	40 48'50.455"N 74 29'36.866"W	6
AN0235	Whippany River	40 49'10.367"N 74 26'24.612"W	6
AN0236	Troy Bk	40 52'59.109"N 74 26'40.924"W	6
AN0237	Troy Bk	40 51'15.858"N 74 23'23.564"W	6
AN0238	Whippany River	40 50'43.120"N 74 20'49.381"W	6
AN0238B	Malapardis Bk	40 49'26.015"N 74 25'09.852"W	6
AN0239	Russia Bk	41 01'11.005"N 74 31'39.196"W	6
AN0240	Rockaway River	40 58'37.202"N 74 32'48.873"W	6
AN0241	Rockaway River	40 57'15.173"N 74 34'14.745"W	6
AN0242	Green Pond Bk	40 54'15.750"N 74 34'04.203"W	6
AN0243	Rockaway River	40 52'48.985"N 74 32'00.567"W	6
AN0244	Mill Bk	40 52'43.577"N 74 31'31.161"W	6
AN0245	Beaver Bk	40 56'49.054"N 74 27'37.127"W	6
AN0246	Beaver Bk	40 54'22.084"N 74 29'49.401"W	6
AN0247	Den Bk	40 52'06.634"N 74 31'01.902"W	6
AN0248	Rockaway River	40 53'39.724"N 74 27'47.249"W	6
AN0249	Stony Bk	40 55'43.882"N 74 26'15.152"W	6
AN0250	Rockaway River	40 54'10.719"N 74 24'35.581"W	6
AN0251	Rockaway River	40 53'57.626"N 74 23'17.715"W	6
AN0252	Crooked Bk	40 56'19.068"N 74 22'16.683"W	6
AN0253	Crooked Bk	40 55'36.438"N 74 22'37.966"W	6
AN0254	Crooked Bk	40 53'24.860"N 74 22'24.849"W	6
AN0255	Wanaque River	41 09'48.768"N 74 18'59.963"W	3
AN0255C	Belcher Ck	41 08'15.049"N 74 22'03.055"W	3
AN0255D	Green Bk	41 09'09.430"N 74 21'31.994"W	3
AN0256	Wanaque River	41 02'13.395"N 74 17'09.206"W	3
AN0256A	Meadow Bk	41 02'34.067"N 74 17'08.645"W	3
AN0257	Wanaque River	41 00'26.460"N 74 17'31.708"W	3
AN0258	Pequannock River	41 06'54.993"N 74 30'49.449"W	3

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

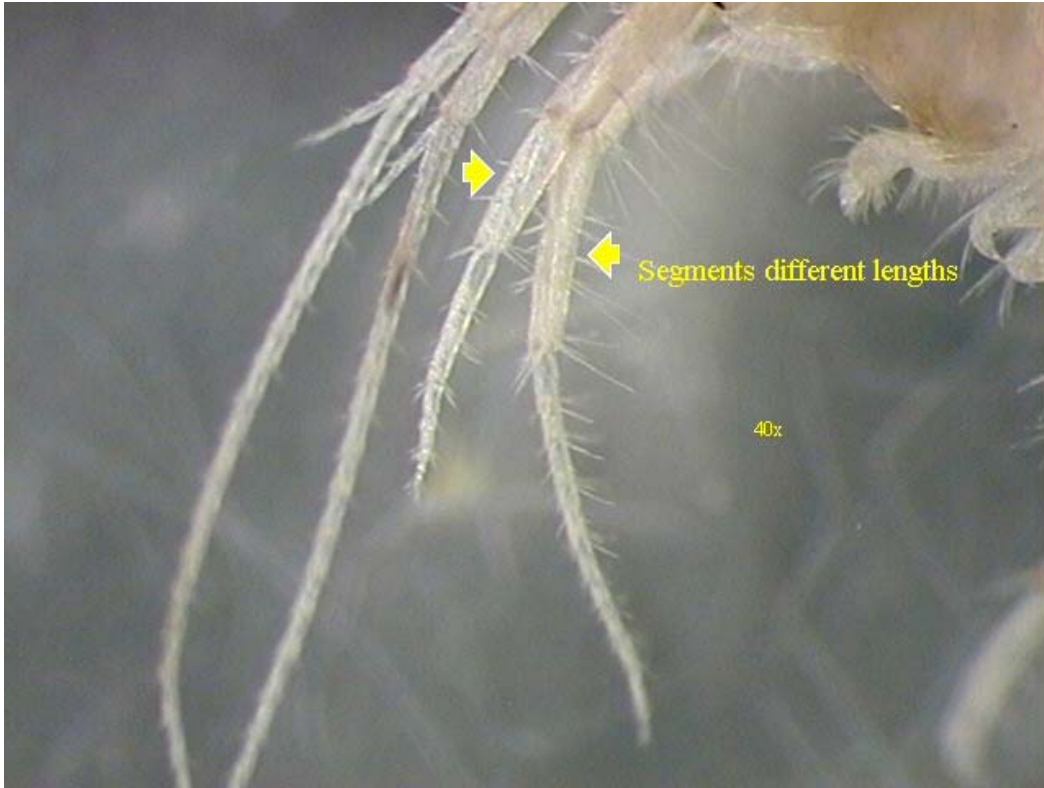
Site	Stream	Latitude Longitude	Watershed Management Area
AN0259	Pequannock River	41 04'41.002"N 74 29'20.652"W	3
AN0260	Mossmans Bk	41 06'24.964"N 74 26'03.736"W	3
AN0261	Clinton Bk	41 03'34.928"N 74 26'25.673"W	3
AN0262	Kanouse Bk	41 02'50.422"N 74 25'47.944"W	3
AN0263	Macopin River	41 02'53.761"N 74 24'21.876"W	3
AN0264	Pequannock River	41 01'06.436"N 74 24'03.801"W	3
AN0265	Pequannock River	41 00'12.371"N 74 20'06.616"W	3
AN0266	Ramapo River	41 05'48.439"N 74 09'55.599"W	3
AN0267	Ramapo River	41 02'08.742"N 74 14'14.638"W	3
AN0268	Pompton River	40 56'36.232"N 74 16'46.240"W	3
AN0269	Dam Bk	40 55'35.622"N 74 17'35.084"W	3
AN0270	Packanack Bk	40 55'58.902"N 74 15'10.028"W	3
AN0271	Deepavaal Bk	40 53'15.211"N 74 15'58.704"W	6
AN0272	Preakness Bk	40 57'26.544"N 74 13'30.102"W	4
AN0273	Preakness Bk	40 54'54.343"N 74 14'32.665"W	4
AN0274	Passaic River	40 53'14.912"N 74 13'25.448"W	4
AN0274A	Passaic River	40 54'03.477"N 74 20'12.800"W	4
AN0275	Peckman River	40 53'31.397"N 74 12'41.327"W	4
AN0275A	Peckman River	40 50'53.502"N 74 14'03.492"W	4
AN0276	Molly Ann Bk	40 54'52.118"N 74 11'25.389"W	4
AN0277	Goffle Bk	40 56'20.372"N 74 09'46.300"W	4
AN0277A	Goffle Bk	40 58'56.275"N 74 08'20.550"W	4
AN0278	Diamond Bk	40 56'52.111"N 74 08'31.064"W	4
AN0279	Saddle River	41 04'16.047"N 74 05'17.748"W	4
AN0280	W Br Saddle River	41 04'24.602"N 74 05'55.421"W	4
AN0281	Saddle River	41 01'54.907"N 74 06'00.568"W	4
AN0282	Saddle River	40 58'21.366"N 74 05'32.790"W	4
AN0283	Hohokus Bk	41 01'33.447"N 74 11'36.944"W	4
AN0284	Valentine Bk	41 01'53.561"N 74 09'08.922"W	4
AN0285	Hohokus Bk	41 01'28.052"N 74 08'11.471"W	4
AN0286	Ramsey Bk	41 04'54.667"N 74 07'22.352"W	4
AN0287	Ramsey Bk	41 01'29.913"N 74 08'09.515"W	4

Site	Stream	Latitude Longitude	Watershed Management Area
AN0288	Hohokus Bk	40 58'24.684"N 74 06'30.629"W	4
AN0289	Saddle River	40 56'46.710"N 74 05'55.372"W	4
AN0290	Saddle River	40 54'12.847"N 74 04'52.155"W	4
AN0291	Saddle River	40 51'50.717"N 74 06'05.631"W	4
AN0292	Third River	40 49'35.858"N 74 08'29.920"W	4
AN0292A	Third River	40 49'59.514"N 74 10'48.078"W	4
AN0292O	Passaic River	40 52'56.729"N 74 07'22.742"W	4
AN0293	Second River	40 46'48.961"N 74 09'03.697"W	4

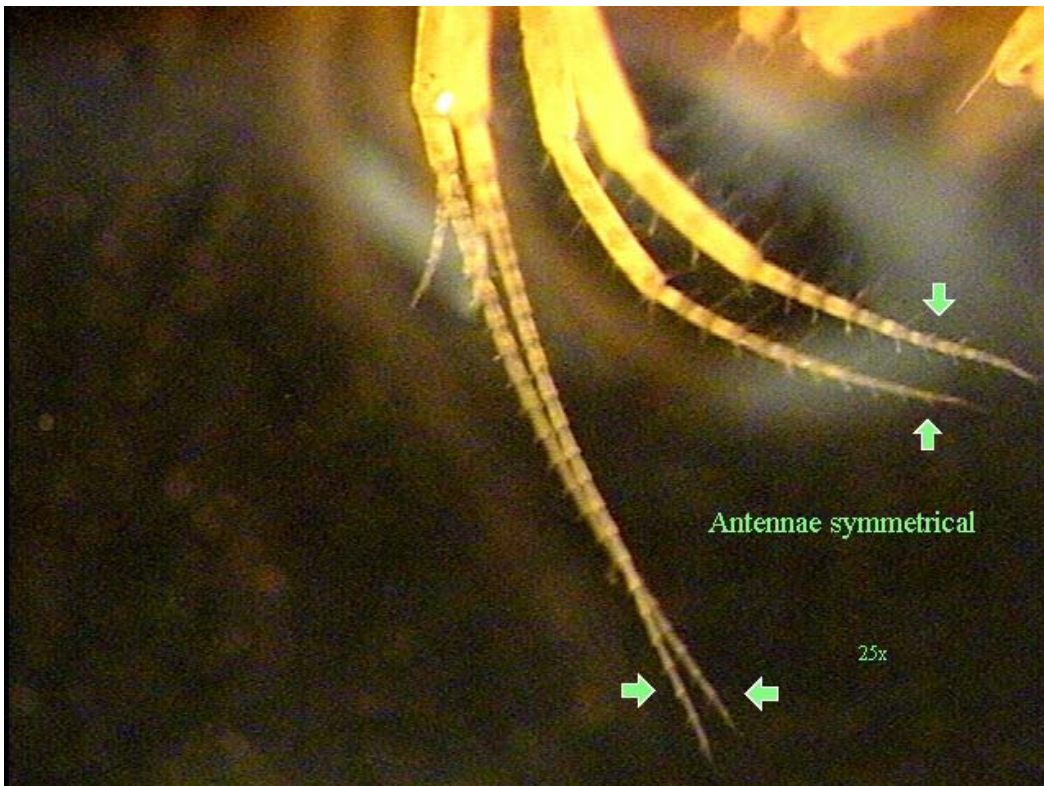
APPENDIX B

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

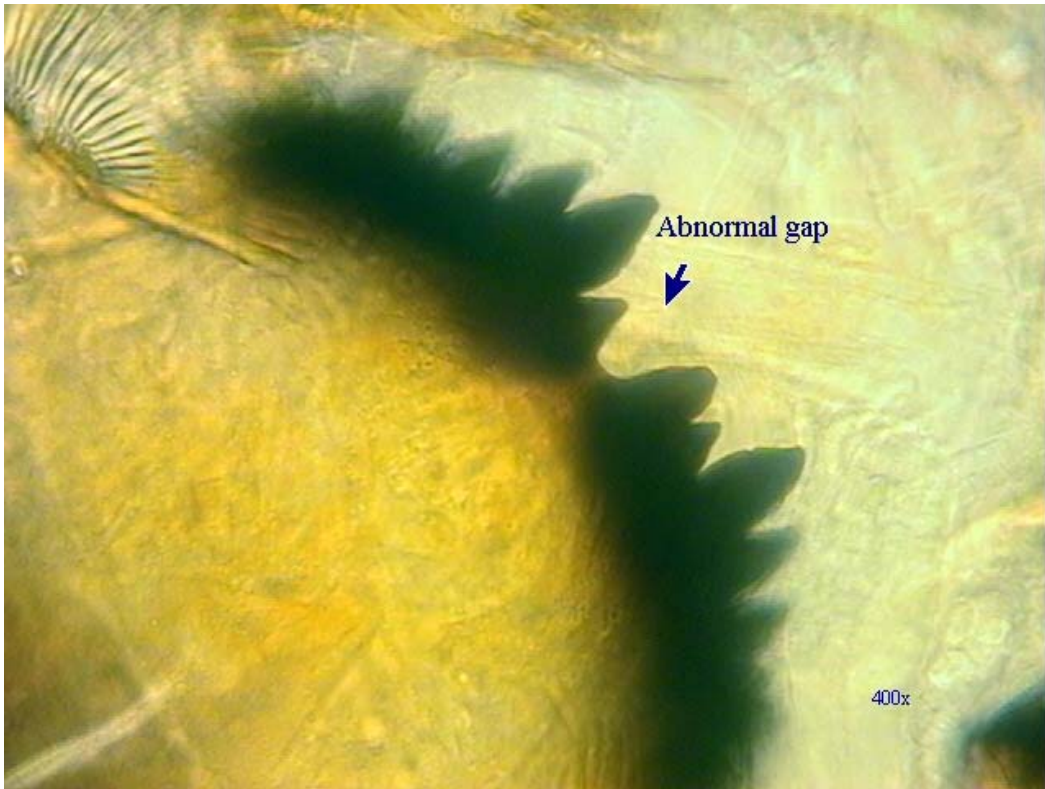
Gammarus fasciatus with second antennae showing different lengths



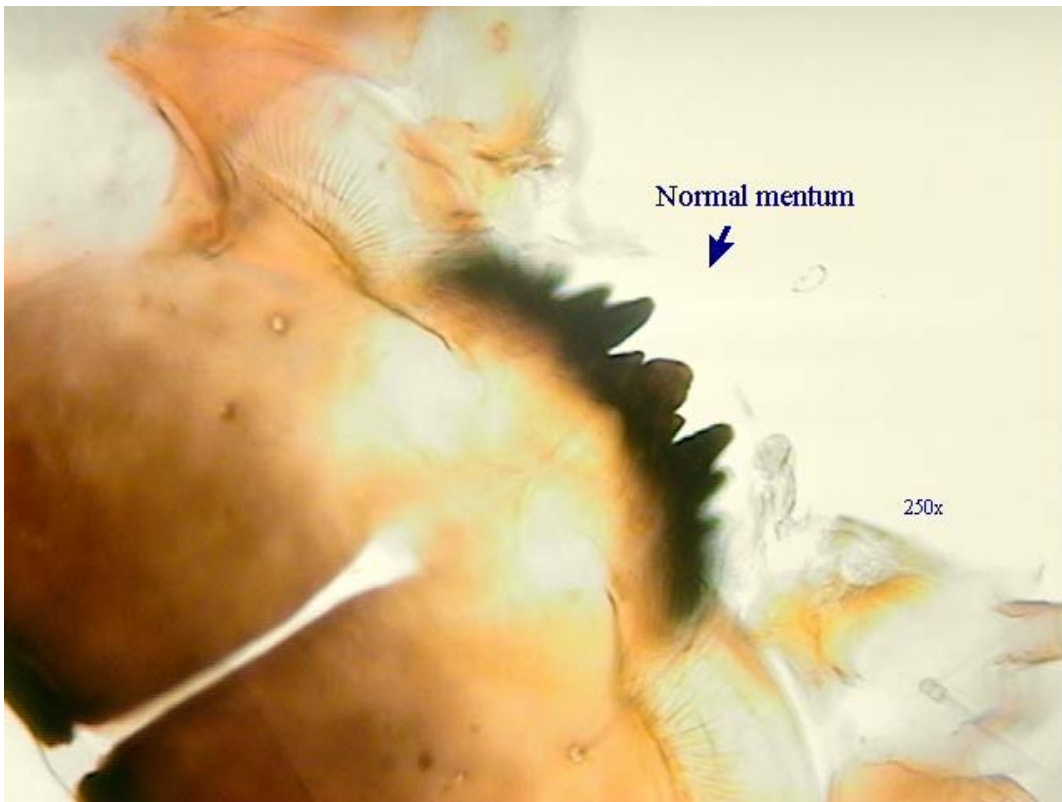
Gammarus fasciatus with normal antennae (showing antennal pairs of same length)



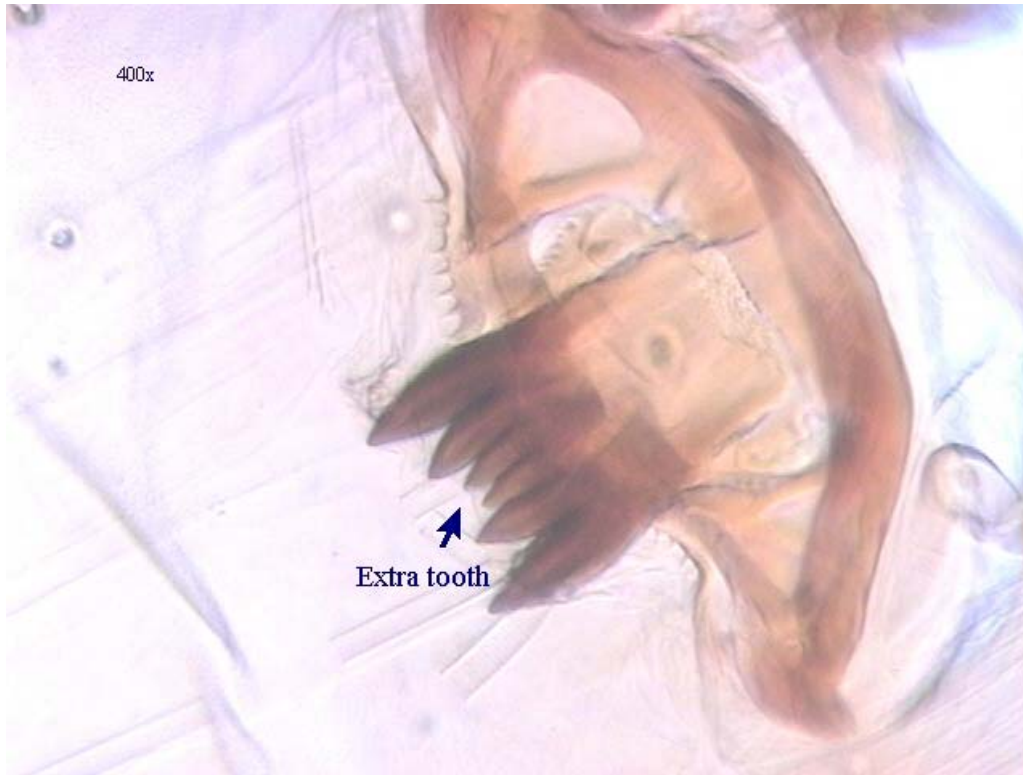
Chironomus species with mentum abnormality



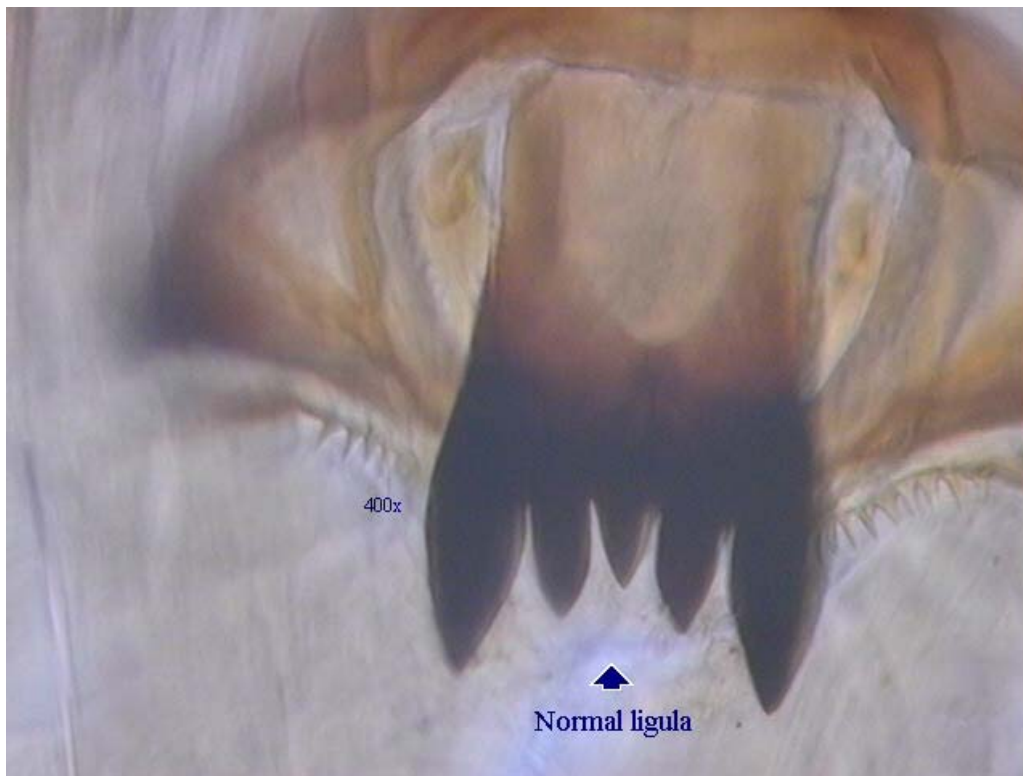
Chironomus species with normal mentum



Procladius species with abnormal ligula



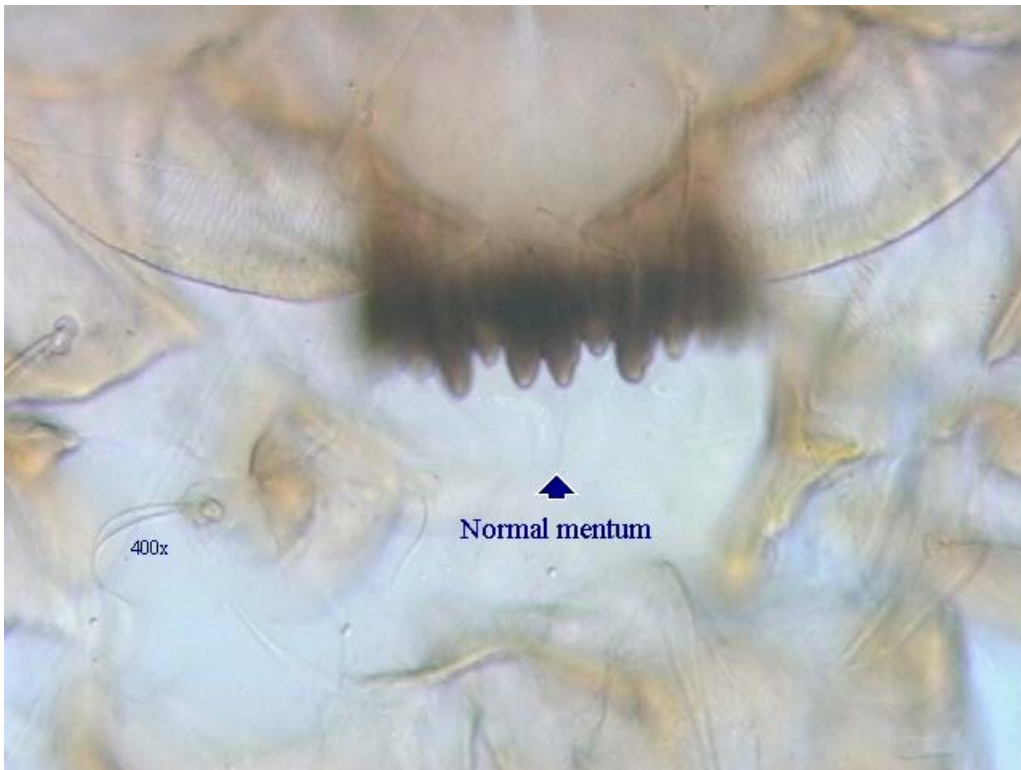
Procladius species with normal ligula



Polypedilum species with abnormal mentum



Polypedilum species with normal mentum

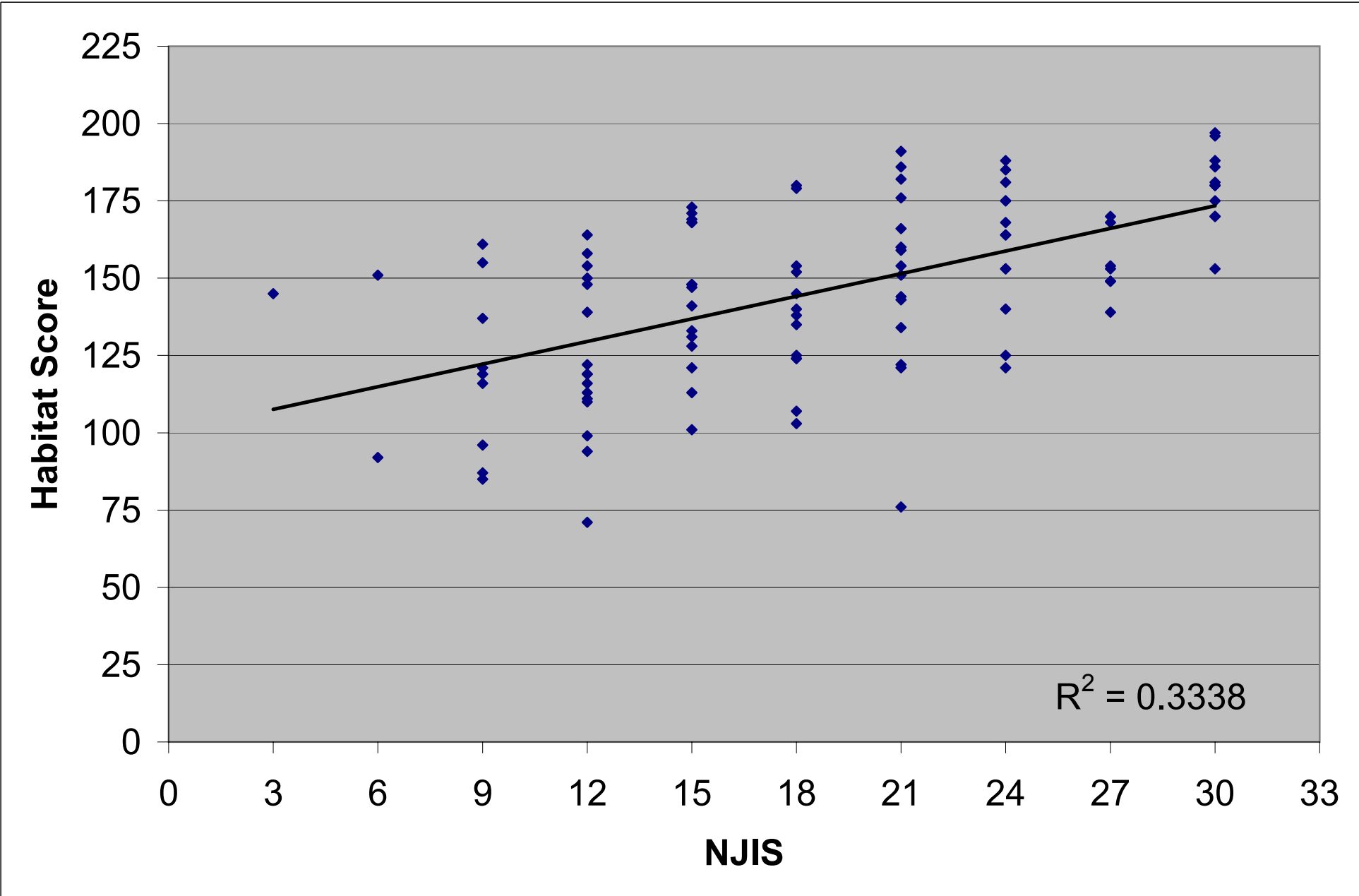


APPENDIX C

Graphical Comparison of New Jersey Impairment Scores versus Habitat Assessment Scores from the Round 3 Northeast Region AMNET Study

Comparative Scores of
HABITAT vs. NJIS

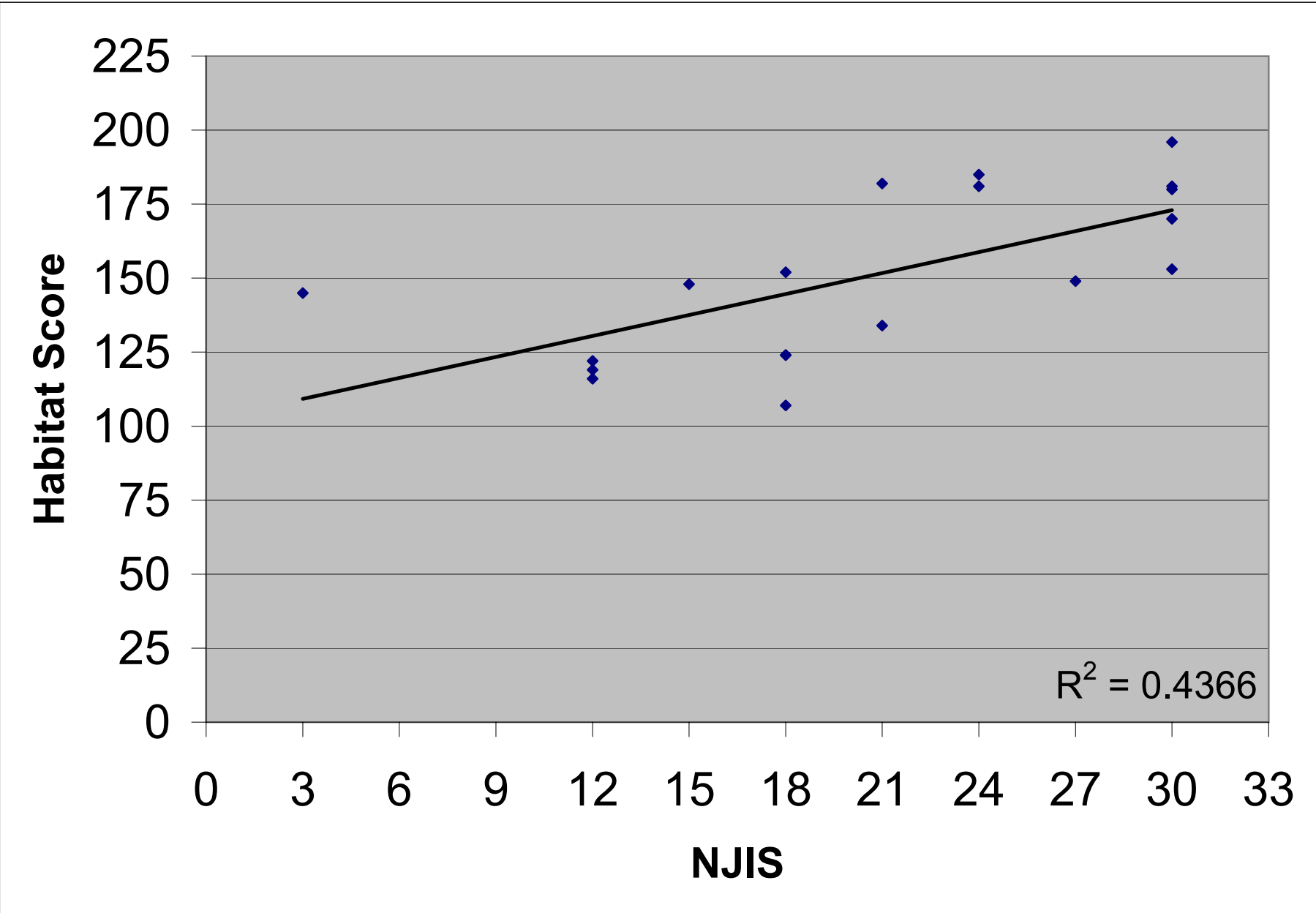
Combined
Rnd 3



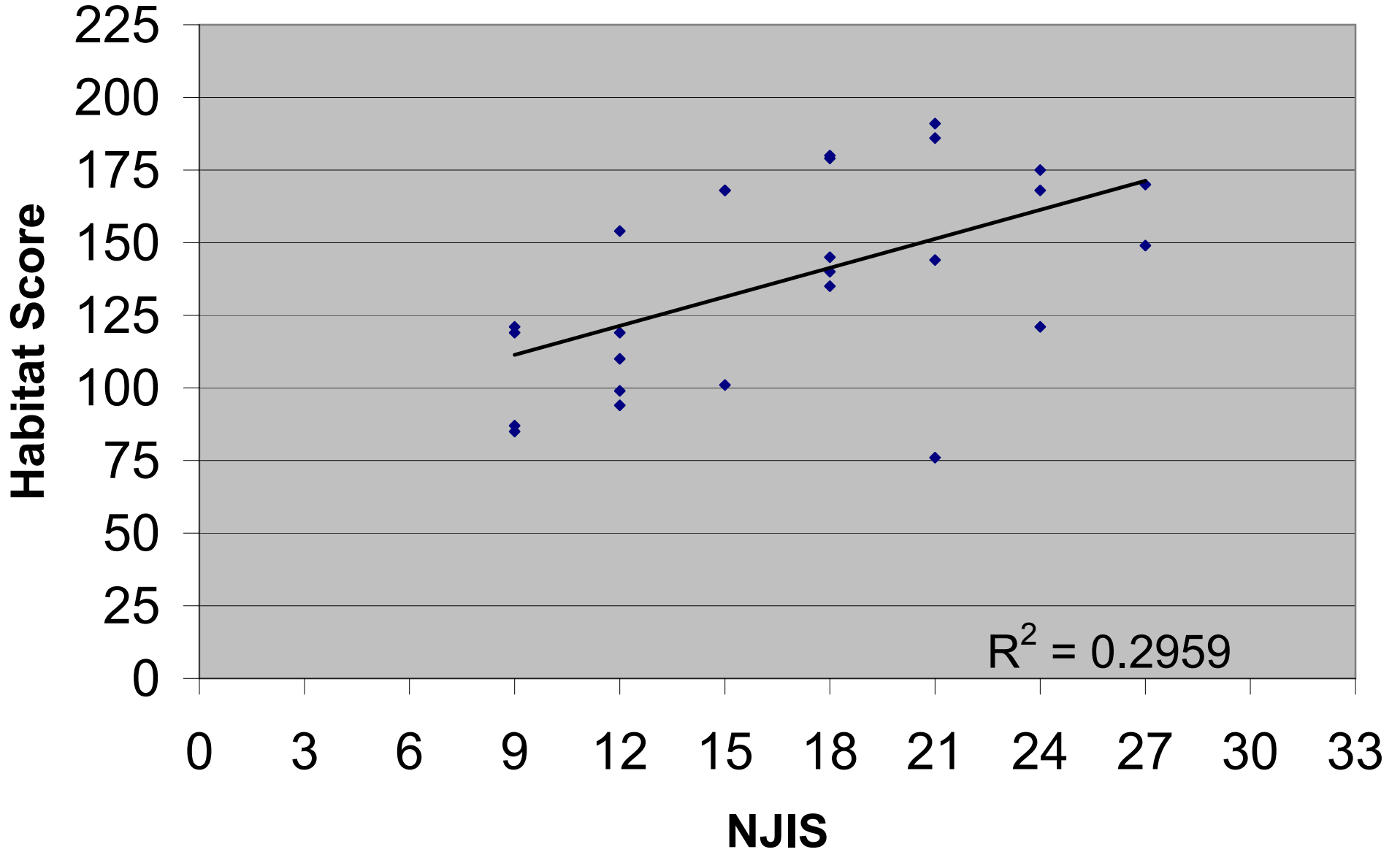
Comparative Scores of
HABITAT vs. NJIS

WMA 3

Rnd 3



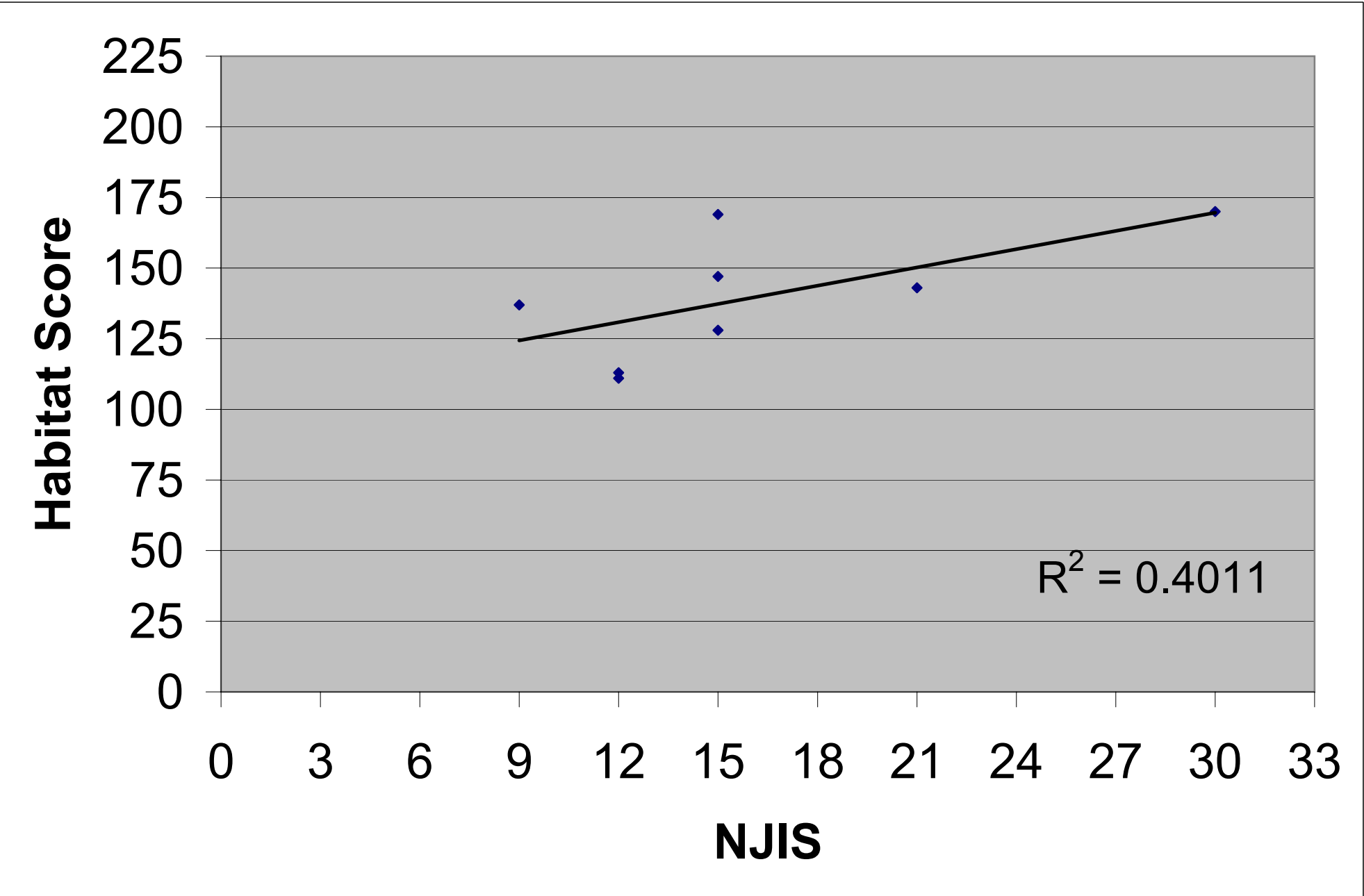
Comparative Scores of
HABITAT vs. NJIS
WMA 4
Rnd 3



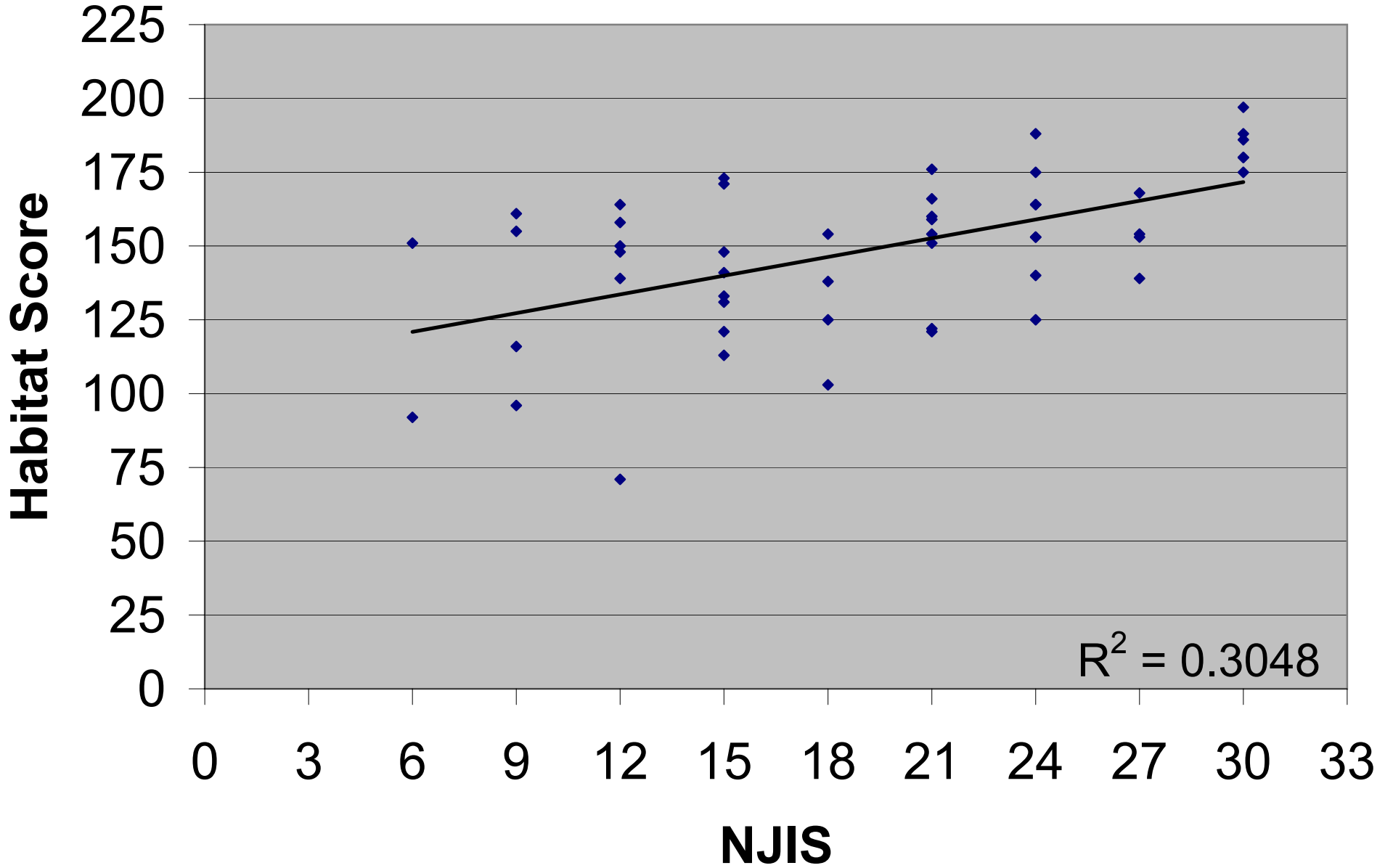
Comparative Scores of
HABITAT vs. NJIS

WMA 5

Rnd 3



Comparative Scores of
HABITAT vs. NJIS
WMA 6
Rnd 3



APPENDIX D

Taxonomic and Statistical Data, NJIS Scores, Habitat Assessment Scores and Observations from the Round 3 Northeast 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 possess 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

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

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
 - Pyalidae
- 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
- Ephydriidae
- Muscidae
- Phoridae
- Psychodidae
- Ptychopteridae
- Sciomyzidae
- Simuliidae
- Stratiomyidae
- Syrphidae
- Tabanidae
- Tanyderidae
- Tipulidae

Phylum MOLLUSCA

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

Station: AN0205
Hackensack River, Old Tappan Rd, Old Tappan Twp, Bergen County
Park Ridge USGS Quadrangle
Date Sampled: 07/08/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	32
Simuliidae	6	24
Gammaridae	4	22
Tubificidae	10	10
Planariidae	4	5
Chironomidae	6	5
BloodRed Chironomidae	8	4
Elmidae	4	4
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 107
% Contribution of Dominant Family: 29.91 % (Hydropsychidae)
Family Biotic Index: 5.29
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 29.91
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 128 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 30 ' / 1 - 2.5 '
Substrate: Cobbles, silt....StreamBank Vegetation/Stability: Trees, shrubs, grass/Poor
Canopy: Mostly Open....Other: Water temp. 21.2 C /pH 7.4 SU /DO 6.3 mg/L /Cond 472
umhos; Suburban. Storm sewers, several flowing.
Very silty around bridge, rocky further downstream. ; Fish observed

Station: AN0206
Musquapsink Brook, Harrington Ave., Westwood Boro, Bergen County
Hackensack USGS Quadrangle
Date Sampled: 07/01/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	35
Chironomidae	6	18
Tubificidae	10	15
Elmidae	4	12
Asellidae	8	9
Sphaeriidae	8	4
Lumbriculidae	8	2
Hydropsychidae	4	1
Physidae	7	1
BloodRed Chironomidae	8	1
Tetrastemmatidae	7	1
Corixidae	9	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 35.00 % (Gammaridae)
Family Biotic Index: 6.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
NJIS Rating: 15
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): 34 ' / 1 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 19.3 C /pH 7.7 SU /DO 6.9 mg/L /Cond 608 umhos; Suburban. School on left bank, sports field on right.
Ducks observed;

Station: AN0207
Pascack Brook, Westwood Ave, Westwood Boro, Bergen County
Hackensack USGS Quadrangle
Date Sampled: 07/01/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	24
Chironomidae	6	23
Asellidae	8	18
Hydropsychidae	4	16
Elmidae	4	9
Baetidae	4	3
Naididae	7	3
Hydroptilidae	4	1
Tipulidae	3	1
BloodRed Chironomidae	8	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 24.00 % (Gammaridae)
Family Biotic Index: 5.32
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 20.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 143 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
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Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 60 ' / 1.8 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Open....Other: Water temp. 20.7 C /pH 7.8 SU /DO 8.1 mg/L /Cond 525
umhos; Suburban. Site downstream of dam at USGS gaging station.
Geese, fish and crayfish observed;

Station: AN0208
Dwars Kill, End Of Anderson Ave, Alpine Boro, Bergen County
Yonkers USGS Quadrangle
Date Sampled: 07/02/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Philopotamidae	3	38
Chironomidae	6	33
Lepidostomatidae	1	11
Leptophlebiidae	2	7
Chloroperlidae	1	2
Perlodidae	2	2
Baetidae	4	1
Hydropsychidae	4	1
Enchytraeidae	10	1
Lumbriculidae	8	1
Elmidae	4	1
Tetrastemmatidae	7	1
Rhyacophilidae	0	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 38.00 % (Philopotamidae)
Family Biotic Index: 3.80
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 63.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 168 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5 ' / < 1.0 '
Substrate: Cobbles, boulders....StreamBank Vegetation/Stability: Trees, shrubs/Poor
Canopy: Closed....Other: Water temp. 16.4 C /pH 7.5 SU /DO 9.4 mg/L /Cond 100 umhos;
Suburban/Forested.
Storm sewers, evidence of old cobble bridge; salamander, minnows and darters observed

Station: AN0209
 Tenakill Brook, Cedar Lane, Closter Boro, Bergen County
 Yonkers USGS Quadrangle
 Date Sampled: 07/01/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	27
BloodRed Chironomidae	8	22
Tubificidae	10	21
Naididae	7	11
Asellidae	8	7
Chironomidae	6	7
Sphaeriidae	8	3
Planorbidae	6	2
Corixidae	9	1
Planariidae	4	1
Lumbriculidae	8	1
Nematoda	6	1
Physidae	7	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 106
 % Contribution of Dominant Family: 25.47 % (Gammaridae)
 Family Biotic Index: 7.01
 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: Turbid....Flow: Slow....Width/Depth (ft): 32 ' / 2
 Substrate: Mud, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
 Canopy: Mostly Closed....Other: Water temp. 22.4 C /pH 7.4 SU /DO 6.8 mg/L /Cond 542
 umhos; Suburban. Storm sewers
 Geese, fish, trash observed;

Station: AN0210
 Dorotockeys Run, Tappan Rd, Harrington Park Boro, Bergen County
 Yonkers USGS Quadrangle
 Date Sampled: 07/02/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	47
BloodRed Chironomidae	8	7
Asellidae	8	6
Sphaeriidae	8	6
Elmidae	4	6
Tubificidae	10	5
Hydropsychidae	4	3
Simuliidae	6	3
Tipulidae	3	2
Planariidae	4	2
Chironomidae	6	2
Hydroptilidae	4	2
Veliidae	9	2
Physidae	7	2
Baetidae	4	1
Ancylidae	6	1
Plagiostomidae	4	1
Planorbidae	6	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 47.00 % (Gammaridae)
 Family Biotic Index: 5.37
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 6.00
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 169 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10 ' / < 1.0 - 1.0 '
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
 Canopy: Mostly Open....Other: Water temp. 19.8 C /pH 8.0 SU /DO 8.2 mg/L /Cond 613
 umhos; Suburban. Storm sewers
 New condominium development adjacent to stream;

Station: AN0211
Van Saun Brook, Main St & Rt 4, Hackensack, Bergen County
Hackensack USGS Quadrangle
Date Sampled: 07/08/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	28
Tubificidae	10	22
BloodRed Chironomidae	8	16
Asellidae	8	12
Hydropsychidae	4	10
Simuliidae	6	8
Naididae	7	4
Planariidae	4	4
Sphaeriidae	8	2
Nematoda	6	1
Physidae	7	1
Glossiphoniidae	8	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 109
% Contribution of Dominant Family: 25.69 % (Chironomidae)
Family Biotic Index: 7.17
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 9.17
NJIS Rating: 12
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): 23 ' / 1.0 - 1.5 '
Substrate: Cobbles, silt....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
Canopy: Mostly Closed....Other: Water temp. 24.4 C /pH 7.7 SU /DO 5.7 mg/L /Cond 830 umhos; Suburban. Storm sewers. USGS gauge station
Filamentous algae and fish observed;

Station: AN0212
Overpeck Ck, Dean Dr, Englewood, Bergen County
Yonkers USGS Quadrangle
Date Sampled: 07/02/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	45
Naididae	7	27
Simuliidae	6	12
BloodRed Chironomidae	8	7
Enchytraeidae	10	5
Tubificidae	10	2
Philopotamidae	3	1
Hydropsychidae	4	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Chironomidae)
Family Biotic Index: 6.64
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 137 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 33/<1-1.0
Substrate: Cobbles/ Gravel/ Sand....StreamBank Vegetation/Stability: Trees/ Shrubs/Fair
Canopy: Mostly Closed....Other: Water Temp 17.7C / pH 7.5SU / DO 9.3mg/L / Cond
520umhos; Suburban / Storm Sewers / Minnows /
Downstream of cemetery / Channelized on Left & Right; banks downstream of RR bridge.

Station: AN0213
Passaic River, Tempe Wicke Rd, Mendham Twp, Morris County
Mendham USGS Quadrangle
Date Sampled: 07/22/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	45
Elmidae	4	41
Asellidae	8	2
Philopotamidae	3	2
Planariidae	4	2
Empididae	6	2
Heptageniidae	4	2
Chironomidae	6	1
Leptoceridae	4	1
Piscicolidae	7	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Hydropsychidae)
Family Biotic Index: 4.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 50.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 175 (Optimal) USEPA Protocol
Deficiency(s) noted:
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Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 24 ' / 1 - 2 '
Substrate: Cobbles, gravel, snags....StreamBank Vegetation/Stability: Trees, grass, shrubs/Poor
Canopy: Mostly Closed....Other: Water temp. 20.4 C /pH 7.5 SU /DO 7.6 mg/L /Cond 235 umhos; Rural / forested

Station: AN0214
 Indian Grave Brook, Hardscrabble Rd N Of Old Army Rd, Bernardsville Boro, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 07/22/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	23
Hydropsychidae	4	20
Psephenidae	4	10
Elmidae	4	9
Oligoneuriidae	2	7
Heptageniidae	4	7
Baetidae	4	6
Perlidae	1	4
Ephemerellidae	1	3
Lumbriculidae	8	3
Tipulidae	3	2
Philopotamidae	3	2
Corydalidae	0	2
Tetrastemmatidae	7	2
Limnephilidae	4	1
Asellidae	8	1
Glossosomatidae	0	1
Empididae	6	1
Hydroptilidae	4	1
Leuctridae	0	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 107
 % Contribution of Dominant Family: 21.50 % (Chironomidae)
 Family Biotic Index: 4.17
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
 % EPT: 49.53
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 197 (Optimal) USEPA Protocol
 Deficiency(s) noted:
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Observations

Streamwater: Slightly Turbid....Flow: Fast....Width/Depth (ft): 17 ' / < 1.0 - 1.5 '
 Substrate: Cobbles, snags....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
 Canopy: Partly Open....Other: Water temp. 19.7 C /pH 7.7 SU /DO 8.4 mg/L /Cond 188
 umhos; Rural / forested
 odd chemical odor;

Station: AN0215
 Primrose Brook, Jockey Hollow Rd In Morristown Nat His Pk, Harding Twp, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 07/22/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Leuctridae	0	20
Chironomidae	6	14
Lumbriculidae	8	11
Elmidae	4	9
Philopotamidae	3	7
Simuliidae	6	6
Rhyacophilidae	0	5
Hydropsychidae	4	4
Lepidostomatidae	1	3
Peltoperlidae	1	3
Baetidae	4	2
Tipulidae	3	2
Limnephilidae	4	2
Gomphidae	1	2
Chloroperlidae	1	2
Tabanidae	6	2
Empididae	6	1
Planariidae	4	1
Helicopsychidae	3	1
Leptophlebiidae	2	1
BloodRed Chironomidae	8	1
Pteronarcyidae	0	1

Statistical Analysis

Number of Taxa: 22
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 20.00 % (Leuctridae)
 Family Biotic Index: 3.48
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
 % EPT: 51.00
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 180 (Optimal) USEPA Protocol
 Deficiency(s) noted:
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Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 5 ' / < 1.0 - 1 '
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees/Fair
 Canopy: Mostly Closed....Other: Water temp. 16.0 C /pH 7.5 SU /DO 9.5 mg/L /Cond 95 umhos; Rural / forested (Jockey Hollow St. Park)
 Banks upstream eroded; Salamanders observed

Station: AN0216
 Primrose Brook, Lees Mill Rd, Harding Twp, Morris County
 Bernardsville USGS Quadrangle
 Date Sampled: 07/22/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	46
Chironomidae	6	13
Asellidae	8	9
Tubificidae	10	8
Elmidae	4	5
Leptoceridae	4	5
Sphaeriidae	8	5
Hydropsychidae	4	2
Empididae	6	2
Physidae	7	2
Heptageniidae	4	2
Gerridae	8	1
Aeshnidae	3	1
Calopterygidae	5	1
Gomphidae	1	1
Leuctridae	0	1
Psychomyiidae	2	1
Limnephilidae	4	1
Simuliidae	6	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 20
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 42.59 % (Gammaridae)
 Family Biotic Index: 5.31
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 11.11
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 121 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
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Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 15 ' / 1 - 2 '
 Substrate: Cobbles, gravel, clay....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
 Canopy: Partly Open....Other: Water temp. 20.7 C /pH 7.5 SU /DO 8.2 mg/L /Cond 140 umhos; Rural
 Mostly clay substrate;

Station: AN0217
 Great Brook, Blackwells Place Near Sand Spring Rd, Harding Twp, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 07/22/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Lumbriculidae	8	32
Tipulidae	3	18
Chironomidae	6	8
Hydropsychidae	4	8
Elmidae	4	7
Baetidae	4	5
Glossosomatidae	0	5
Leuctridae	0	4
Simuliidae	6	4
Philopotamidae	3	3
Lumbricidae	10	3
Corydalidae	0	2
Perlidae	1	2
Planariidae	4	1
Lepidostomatidae	1	1
Naididae	7	1
Leptophlebiidae	2	1

Statistical Analysis

Number of Taxa: 17
 Total Number of Individuals: 105
 % Contribution of Dominant Family: 30.48 % (Lumbriculidae)
 Family Biotic Index: 4.92
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
 % EPT: 27.62
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 139 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
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Observations

Streamwater: Slightly Turbid....Flow: Fast....Width/Depth (ft): 4 ' / < 1.0 - 1.5 '
 Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Grasses, shrubs, trees/Poor
 Canopy: Mostly Closed....Other: Water temp. 17.1 C /pH 7.6 SU /DO 9.4 mg/L /Cond 324 umhos; Rural. Storm sewers; Salamanders observed

Station: AN0218
 Great Brook, Blackberry Lane Rd Near Rt I-287, Harding Twp, Morris County
 Morristown USGS Quadrangle
 Date Sampled: 07/24/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	33
Asellidae	8	26
Sphaeriidae	8	11
Glossiphoniidae	8	6
Elmidae	4	5
Tubificidae	10	5
Chironomidae	6	4
Plagiostomidae	4	3
BloodRed Chironomidae	8	2
Hydrobiidae	8	1
Hydropsychidae	4	1
Planorbidae	6	1
Nematoda	6	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 33.00 % (Gammaridae)
 Family Biotic Index: 6.29
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 1.00
 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: Moderate....Width/Depth (ft): 15 ' / 1 '
 Substrate: Gravel/sand, mud, silt....StreamBank Vegetation/Stability: Trees, grass/Fair
 Canopy: Closed....Other: Water temp. 22.4 C /pH 7.2 SU /DO 6.0 mg/L /Cond 423 umhos;
 Suburban. Storm sewers
 parking lot on left side of stream.; frogs observed

Station: AN0219
 Great Brook, End Of Woodland Rd, Chatham Twp, Morris County
 Chatham USGS Quadrangle
 Date Sampled: 07/24/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	52
Tubificidae	10	25
Hydropsychidae	4	6
BloodRed Chironomidae	8	6
Sphaeriidae	8	5
Pyralidae	5	3
Physidae	7	2
Asellidae	8	1
Planariidae	4	1
Naididae	7	1
Unionidae	8	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 103
 % Contribution of Dominant Family: 50.49 % (Gammaridae)
 Family Biotic Index: 6.08
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 5.83
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 164 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 17 ' / 3 '
 Substrate: Cobbles, gravel/sand, mud, silt....StreamBank Vegetation/Stability: Trees, shrubs/Good
 Canopy: Mostly Open....Other: Water temp. 22.3 C /pH 7.0 SU /DO 5.7 mg/L /Cond 288 umhos; Forested. Great Swamp Wildlife refuge.
 Fish and macrophytes observed;

Station: AN0220
Loantaka Brook, Bluestone Terrace, Morristown, Morris County
Morristown USGS Quadrangle
Date Sampled: 07/24/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	50
Hydropsychidae	4	13
Tubificidae	10	10
BloodRed Chironomidae	8	8
Sphaeriidae	8	6
Planorbidae	6	5
Chironomidae	6	3
Coenagrionidae	9	2
Physidae	7	2
Planariidae	4	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 50.00 % (Gammaridae)
Family Biotic Index: 5.48
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 13.00
NJIS Rating: 12
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): 15 ' / 1 '
Substrate: Gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 21.6 C /pH 7.2 SU /DO 7.1 mg/L /Cond 863
umhos; Suburban. Storm sewers
bike path along left bank;

Station: AN0221
Loantaka Brook, Green Village Rd, Harding Twp, Morris County
Chatham USGS Quadrangle
Date Sampled: 07/24/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	18
Tubificidae	10	18
Elmidae	4	17
Sphaeriidae	8	15
BloodRed Chironomidae	8	9
Tipulidae	3	6
Chironomidae	6	6
Hydropsychidae	4	4
Lumbricidae	10	2
Gerridae	8	1
Coenagrionidae	9	1
Veliidae	9	1
Physidae	7	1
Planariidae	4	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 18.00 % (Gammaridae & Tubificidae)
Family Biotic Index: 6.39
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 4.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 131 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 30 ' / 1 '
Substrate: Gravel/sand, mud, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 22.4 C /pH 7.6 SU /DO 7.5 mg/L /Cond 554
umhos; Suburban

Station: AN0222
 Black Brook, Southern Blvd, Harding Twp, Morris County
 Chatham USGS Quadrangle
 Date Sampled: 7/24/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	29
Sphaeriidae	8	25
Planariidae	4	15
Naididae	7	12
BloodRed Chironomidae	8	5
Physidae	7	4
Chironomidae	6	4
Planorbidae	6	2
Asellidae	8	1
Simuliidae	6	1
Coenagrionidae	9	1
Glossiphoniidae	8	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 29.00 % (Tubificidae)
 Family Biotic Index: 7.69
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
 % EPT: 0.00
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 139 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8 ' / < 1.0 '
 Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability: Trees, shrubs/Fair
 Canopy: Closed....Other: Water temp. 24.9 C /pH 7.1 SU /DO 5.6 mg/L /Cond 355 umhos;
 Suburban. Outlet of pond from golf course
 Golf course upstream and adjacent to left bank. ; Storm sewers

Station: AN0223
Black Brook, New Vernon Rd, Passaic Twp, Morris County
Chatham USGS Quadrangle
Date Sampled: 07/31/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	58
Tubificidae	10	14
BloodRed Chironomidae	8	11
Sphaeriidae	8	6
Physidae	7	5
Glossiphoniidae	8	3
Ceratopogonidae	6	1
Gammaridae	4	1
Chironomidae	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 58.00 % (Asellidae)
Family Biotic Index: 8.15
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 151 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear, cedar brown....Flow: Moderate....Width/Depth (ft): 45 ' / 1.5 - 2 '
Substrate: Sand, silt, snags....StreamBank Vegetation/Stability: Grasses, trees/Fair
Canopy: Mostly Open....Other: Water temp. 21.0 C /pH 6.7 SU /DO 0.63 mg/L /Cond 315
umhos; Forested. Great Swamp Nat Wildlife Refuge
Frogs and fish; oily sheen seen on surface;

Station: AN0224
 Passaic River, Passaic Valley Rd (Rt 512), Passaic Twp, Morris County
 Bernardsville USGS Quadrangle
 Date Sampled: 09/09/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	18
Chironomidae	6	18
Elmidae	4	17
Tubificidae	10	12
Hydropsychidae	4	10
Tabanidae	6	8
BloodRed Chironomidae	8	5
Psephenidae	4	4
Tetrastemmatidae	7	2
Heptageniidae	4	2
Corydalidae	0	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 98
 % Contribution of Dominant Family: 18.37 % (Gammaridae & Chironomidae)
 Family Biotic Index: 5.51
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 12.24
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 154 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 63 ' / 1 - 2 '
 Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
 Canopy: Mostly Open....Other: Water temp.18.8 C /pH 7.5 SU /DO 6.4 mg/L /Cond 316 umhos;
 Suburban. Storm sewers
 Macrophytes observed;

Station: AN0225
Unt To Dead River, Off Somerville Rd Upstream Of Site An0226, Bernards Twp, Somerset
County
Bernardsville USGS Quadrangle
Date Sampled: 07/31/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	46
Planariidae	4	13
Tubificidae	10	13
Chironomidae	6	11
Elmidae	4	10
Tipulidae	3	2
Hydropsychidae	4	2
Collembola	10	2
Limnephilidae	4	1
Asellidae	8	1
Cambaridae	5	1
Gerridae	8	1
Leuctridae	0	1
Lumbriculidae	8	1
Psephenidae	4	1
Veliidae	9	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 107
% Contribution of Dominant Family: 42.99 % (Gammaridae)
Family Biotic Index: 5.16
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 3.74
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 173 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 1.5 ' / < 1.0 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Grasses, weeds,
trees/Good
Canopy: Mostly Closed....Other: Water temp. 18.7 C /pH 8.0 SU /DO 9.7 mg/L /Cond 483
umhos; Suburban / forested
Minnows observed;

Station: AN0226
 Dead River, Off Somerville Rd, Opp Shannon Hill Rd, Bernards Twp, Somerset County
 Bernardsville USGS Quadrangle
 Date Sampled: 07/31/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	76
Chironomidae	6	7
Psephenidae	4	7
Elmidae	4	5
Hydropsychidae	4	3
Sphaeriidae	8	2
Baetidae	4	1
Asellidae	8	1
Hydroptilidae	4	1
Physidae	7	1
Psychomyiidae	2	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 106
 % Contribution of Dominant Family: 71.70 % (Gammaridae)
 Family Biotic Index: 4.27
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 5.66
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 171 (Optimal) USEPA Protocol
 Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 4.5 ' / < 1.0 - 1.0 '
 Substrate: Cobbles, gravel, silt....StreamBank Vegetation/Stability: Grasses, trees/Fair
 Canopy: Open....Other: Water temp. 20.7 C /pH 8.1 SU /DO 9.0 mg/L /Cond 456 umhos;
 Suburban / forested
 Periphyton, filamentous algae, minnows and crayfish observed;

Station: AN0227
Dead River, King George Rd (Rt 651), Warren Twp, Somerset County
Bernardsville USGS Quadrangle
Date Sampled: 07/31/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	54
Tubificidae	10	14
Physidae	7	9
Corixidae	9	9
Chironomidae	6	6
Asellidae	8	3
Elmidae	4	2
Culicidae	8	1
Ceratopogonidae	6	1
Plagiostomidae	4	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 54.00 % (Gammaridae)
Family Biotic Index: 5.86
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 96 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 36 ' / 2 '
Substrate: Mud, silt....StreamBank Vegetation/Stability: Grasses, trees/Poor
Canopy: Open....Other: Water temp. 20.3 C /pH 7.5 SU /DO 6.6 mg/L /Cond 570 umhos;
Suburban. STP upstream.
Macrophytes, catfish, minnows, frogs and crayfish observed;

Station: AN0227A
 Harrison Brook, Off Valley Rd (Ballfield), Bernards Twp, Somerset County
 Bernardsville USGS Quadrangle
 Date Sampled: 08/07/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	55
Chironomidae	6	11
Elmidae	4	10
BloodRed Chironomidae	8	5
Baetidae	4	4
Hydropsychidae	4	3
Naididae	7	2
Tubificidae	10	2
Coenagrionidae	9	1
Aeshnidae	3	1
Asellidae	8	1
Caenidae	7	1
Curculionidae	7	1
Planorbidae	6	1
Lumbriculidae	8	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 55.00 % (Gammaridae)
 Family Biotic Index: 4.84
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 8.00
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 138 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 30 ' / 1 '
 Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Poor
 Canopy: Mostly Closed....Other: Water temp.20.2 C /pH 7.6 SU /DO 7.6 mg/L /Cond 380
 umhos; Suburban / Forested. Storm sewers
 Little league ball field on right side of stream;

Station: AN0228
 Passaic River, S. Main Ave & Myers Rd, Passaic Twp, Morris County
 Chatham USGS Quadrangle
 Date Sampled: 09/09/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Heptageniidae	4	16
Elmidae	4	13
Gammaridae	4	12
Tubificidae	10	12
Chironomidae	6	10
Coenagrionidae	9	9
BloodRed Chironomidae	8	9
Hydropsychidae	4	8
Asellidae	8	7
Sphaeriidae	8	5
Glossiphoniidae	8	1
Sialidae	4	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 103
 % Contribution of Dominant Family: 15.53 % (Heptageniidae)
 Family Biotic Index: 6.18
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 23.30
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 125 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 50 ' / 2 - 2.5 '
 Substrate: Cobbles, silt....StreamBank Vegetation/Stability: Trees, grass, shrubs/Poor
 Canopy: Partly Open....Other: Water temp. 18.3 C /pH 7.5 SU / DO 6.5 mg/L /Cond 349
 umhos; Forested
 extreme scouring of banks; drainage ditch adjacent to road

Station: AN0229
 Passaic River, Stanley Ave, Chatham Twp, Morris/Union County
 Chatham USGS Quadrangle
 Date Sampled: 09/09/03

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	28
Gammaridae	4	24
Chironomidae	6	10
Ancylidae	6	9
Tubificidae	10	9
Sphaeriidae	8	8
Planorbidae	6	3
Elmidae	4	3
Asellidae	8	2
Hydropsychidae	4	2
Glossiphoniidae	8	2
Planariidae	4	2
Heptageniidae	4	2
Gerridae	8	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 105
 % Contribution of Dominant Family: 26.67 % (BloodRed Chironomidae)
 Family Biotic Index: 6.50
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 3.81
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 141 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 93 ' / 3 '
 Substrate: Gravel, sand, silt....StreamBank Vegetation/Stability: Trees, grass, shrubs/Fair
 Canopy: Open....Other: Water temp. 19.3 C /pH 7.5 SU /DO 6.2 mg/L /Cond 380 umhos;
 Suburban / forested (located in Park). USGS gage and weir
 Stone retaining wall on left bank. Drainage ditch draining parking lot; Macrophytes

Station: AN0230
Passaic River, Summit Ave & Chatham Rd, Chatham Twp, Morris & Union County
Chatham USGS Quadrangle
Date Sampled: 09/09/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	46
Gammaridae	4	22
Elmidae	4	16
Hydroptilidae	4	5
Chironomidae	6	5
Planariidae	4	2
Tetrastemmatidae	7	2
Psephenidae	4	1
Sphaeriidae	8	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 101
% Contribution of Dominant Family: 45.54 % (Hydropsychidae)
Family Biotic Index: 4.20
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 51.49
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 154 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 68 ' / 3 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Partly Open....Other: Water temp. 19.7 C /pH 7.6 SU /DO 8.2 mg/L /Cond 377 umhos; Suburban / Industrial. Storm sewers
Site adjacent to Central Jersey Power & Light station; New housing development adjacent to left bank

Station: AN0231
Passaic River, Eagle Rock Ave, East Hanover Twp, Morris / Essex County
Caldwell USGS Quadrangle
Date Sampled: 09/11/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	38
BloodRed Chironomidae	8	19
Corixidae	9	12
Tubificidae	10	11
Asellidae	8	9
Tetrastemmatidae	7	8
Elmidae	4	3
Chironomidae	6	2
Coenagrionidae	9	1
Planariidae	4	1
Physidae	7	1
Sphaeriidae	8	1
Gerridae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 107
% Contribution of Dominant Family: 35.51 % (Gammaridae)
Family Biotic Index: 6.64
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 121 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 100 ' / 2 '
Substrate: Sand, silt....StreamBank Vegetation/Stability: Grasses, trees, shrubs/Poor
Canopy: Open....Other: Water temp. 19.8 C /pH 6.9 SU /DO 5.2 mg/L /Cond 467 umhos;
Suburban
crayfish observed;

Station: AN0231A
Passaic River, Passaic Avenue, Chatham Twp, Morris And Essex County
Caldwell USGS Quadrangle
Date Sampled: 06/24/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	51
Gammaridae	4	9
Glossiphoniidae	8	9
BloodRed Chironomidae	8	9
Chironomidae	6	6
Elmidae	4	6
Sphaeriidae	8	6
Asellidae	8	3
Corixidae	9	3
Plagiostomidae	4	2
Coenagrionidae	9	1
Philopotamidae	3	1
Corbiculidae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 107
% Contribution of Dominant Family: 47.66 % (Tubificidae)
Family Biotic Index: 8.20
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.93
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 116 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 96' / 3'
Substrate: Mud, Silt....StreamBank Vegetation/Stability: Trees, Weeds/Fair
Canopy: Mostly Open....Other: Water temp. 21.7 C / pH 7.3 SU / DO 7.3 mg/L / Cond. 485
umhos; Suburban, Forested
fish, crayfish present

Station: AN0231C
Slough Brook, Parsonage Hill Rd, Millburn Twp, Essex County
Caldwell USGS Quadrangle
Date Sampled: 08/07/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	27
Physidae	7	26
Chironomidae	6	22
Baetidae	4	13
BloodRed Chironomidae	8	13
Hydropsychidae	4	3
Lymnaeidae	6	1
Sphaeriidae	8	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 107
% Contribution of Dominant Family: 25.23 % (Tubificidae)
Family Biotic Index: 7.21
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 14.95
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: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 15 ' / 1 '
Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Closed....Other: Water temp. 21.7 C /pH 7.1 SU /DO 6.5 mg/L /Cond 197 umhos; Suburban / forested. Storm sewers
trash, fish observed;

Station: AN0231D
 Canoe Brook, Parsonage Hill Rd, Millburn Twp, Essex County
 Roselle USGS Quadrangle
 Date Sampled: 08/07/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	34
Gammaridae	4	29
Ancylidae	6	9
Chironomidae	6	7
BloodRed Chironomidae	8	4
Veliidae	9	3
Collembola	10	2
Lumbriculidae	8	2
Sphaeriidae	8	2
Elmidae	4	2
Baetidae	4	1
Leptoceridae	4	1
Erpobdellidae	8	1
Lymnaeidae	6	1
Simuliidae	6	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 34.00 % (Hydropsychidae)
 Family Biotic Index: 5.02
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 36.00
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 164 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27 ' / 1 '
 Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Good
 Canopy: Mostly Closed....Other: Water temp. 23.3 C /pH 7.4 SU /DO 6.5 mg/L /Cond 304
 umhos; Suburban. Storm sewers. Water supply pumping station
 crayfish observed;

Station: AN0231E
 Canoe Brook, E. McClellan St, Livingston Twp, Essex County
 Caldwell USGS Quadrangle
 Date Sampled: 08/07/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	35
Chironomidae	6	29
Baetidae	4	23
Hydroptilidae	4	5
Simuliidae	6	3
Erpobdellidae	8	2
Tetrastemmatidae	7	2
Calopterygidae	5	1
Lumbriculidae	8	1
Enchytraeidae	10	1
Glossiphoniidae	8	1
Glossosomatidae	0	1
Planorbidae	6	1
Lumbricidae	10	1
Tipulidae	3	1
BloodRed Chironomidae	8	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 17
 Total Number of Individuals: 109
 % Contribution of Dominant Family: 32.11 % (Hydropsychidae)
 Family Biotic Index: 4.95
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 58.72
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 153 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12 ' / < 1.0 '
 Substrate: Cobbles, gravel/sand, boulders....StreamBank Vegetation/Stability: Trees, shrubs/Fair
 Canopy: Mostly Closed....Other: Water temp. 21.5 C /pH 7.7 SU /DO 8.1 mg/L /Cond 366 umhos; Suburban.
 Storm sewers;

Station: AN0232
 Whippany River, Mt. Pleasant Road, Mendham Twp, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 08/14/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	22
Tipulidae	3	9
Limnephilidae	4	7
Hydropsychidae	4	6
Perlidae	1	5
Leuctridae	0	5
Corydalidae	0	5
Lumbriculidae	10	5
BloodRed Chironomidae	8	4
Baetidae	4	3
Psephenidae	4	3
Gomphidae	1	3
Naididae	7	2
Tubificidae	10	2
Brachycentridae	1	1
Philopotamidae	3	1
Glossosomatidae	0	1
Empididae	6	1
Leptoceridae	4	1
Elmidae	4	1
Pteronarcyidae	0	1

Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 88
 % Contribution of Dominant Family: 25.00 % (Chironomidae)
 Family Biotic Index: 4.28
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
 % EPT: 35.23
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 180 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 6.0 / <1.0-1.0
 Substrate: Cobbles / Gravel/ Sand....StreamBank Vegetation/Stability: Trees / Grasses / Shrubs/Good
 Canopy: Mostly Closed....Other: Water Temp 18.2C / pH 7.7SU / DO 9.0mg/L / Cond 375umhos; Rural / Storm sewers flowing / frogs

Station: AN0233
 Whippany River, Whitehead Rd, Morris Twp, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 08/14/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	17
Tubificidae	10	15
Gammaridae	4	13
Lumbriculidae	8	12
Elmidae	4	11
Aeshnidae	3	5
Asellidae	8	5
Calopterygidae	5	4
Heptageniidae	4	4
Baetidae	4	3
Psephenidae	4	3
Cambaridae	5	2
Hydropsychidae	4	2
Philopotamidae	3	2
BloodRed Chironomidae	8	2
Phryganeidae	4	2
Tipulidae	3	1
Enchytraeidae	10	1
Limnephilidae	4	1
Coenagrionidae	9	1
Chironomidae	6	1
Physidae	7	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 23
 Total Number of Individuals: 109
 % Contribution of Dominant Family: 15.60 % (Chironomidae)
 Family Biotic Index: 5.98
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 12.84
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 153 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10 ' / < 1.0 '
 Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, shrubs,
 grass/Good
 Canopy: Mostly Open....Other: Water temp. 21.4 C /pH 7.5 SU /DO 8.0 mg/L /Cond 210
 umhos; Rural
 Fish observed;

Station: AN0234
Whippany River, Ridgedale Ave (West Of I 287), Morristown, Morris County
Morristown USGS Quadrangle
Date Sampled: 08/14/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	55
Elmidae	4	28
Hydropsychidae	4	4
Chironomidae	6	4
Heptageniidae	4	4
Asellidae	8	3
Tipulidae	3	2
Baetidae	4	2
Philopotamidae	3	2
Empididae	6	2
Cambaridae	5	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 107
% Contribution of Dominant Family: 51.40 % (Gammaridae)
Family Biotic Index: 4.20
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 11.21
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 151 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 39 ' / 1 - 2 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Shrubs, trees/Poor
Canopy: Partly Open....Other: Water temp. 23.1 C /pH 7.5 SU /DO 7.9 mg/L /Cond 342
umhos; Suburban. Downstream of small weir
Adjacent to lumber yard, auto body shop and an auto repair shop;

Station: AN0234A
Watnong Brook, Lake Rd, Morristown, Morris County
Morristown USGS Quadrangle
Date Sampled: 08/14/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	42
Gammaridae	4	25
Chironomidae	6	10
Lumbriculidae	8	8
Elmidae	4	8
Baetidae	4	5
Sphaeriidae	8	2
Tipulidae	3	1
Asellidae	8	1
Planariidae	4	1
Glossosomatidae	0	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 105
% Contribution of Dominant Family: 40.00 % (Hydropsychidae)
Family Biotic Index: 4.58
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 45.71
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 140 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 21 ' / < 1.0 - 1.5
'
Substrate: Gravel/sand, cobble, silt....StreamBank Vegetation/Stability: Grasses, trees, shrubs/Good
Canopy: Partly Open....Other: Water temp. 22.0 C /pH 7.6 SU /DO 8.3 mg/L /Cond 355 umhos; Suburban. Discharge downstream of site.
Fish. Substrate primarily silt beyond lawns.;

Station: AN0235
Whippany River, Jefferson Road (East Of R I-287), Hanover Twp , Morris County
Morristown USGS Quadrangle
Date Sampled: 08/19/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	75
Hydropsychidae	4	11
Gammaridae	4	10
Baetidae	4	2
Planariidae	4	2
Chironomidae	6	2
Tetrastemmatidae	7	2
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 105
% Contribution of Dominant Family: 71.43 % (Elmidae)
Family Biotic Index: 4.10
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 13.33
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 133 (Suboptimal) USEPA Protocol
Deficiency(s) noted: Elmidae Family Overwhelmingly Dominant -
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 44 / 2
Substrate: Cobbles / Gravel / Sand / Silt....StreamBank Vegetation/Stability: Trees / Shrubs/Good
Canopy: Partly Open....Other: Water Temp 21.6C / pH 8.1SU / DO 9.9mg/L / Cond 525umhos;
Suburban / Storm Sewers

Station: AN0236
Troy Brook, Lake Drive, Outlet Of Mt Lake, Mountain Lakes Boro, Morris County
Boonton USGS Quadrangle
Date Sampled: 08/21/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	41
Gammaridae	4	26
Planariidae	4	15
Sphaeriidae	8	8
Chironomidae	6	6
Tetrastemmatidae	7	5
Simuliidae	6	2
Philopotamidae	3	1
Empididae	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 105
% Contribution of Dominant Family: 39.05 % (Hydropsychidae)
Family Biotic Index: 4.61
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 40.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 176 (Optimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8 ' / < 1.0 - 1 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
Canopy: Mostly Closed....Other: Water temp. 26.5 C /pH 7.8 SU /DO 6.1 mg/L /Cond 360 umhos; Suburban

Station: AN0237
 Troy Brook, Beverwyck Rd. South Of Alan Dr., Parsippany-Troy Hills Twp, Morris County
 Morristown USGS Quadrangle
 Date Sampled: 08/19/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	40
Elmidae	4	21
Chironomidae	6	12
Gammaridae	4	5
Philopotamidae	3	4
Simuliidae	6	4
Baetidae	4	3
Sphaeriidae	8	3
Asellidae	8	2
Tipulidae	3	1
Planariidae	4	1
Lumbriculidae	8	1
Empididae	6	1
Tetrastemmatidae	7	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 40.00 % (Hydropsychidae)
 Family Biotic Index: 4.56
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 48.00
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 153 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30 / <1.0
 Substrate: Cobbles / Gravel / Sand....StreamBank Vegetation/Stability: Trees / Shrubs/Good
 Canopy: Mostly Closed....Other: Water Temp 22.5C / pH 7.9SU / DO 7.6mg/L / Cond 865umhos; Suburban / Storm Sewers

Station: AN0238
 Whippany River, End Of Edwards Rd (Usgs Gauge), East Hanover Twp, Morris County
 Caldwell USGS Quadrangle
 Date Sampled: 08/19/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	79
Tubificidae	10	5
Corbiculidae	8	3
Physidae	7	3
BloodRed Chironomidae	8	3
Asellidae	8	2
Corixidae	9	2
Chironomidae	6	2
Enchytraeidae	10	1
Coenagrionidae	9	1
Lymnaeidae	6	1
Sphaeriidae	8	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 13
 Total Number of Individuals: 104
 % Contribution of Dominant Family: 75.96 % (Gammaridae)
 Family Biotic Index: 4.98
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
 % EPT: 0.00
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 71 (Marginal) USEPA Protocol
 Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 49 / 2
 Substrate: Sand / Silt / Root mats....StreamBank Vegetation/Stability: Trees /
 Grass/Poor
 Canopy: Mostly Open....Other: Water Temp 22.2C / pH 7.3SU / DO 6.3mg/L / Cond 537umhos;
 Suburban / Drainage pipe / left bank stabilized with
 rip-rap;

Station: AN0238B
Malapardis Bk, Mt. Pleasant Ave., Hanover Twp, Morris County
Morristown USGS Quadrangle
Date Sampled: 08/19/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	29
Philopotamidae	3	22
Hydropsychidae	4	17
Psephenidae	4	6
Planariidae	4	5
Chironomidae	6	5
Simuliidae	6	5
Baetidae	4	4
Gammaridae	4	3
Tetrastemmatidae	7	2
Tubificidae	10	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Elmidae)
Family Biotic Index: 4.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 43.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 154 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 14 / <1.0
Substrate: Cobbles / Gravel / Sand....StreamBank Vegetation/Stability: Trees / Shrubs/Good
Canopy: Mostly Closed....Other: Water Temp 22.2C / pH 7.8SU / DO 7.3mg/L / Cond 432umhos; Suburban / Large parking lot on the left bank.

Station: AN0239
 Russia Brook, Milton-Dover Rd, Jefferson Twp, Morris County
 Franklin USGS Quadrangle
 Date Sampled: 09/16/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	47
Hydropsychidae	4	16
Chironomidae	6	6
Simuliidae	6	4
Psephenidae	4	4
Elmidae	4	4
Perlidae	1	2
Tipulidae	3	2
Baetidae	4	2
Philopotamidae	3	2
Glossosomatidae	0	2
Oligoneuriidae	2	2
Heptageniidae	4	2
Aeshnidae	3	1
Empididae	6	1
Calopterygidae	5	1
Leptoceridae	4	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 47.00 % (Gammaridae)
 Family Biotic Index: 4.04
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
 % EPT: 29.00
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 164 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 20 ' / 1 - 2 '
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
 Canopy: Mostly Closed....Other: Water temp. 19.3 C /pH 7.5 SU /DO 7.7 mg/L /Cond 255
 umhos; Suburban / forested
 Small pond downstream, small dam;

Station: AN0240
Rockaway River, Blue Rd (Outlet Of Longwood Lake), Jefferson Twp, Morris County
Dover USGS Quadrangle
Date Sampled: 09/16/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	37
Hydropsychidae	4	24
Gammaridae	4	8
Tubificidae	10	8
Leptoceridae	4	8
Elmidae	4	5
Philopotamidae	3	3
Sphaeriidae	8	3
Heptageniidae	4	2
Coenagrionidae	9	1
Planorbidae	6	1
Corydalidae	0	1
Tetrastemmatidae	7	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 103
% Contribution of Dominant Family: 35.92 % (Chironomidae)
Family Biotic Index: 5.32
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 35.92
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 188 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 17 ' / 1 - 2 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
Canopy: Mostly Closed....Other: Water temp. 21.0 C /pH 7.5 SU /DO 7.8 mg/L /Cond 212 umhos; Rural / forested; downstream of lake outfall
Macrophytes and fish observed;

Station: AN0241
 Rockaway River, Berkshire Valley Rd (S Of Taylor Rd), Jefferson Twp, Morris County
 Dover USGS Quadrangle
 Date Sampled: 09/16/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	66
Corixidae	9	16
Coenagrionidae	9	5
Tubificidae	10	5
Chironomidae	6	4
Hydrobiidae	8	1
Baetidae	4	1
Tabanidae	6	1
Elmidae	4	1
Physidae	7	1
Nepidae	8	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 102
 % Contribution of Dominant Family: 64.71 % (Gammaridae)
 Family Biotic Index: 5.53
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 0.98
 NJIS Rating: 9
 Biological Condition: Moderately Impaired
 Habitat Analysis: 155 (Suboptimal) USEPA Protocol
 Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 48 ' / 4.5 '
 Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
 Canopy: Open....Other: Water temp. 19.1 C /pH 7.2 SU /DO 6.7 mg/L /Cond 285 umhos;
 Suburban. Storm sewers, USGS gage station

Station: AN0242
Green Pond Brook, Mt Pleasant Tpk & Rt 15, Wharton Boro, Morris County
Dover USGS Quadrangle
Date Sampled: 09/11/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	30
Chironomidae	6	27
BloodRed Chironomidae	8	15
Asellidae	8	8
Elmidae	4	5
Calopterygidae	5	3
Corixidae	9	3
Sphaeriidae	8	2
Tipulidae	3	1
Aeshnidae	3	1
Hydropsychidae	4	1
Empididae	6	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 98
% Contribution of Dominant Family: 30.61 % (Gammaridae)
Family Biotic Index: 5.79
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.02
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 148 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 43 ' / 1-2 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Shrubs, grass, trees/Fair
Canopy: Open....Other: Water temp. 20.3 C /pH 7.9 SU /DO 9.2 mg/L /Cond 351 umhos;
Suburban / industrial; storm sewers
sewage pumping station adj to stream; small culvert draining into stream adj to Rt 15

Station: AN0243
 Rockaway River, Rt 513 & E. Blackwell Rd, Randolph Twp., Morris County
 Dover USGS Quadrangle
 Date Sampled: 09/11/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	59
Hydrobiidae	8	15
Hydropsychidae	4	7
Elmidae	4	7
Chironomidae	6	5
Leptoceridae	4	4
Ancylidae	6	2
Sphaeriidae	8	2
Tipulidae	3	1
Asellidae	8	1
Pleuroceridae	6	1
Empididae	6	1
Plagiostomidae	4	1
Tubificidae	10	1
Tetrastemmatidae	7	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 109
 % Contribution of Dominant Family: 54.13 % (Gammaridae)
 Family Biotic Index: 4.90
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 11.01
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 160 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear, gray haze....Flow: Moderate....Width/Depth (ft): 40 ' / < 1.0 - 1.5 '
 Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, grass, shrubs/Fair
 Canopy: Partly Open....Other: Water temp. 19.6 C /pH 8.2 SU /DO 10.9 mg/L /Cond 435 umhos; Suburban / Industrial
 Flowing storm sewers. RR tracks on both sides of river; Crayfish observed

Station: AN0244
 Mill Brook, Palmer & Franklin Rds, Randolph Twp., Morris County
 Dover USGS Quadrangle
 Date Sampled: 09/11/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	22
Gammaridae	4	14
Chironomidae	6	14
Elmidae	4	12
Baetidae	4	8
Asellidae	8	7
Glossosomatidae	0	6
Sphaeriidae	8	5
Tubificidae	10	3
Calopterygidae	5	2
Limnephilidae	4	2
Simuliidae	6	2
Gerridae	8	1
Empididae	6	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 22.00 % (Hydropsychidae)
 Family Biotic Index: 4.82
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 39.00
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 168 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 21 ' / < 1.0 - 1.5 '
 Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
 Canopy: Mostly Closed....Other: Water temp. 15.8 C /pH 7.2 SU /DO 9.3 mg/L /Cond 362
 umhos; Suburban / Industrial (adjacent to industrial park)
 Storm sewers. USGS gauge; Macrophytes observed

Station: AN0245
 Beaver Brook, Meriden Rd, Rockaway Twp, Morris County
 Dover USGS Quadrangle
 Date Sampled: 08/21/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	31
Leptoceridae	4	17
Chironomidae	6	8
Ephemerellidae	1	8
Elmidae	4	8
Heptageniidae	4	7
Leuctridae	0	6
Peltoperlidae	1	4
Baetidae	4	3
Perlidae	1	2
Aeshnidae	3	2
Glossosomatidae	0	2
Calopterygidae	5	1
Dryopidae	5	1
Gomphidae	1	1
Psychomyiidae	2	1
Corydalidae	0	1
Sphaeriidae	8	1
BloodRed Chironomidae	8	1
Pteronarcyidae	0	1

Statistical Analysis

Number of Taxa: 20
 Total Number of Individuals: 106
 % Contribution of Dominant Family: 29.25 % (Hydropsychidae)
 Family Biotic Index: 3.41
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
 % EPT: 77.36
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 188 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 20 ' / < 1.0 - 1 '
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
 Canopy: Mostly Closed....Other: Water temp. 21.5 C /pH 7.3 SU /DO 8.4 mg/L /Cond 59
 umhos; Rural

Station: AN0246
Beaver Brook, Morris Ave, Denville Twp, Morris County
Boonton USGS Quadrangle
Date Sampled: 08/21/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydrobiidae	8	27
Gammaridae	4	26
Chironomidae	6	19
Hydropsychidae	4	15
Asellidae	8	2
Pleuroceridae	6	2
Elmidae	4	2
Physidae	7	2
Sphaeriidae	8	2
Planariidae	4	1
Coenagrionidae	9	1
Cambaridae	5	1
Baetidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 101
% Contribution of Dominant Family: 26.73 % (Hydrobiidae)
Family Biotic Index: 5.76
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 15.84
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 103 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 48 ' / 3 '
Substrate: Sand, silt, snags....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Partly Open....Other: Water temp. 24.2 C /pH 7.1 SU /DO 5.3 mg/L /Cond 213 umhos; Suburban. Storm sewers
Sand bars. Painted turtle and macrophytes observed;

Station: AN0247
Den Brook, Mt Pleasant Tpk, Denville Twp, Morris County
Mendham USGS Quadrangle
Date Sampled: 09/11/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	37
Chironomidae	6	26
Perlidae	1	10
Philopotamidae	3	9
Simuliidae	6	4
Gammaridae	4	2
Gomphidae	1	2
Tubificidae	10	2
Leptoceridae	4	2
Calopterygidae	5	1
Glossosomatidae	0	1
Lumbriculidae	8	1
Naididae	7	1
Tetrastemmatidae	7	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 37.00 % (Hydropsychidae)
Family Biotic Index: 4.34
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 60.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 186 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15 ' / < 1 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Grasses, shrubs, trees/Good
Canopy: Mostly Closed....Other: Water temp. 18.0 C /pH 7.4 SU /DO 8.2 mg/L /Cond 278 umhos; Suburban / in Den Brook Park
Storm sewers, frogs, and macrophytes observed;

Station: AN0248
Rockaway River, Pocono Road, Denville Twp, Morris County
Boonton USGS Quadrangle
Date Sampled: 08/21/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	62
Gammaridae	4	18
Sphaeriidae	8	7
Pleuroceridae	6	4
Psephenidae	4	4
Hydropsychidae	4	2
Planariidae	4	2
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 62.00 % (Elmidae)
Family Biotic Index: 4.36
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 3.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 161 (Optimal) USEPA Protocol
Deficiency(s) noted: Elmidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 35 / 1.0-2.0
Substrate: Cobbles / Gravel....StreamBank Vegetation/Stability: Trees / Grass /
Shrubs/Fair
Canopy: Partly Open....Other: Water Temp 22.2C / pH 7.8SU / DO 8.6mg/L / Cond 375umhos;
Suburban / Storm Sewers

Station: AN0249
Stony Brook, Valley Rd Nr Airport, Boonton Twp, Morris County
Boonton USGS Quadrangle
Date Sampled: 09/25/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	41
Gammaridae	4	36
Asellidae	8	7
Sphaeriidae	8	7
Baetidae	4	1
Hydrobiidae	8	1
Tubificidae	10	1
Planariidae	4	1
Ancylidae	6	1
Phryganeidae	4	1
Pyralidae	5	1
Simuliidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 41.00 % (Chironomidae)
Family Biotic Index: 5.53
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 150 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 49 ' / 3 '
Substrate: Gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
Canopy: Partly Open....Other: Water temp. 17.8 C /pH 7.5 SU /DO 7.4 mg/L /Cond 158
umhos; Suburban / forested. Beaver dam upstream
overgrown banks, no apparent bank erosion; many macrophytes observed

Station: AN0250
 Rockaway River, Under Morris Ave, Usgs Access, Boonton Twp, Morris County
 Boonton USGS Quadrangle
 Date Sampled: 09/25/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	53
Hydropsychidae	4	15
Baetidae	4	8
Elmidae	4	8
Psephenidae	4	5
Lumbriculidae	8	4
Heptageniidae	4	4
Philopotamidae	3	2
Physidae	7	2
Sphaeriidae	8	2
Hydrobiidae	8	1
Corydalidae	0	1
Planorbidae	6	1
Chironomidae	6	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 107
 % Contribution of Dominant Family: 49.53 % (Gammaridae)
 Family Biotic Index: 4.30
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 27.10
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 166 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 60 ' / 3 '
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs/Good
 Canopy: Mostly Open....Other: Water temp. 17.2 C /pH 7.6 SU /DO 9.6 mg/L /Cond 232 umhos;
 Suburban. Storm sewers, USGS gage Station
 small trib flowing into river; left bank stabilized by small rock wall

Station: AN0251
 Rockaway River, Green Bank Rd Nr Vreeland & River Rd, Boonton Twp, Morris County
 Boonton USGS Quadrangle
 Date Sampled: 09/30/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	50
Chironomidae	6	26
Simuliidae	6	8
Planariidae	4	3
Glossiphoniidae	8	3
Psephenidae	4	3
BloodRed Chironomidae	8	2
Baetidae	4	1
Empididae	6	1
Enchytraeidae	10	1
Tetrastemmatidae	7	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 50.00 % (Hydropsychidae)
 Family Biotic Index: 4.98
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 51.00
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 159 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Fast....Width/Depth (ft): 55 ' / 2 '
 Substrate: Gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Good
 Canopy: Mostly Open....Other: Water temp. 19.4 C /pH 7.9 SU /DO 9.1 mg/L /Cond 295
 umhos; Suburban / forested
 RBRSA STP upstream; macrophytes observed

Station: AN0252
 Crooked Brook, Hemlock Rd & Glen Terrace, Montville Twp, Morris County
 Pompton Plains USGS Quadrangle
 Date Sampled: 09/25/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	39
Philopotamidae	3	13
Perlidae	1	10
Pteronarcyidae	0	10
Heptageniidae	4	5
Chironomidae	6	4
Ephemerellidae	1	3
Empididae	6	3
Simuliidae	6	2
Lepidostomatidae	1	2
Psephenidae	4	2
Tipulidae	3	2
Baetidae	4	1
Naididae	7	1
Polycentropodidae	6	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 99
 % Contribution of Dominant Family: 39.39 % (Hydropsychidae)
 Family Biotic Index: 3.25
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
 % EPT: 84.85
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 175 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 20 ' / < 1.0 - 1.5 '
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grasses/Fair
 Canopy: Partly Open....Other: Water temp. 15.5 C /pH 7.5 SU /DO 9.8 mg/L /Cond 147
 umhos; Suburban / forested

Station: AN0253
 Crooked Brook, Vista Rd Dwnstrm Lake Valhalla, Montville Twp, Morris County
 Boonton USGS Quadrangle
 Date Sampled: 09/25/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	69
Heptageniidae	4	22
Asellidae	8	4
Gammaridae	4	4
Leptoceridae	4	2
Elmidae	4	2
Veliidae	9	1
Erpobdellidae	8	1
Sphaeriidae	8	1
Planariidae	4	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 63.89 % (Hydropsychidae)
 Family Biotic Index: 4.26
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 86.11
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 122 (Suboptimal) USEPA Protocol
 Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
 -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 19 ' / 3 '
 Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, grasses/Poor
 Canopy: Mostly Closed....Other: Water temp. 20.8 C /pH 7.5 SU /DO 7.9 mg/L /Cond 134 umhos; Suburban / forested / recreational area
 sand bars, highly eroded banks; large clearing on left bank

Station: AN0254
 Crooked Brook, River Rd (Near Knoll Rd), Montville Twp, Morris County
 Pompton Plains USGS Quadrangle
 Date Sampled: 09/30/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	36
Hydropsychidae	4	33
Gammaridae	4	13
Asellidae	8	10
Planariidae	4	3
Chironomidae	6	3
Physidae	7	2
Baetidae	4	1
Glossosomatidae	0	1
Planorbidae	6	1
Sphaeriidae	8	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 105
 % Contribution of Dominant Family: 34.29 % (Elmidae)
 Family Biotic Index: 4.51
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 33.33
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 125 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 30 ' / 2 '
 Substrate: Cobbles, sand, silt....StreamBank Vegetation/Stability: Trees, shrubs/Fair
 Canopy: Mostly Open....Other: Water temp. 15.3 C /pH 7.6 SU /DO 9.4 mg/L /Cond 296
 umhos; Suburban / forested

Station: AN0255
 Wanaque River, Fire Lane Off E Shore Drive, West Milford Ave, Passaic County
 Greenwood Lake USGS Quadrangle
 Date Sampled: 10/07/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	54
Heptageniidae	4	15
Gammaridae	4	11
Physidae	7	5
Chironomidae	6	4
Coenagrionidae	9	2
Sphaeriidae	8	2
Perlidae	1	1
Simuliidae	6	1
Naididae	7	1
Planariidae	4	1
Gomphidae	1	1
Leptoceridae	4	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 54.00 % (Hydropsychidae)
 Family Biotic Index: 4.44
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 71.00
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 181 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 19 ' / 2 '
 Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Good
 Canopy: Partly Open....Other: Water temp. 13.7 C /pH 7.9 SU /DO 9.6 mg/L /Cond 202
 umhos; Forested. 1 mile downstream of Greenwood Lake
 Fish observed;

Station: AN0255C
 Belcher Creek, Union Valley Rd, West Milford Twp, Passaic County
 Greenwood Lake USGS Quadrangle
 Date Sampled: 10/07/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	27
BloodRed Chironomidae	8	24
Naididae	7	16
Chironomidae	6	5
Ceratopogonidae	6	3
Sphaeriidae	8	3
Hydrobiidae	8	2
Glossiphoniidae	8	2
Simuliidae	6	2
Coenagrionidae	9	1
Tetrastemmatidae	7	1
Corduliidae	5	1
Elmidae	4	1
Lumbriculidae	10	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 89
 % Contribution of Dominant Family: 30.34 % (Tubificidae)
 Family Biotic Index: 8.15
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
 % EPT: 0.00
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 119 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 18 ' / 1 '
 Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Grasses, shrubs, trees/Fair
 Canopy: Mostly Open....Other: Water temp. 13.2 C /pH 8.3 SU /DO 10.5 mg/L /Cond 201 umhos; Suburban. Storm sewers; downstream of Pineclift Lake new dam; strip mall on both banks; crayfish, periphyton, filamentous algae, fish odor

Station: AN0255D
Green Brook, Union Valley Rd, West Milford Twp, Passaic County
Greenwood Lake USGS Quadrangle
Date Sampled: 10/07/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	32
Philopotamidae	3	26
Chironomidae	6	17
Gammaridae	4	4
Chloroperlidae	1	3
Lumbriculidae	8	3
Simuliidae	6	3
Perlidae	1	2
Peltoperlidae	1	2
Tipulidae	3	2
Enchytraeidae	10	1
Ephemerellidae	1	1
Glossosomatidae	0	1
Perlodidae	2	1
Limnephilidae	4	1
Psychomyiidae	2	1
Naididae	7	1
Heptageniidae	4	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 103
% Contribution of Dominant Family: 31.07 % (Hydropsychidae)
Family Biotic Index: 4.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
% EPT: 68.93
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 181 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12 ' / < 1.0 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Closed....Other: Water temp. 9.2 C /pH 8.4 SU /DO 11.6 mg/L /Cond 120 umhos;
Rural / forested. Storm sewers
crayfish observed;

Station: AN0256
 Wanaque River, Highland Ave Behind Stp, Wanaque Boro, Passaic County
 Wanaque USGS Quadrangle
 Date Sampled: 10/02/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	45
Chironomidae	6	20
BloodRed Chironomidae	8	15
Asellidae	8	8
Tubificidae	10	3
Lumbriculidae	8	3
Leptoceridae	4	3
Aeshnidae	3	1
Planariidae	4	1
Cambaridae	5	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 101
 % Contribution of Dominant Family: 44.55 % (Gammaridae)
 Family Biotic Index: 5.60
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 3.96
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 116 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 30 ' / 2.5 - 3 '
 Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Grasses, trees/Fair
 Canopy: Open....Other: Water temp. 14.7 C /pH 7.3 SU /DO 8.9 mg/L /Cond 280 umhos;
 Suburban / forested (located in Wanaque Park)
 downstream of STP; turtles and periphyton observed

Station: AN0256A
Meadow Brook, Highland Ave, Wanaque Boro, Passaic County
Wanaque USGS Quadrangle
Date Sampled: 09/30/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	60
Elmidae	4	14
Baetidae	4	9
Lumbriculidae	8	5
Hydropsychidae	4	4
Planariidae	4	4
Calopterygidae	5	2
Glossosomatidae	0	2
Leptoceridae	4	2
Tetrastemmatidae	7	1
Chironomidae	6	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 104
% Contribution of Dominant Family: 57.69 % (Gammaridae)
Family Biotic Index: 4.18
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 16.35
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 134 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10 ' / < 1.0 '
Substrate: Gravel/sand....StreamBank Vegetation/Stability: Trees, weeds/Good
Canopy: Open....Other: Water temp. 15.0 C /pH 7.5 SU /DO 8.8 mg/L /Cond 297 umhos;
Forested / rock quarry / STP
macrophytes and a lot of trash observed;

Station: AN0257
Wanaque River, Wanaque Ave, Outlet Of Lake Inez, Pompton Plains Boro, Passaic County
Wanaque USGS Quadrangle
Date Sampled: 09/30/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	75
Gammaridae	4	16
Elmidae	4	3
Baetidae	4	2
Asellidae	8	2
Chironomidae	6	2
BloodRed Chironomidae	8	1
Ancylidae	6	1
Tubificidae	10	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 104
% Contribution of Dominant Family: 72.12 % (Hydropsychidae)
Family Biotic Index: 4.23
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 75.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 107 (Marginal) USEPA Protocol
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 85 ' / 2 '
Substrate: Cobbles, sand, silt....StreamBank Vegetation/Stability: Trees, weeds/Fair
Canopy: Open....Other: Water temp. 15.3 C /pH 7.6 SU /DO 10.1 mg/L /Cond 228 umhos;
Urban
trash in stream, concrete walls by bridge (downstream); Caution sign posted reads: "Don't eat fish until further notice"
-

Station: AN0258
 Pequannock River, Rt 515, Hardyston Twp, Sussex County
 Franklin USGS Quadrangle
 Date Sampled: 09/16/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	35
Corixidae	9	24
Sphaeriidae	8	13
Chironomidae	6	6
Aeshnidae	3	5
Baetidae	4	3
Hydrobiidae	8	3
Elmidae	4	2
Gammaridae	4	2
Limnephilidae	4	2
Asellidae	8	1
Hydropsychidae	4	1
Tabanidae	6	1
Planorbidae	6	1
Leptophlebiidae	2	1
Pleuroceridae	6	1
Haliplidae	5	1
Glossiphoniidae	8	1
Phryganeidae	4	1
Lymnaeidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 106
 % Contribution of Dominant Family: 33.02 % (Tubificidae)
 Family Biotic Index: 7.92
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 8.49
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 124 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 19 ' / 2 - 3 '
 Substrate: Sand, silt....StreamBank Vegetation/Stability: Grasses, trees/Fair
 Canopy: Open....Other: Water temp. 18.6 C /pH 7.5 SU /DO 6.1 mg/L/ Cond 235 umhos;
 Rural / forested
 Sunfish, minnows & macrophytes observed;

Station: AN0259
 Pequannock River, Rt 23 N (Near Canistear Rd), West Milford Twp, Passaic/Morris County
 Newfoundland USGS Quadrangle
 Date Sampled: 10/09/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	25
Heptageniidae	4	10
Taeniopterygidae	2	10
Hydropsychidae	4	9
Baetidae	4	8
Chironomidae	6	6
Limnephilidae	4	6
Tetrastemmatidae	7	4
Hydroptilidae	4	3
Simuliidae	6	3
Elmidae	4	2
Naididae	7	2
Sphaeriidae	8	2
Perlidae	1	1
Corydalidae	0	1
Ancylidae	6	1
Gammaridae	4	1
Empididae	6	1
Oligoneuriidae	2	1
Lepidostomatidae	1	1
Planorbidae	6	1
Leptoceridae	4	1
Phryganeidae	4	1

Statistical Analysis

Number of Taxa: 23
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 25.00 % (Ephemerellidae)
 Family Biotic Index: 3.43
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
 % EPT: 76.00
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 180 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 15 ' / 2 - 2.5 '
 Substrate: Bedrock, cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
 Canopy: Mostly Open....Other: Water temp. 12.9 C /pH 7.7 SU /DO 10.0 mg/L /Cond 211 umhos; Suburban. 2 storm sewers draining into stream; macrophytes, periphyton and filamentous algae (on storm drain) observed;

Station: AN0260

Mossmans Brook, Clinton Rd N Of Clinton Reservoir, West Milford Twp, Passaic County
Newfoundland USGS Quadrangle

Date Sampled: 09/25/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	14
Sphaeriidae	8	13
Heptageniidae	4	10
Simuliidae	6	8
Gomphidae	1	7
Chironomidae	6	6
Tubificidae	10	6
Elmidae	4	5
Baetidae	4	4
Philopotamidae	3	4
Psephenidae	4	4
Lumbriculidae	8	4
Tipulidae	3	4
Leptophlebiidae	2	3
Perlidae	1	2
Ephemerellidae	1	2
Sialidae	4	2
Asellidae	8	1
Calamoceratidae	0	1
Lumbricidae	10	1
Peltoperlidae	1	1
BloodRed Chironomidae	8	1
Pteronarcyidae	0	1
Limnephilidae	4	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 25

Total Number of Individuals: 106

% Contribution of Dominant Family: 13.21 % (Hydropsychidae)

Family Biotic Index: 4.86

E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11

% EPT: 40.57

NJIS Rating: 30

Biological Condition: Nonimpaired

Habitat Analysis: 196 (Optimal) USEPA Protocol

Deficiency(s) noted:

-

Observations

Streamwater: Clear, cedar color....Flow: Fast....Width/Depth (ft): 15 ' / 1 '

Substrate: Cobbles, gravel, boulders....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Good

Canopy: Mostly Closed....Other: Water temp. 13.8 C /pH 6.4 SU /DO 8.8 mg/L /Cond 39 umhos; Forested (large hemlock stand)
macrophytes and water snake observed;

Station: AN0261
 Clinton Brook, La Rue Rd, West Milford Twp, Passaic County
 Newfoundland USGS Quadrangle
 Date Sampled: 09/16/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	59
Asellidae	8	9
Sphaeriidae	8	7
Planariidae	4	4
Talitridae	8	3
Leptoceridae	4	3
Baetidae	4	3
Hydrobiidae	8	2
Tabanidae	6	2
BloodRed Chironomidae	8	2
Naididae	7	2
Tubificidae	10	1
Calopterygidae	5	1
Corixidae	9	1
Empididae	6	1
Coenagrionidae	9	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 101
 % Contribution of Dominant Family: 58.42 % (Chironomidae)
 Family Biotic Index: 6.37
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 5.94
 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: Slow....Width/Depth (ft): 33 ' / 2 - 6 '
 Substrate: Sand, silt....StreamBank Vegetation/Stability: Shrubs, trees, grass/Fair
 Canopy: Mostly Open....Other: Water temp. 20.8 C /pH 7.3 SU /DO 6.7 mg/L /Cond 64
 umhos; Suburban / forested. Storm sewers (strong odor at pipe)
 Very deep under bridge; Fish and macrophytes observed

Station: AN0262
 Kanouse Brook, Kanouse Rd Nr Newfoundland, West Milford Twp, Passaic County
 Newfoundland USGS Quadrangle
 Date Sampled: 09/25/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	27
Gammaridae	4	15
Heptageniidae	4	15
Enchytraeidae	10	12
Simuliidae	6	6
Pyralidae	5	5
Sphaeriidae	8	5
Empididae	6	4
Coenagrionidae	9	2
Tubificidae	10	2
Baetidae	4	2
Hydropsychidae	4	2
Cambaridae	5	2
Polycentropodidae	6	2
Sialidae	4	2
Asellidae	8	1
Ephemerellidae	1	1
Calopterygidae	5	1
Naididae	7	1
Haliplidae	5	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 109
 % Contribution of Dominant Family: 24.77 % (Chironomidae)
 Family Biotic Index: 5.90
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 20.18
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 182 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10 ' / < 1.0 - 2 '
 Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs, weeds/Good
 Canopy: Mostly Open....Other: Water temp. 14.9 C /pH 6.8 SU /DO 8.7 mg/L /Cond 116
 umhos; Forested
 Bridge Out; macrophytes observed

Station: AN0263
Macopin River, Outlet Of Echo Lake, West Milford Twp, Passaic County
New Foundland USGS Quadrangle
Date Sampled: 10/21/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	47
Planariidae	4	18
Hydropsychidae	4	18
Physidae	7	6
Tipulidae	3	2
Baetidae	4	2
Heptageniidae	4	2
Chironomidae	6	1
Gammaridae	4	1
Empididae	6	1
Hydroptilidae	4	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 47.00 % (Naididae)
Family Biotic Index: 5.63
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 23.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 152 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 21' / <1'
Substrate: Cobbles....StreamBank Vegetation/Stability: Grasses, Few Trees/Good
Canopy: Open....Other: Water temp. 13.2 C / pH 8.1 SU / DO 8.3 mg/L / Cond. 153 umhos;
Forested
station downstream of Echo Lake and dam

Station: AN0264
 Pequannock River, Rt 23, Usgs Gage Station, West Milford Twp, Passaic / Morris County
 Newfoundland USGS Quadrangle
 Date Sampled: 10/09/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	27
Gammaridae	4	25
Hydropsychidae	4	19
Chironomidae	6	13
Baetidae	4	5
Heptageniidae	4	4
Taeniopterygidae	2	3
Planorbidae	6	2
Tetrastemmatidae	7	2
Ancylidae	6	1
Lumbriculidae	8	1
Ephemerellidae	1	1
Coenagrionidae	9	1
Oligoneuriidae	2	1
Leptophlebiidae	2	1
Elmidae	4	1
Rhyacophilidae	0	1

Statistical Analysis

Number of Taxa: 17
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 25.00 % (Simuliidae)
 Family Biotic Index: 4.78
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
 % EPT: 32.41
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 149 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Turbid, brown-green....Flow: Moderate....Width/Depth (ft): 50 ' / 3 '
 Substrate: Cobbles, gravel/sand, silt, boulders....StreamBank Vegetation/Stability:
 Trees, shrubs/Good
 Canopy: Mostly Open....Other: Water temp. 14.6 C /pH 7.8 SU /DO 7.6 mg/L /Cond 184
 umhos; Suburban, storm sewers
 few macrophytes observed;

Station: AN0265
 Pequannock River, Main St Nr Arch St, Butler Boro, Morris / Passaic County
 Wanaque USGS Quadrangle
 Date Sampled: 10/09/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	24
Chironomidae	6	18
Leptoceridae	4	18
Heptageniidae	4	14
Gammaridae	4	11
Baetidae	4	3
Asellidae	8	2
Hydropsychidae	4	2
Plagiostomidae	4	2
Aeshnidae	3	1
Ephemerellidae	1	1
Hydroptilidae	4	1
Planorbidae	6	1
Elmidae	4	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 24.00 % (Simuliidae)
 Family Biotic Index: 4.90
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 39.00
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 153 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear, gray-green tint....Flow: Moderate....Width/Depth (ft): 46 ' / 1 - 2.5 '
 Substrate: Cobbles, gravel, boulders....StreamBank Vegetation/Stability: Trees, grass, shrubs/Poor
 Canopy: Mostly Closed....Other: Water temp. 14.6 C /pH 7.7 SU /DO 9.6 mg/L /Cond 217 umhos; Suburban
 Right bank channelized by wall on both sides of bridge; trash in stream

Station: AN0266
 Ramapo River, End Of West Ramapo Ave, Mahwah Twp, Bergen County
 Ramsey USGS Quadrangle
 Date Sampled: 10/02/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	67
Elmidae	4	11
Planariidae	4	4
Chironomidae	6	4
Gammaridae	4	3
Tetrastemmatidae	7	2
Coenagrionidae	9	1
Baetidae	4	1
Philopotamidae	3	1
BloodRed Chironomidae	8	1
Oligoneuriidae	2	1
Hydroptilidae	4	1
Psephenidae	4	1
Simuliidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 67.00 % (Hydropsychidae)
 Family Biotic Index: 4.22
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 72.00
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 141 (Suboptimal) USEPA Protocol
 Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
 -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 90 ' / 2-2.5 '
 Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs,
 grasses/Fair
 Canopy: Open....Other: Water temp. 13.8 C /pH 7.4 SU /DO 9.9 mg/L /Cond 283 umhos;
 Suburban / forested

Station: AN0267
Ramapo River, Lenape Lane, Oakland Boro, Bergen County
Ramsey USGS Quadrangle
Date Sampled: 10/21/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	20
Planariidae	4	16
Gammaridae	4	13
Baetidae	4	11
Chironomidae	6	8
Heptageniidae	4	5
Philopotamidae	3	4
Oligoneuriidae	2	4
Lumbriculidae	8	4
Elmidae	4	4
Taeniopterygidae	2	4
Psephenidae	4	3
Pleuroceridae	6	2
Simuliidae	6	2
Sphaeriidae	8	2

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 102
% Contribution of Dominant Family: 19.61 % (Hydropsychidae)
Family Biotic Index: 4.27
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 47.06
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 170 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 147 ' / < 1.0 - 3 '
Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Open....Other: Water temp. 10.9 C /pH 7.9 SU /DO 12.0 mg/L /Cond 355 umhos;
Suburban

Station: AN0268
Pompton River, Rt 504 (Newark-Pompton Tpk), Pequannock Twp, Morris / Passaic County
Pompton Plains USGS Quadrangle
Date Sampled: 10/15/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	33
Pleuroceridae	6	32
Hydrobiidae	8	24
Gammaridae	4	6
Ancylidae	6	3
Corbiculidae	8	1
Planorbidae	6	1
Glossiphoniidae	8	1
Planariidae	4	1
Lumbriculidae	8	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 104
% Contribution of Dominant Family: 31.73 % (Sphaeriidae)
Family Biotic Index: 7.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 148 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Fast....Width/Depth (ft): 183 ' / 3.5 '
Substrate: Gravel/sand....StreamBank Vegetation/Stability: Trees/Good
Canopy: Open....Other: Water temp. 14.9 C /pH 7.5 SU /DO 9.9 mg/L /Cond 325 umhos;
Urban / suburban / industrial
storm sewers;

Station: AN0269
 Dam Brook, Trib To Pompton River, Ryerson Rd, Lincoln Park Boro, Morris County
 Pompton Plains USGS Quadrangle
 Date Sampled: 10/15/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	66
Hydrobiidae	8	15
Gammaridae	4	15
Culicidae	8	1
Elmidae	4	1
Asellidae	8	1
Calopterygidae	5	1
Ancylidae	6	1
Chironomidae	6	1

Statistical Analysis

Number of Taxa: 9
 Total Number of Individuals: 102
 % Contribution of Dominant Family: 64.71 % (Sphaeriidae)
 Family Biotic Index: 7.30
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
 % EPT: 0.00
 NJIS Rating: 3
 Biological Condition: Severely Impaired
 Habitat Analysis: 145 (Suboptimal) USEPA Protocol
 Deficiency(s) noted: Sphaeriidae Family Overwhelmingly Dominant -
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 29 ' / 1.5 '
 Substrate: Silt, gravel/sand,StreamBank Vegetation/Stability: Trees, shrubs/Fair
 Canopy: Partly Open....Other: Water temp. 14.4 C /pH 7.5 SU /DO 7.6 mg/L /Cond 248
 umhos; Suburban / forested
 storm sewers;

Station: AN0270
Packanack Brook, Osbourne Rd, Wayne Twp, Passaic County
Pompton Plains USGS Quadrangle
Date Sampled: 10/15/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	51
Gammaridae	4	25
Tubificidae	10	12
Elmidae	4	12
Erpobdellidae	8	3
Simuliidae	6	3
Planariidae	4	2
Empididae	6	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 110
% Contribution of Dominant Family: 46.36 % (Hydropsychidae)
Family Biotic Index: 4.86
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 46.36
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 124 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 59 ' / 1 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Shrubs, trees/Fair
Canopy: Mostly Open....Other: Water temp. 16.6 C /pH 7.8 SU /DO 8.4 mg/L /Cond 246
umhos; Suburban. Storm sewers; downstream of Packanack lake
stone wall on right bank of stream;

Station: AN0271
 Deepavaal Brook, Little Falls Ave & Jane Rd, Caldwell Twp, Essex County
 Paterson USGS Quadrangle
 Date Sampled: 10/23/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	22
Gammaridae	4	21
BloodRed Chironomidae	8	17
Asellidae	8	13
Sphaeriidae	8	10
Coenagrionidae	9	9
Plagiostomidae	4	5
Hydrobiidae	8	4
Glossiphoniidae	8	2
Planariidae	4	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 105
 % Contribution of Dominant Family: 20.95 % (Tubificidae)
 Family Biotic Index: 7.47
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
 % EPT: 0.00
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 99 (Marginal) USEPA Protocol
 Deficiency(s) noted:
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 23.5 ' / 3.5 '
 Substrate: Gravel/sand, silt....StreamBank Vegetation/Stability: Trees, grass/Fair
 Canopy: Mostly Closed....Other: Water temp. 9.0 C /pH 7.3 SU /DO 7.5 mg/L /Cond 657
 umhos; Suburban; next to sewage pumping station
 storm sewers; water had slight petroleum odor;

Station: AN0272
 Preakness Brook (Singac Bk), Rt 504 (Pat Ham Tpk) Br In Ramapo Plz, Wayne Twp, Passaic County
 Patterson USGS Quadrangle
 Date Sampled: 10/21/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	53
Elmidae	4	12
Chironomidae	6	10
Lumbriculidae	8	9
Philopotamidae	3	6
Tipulidae	3	5
Planariidae	4	4
Empididae	6	3
Psephenidae	4	3
Gammaridae	4	1
Glossosomatidae	0	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 49.07 % (Hydropsychidae)
 Family Biotic Index: 4.45
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 55.56
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 121 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 32 ' / < 1.0 - 1.5 '
 Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Grasses, trees, shrubs/Fair
 Canopy: Open....Other: Water temp. 12.5 C /pH 7.7 SU /DO 11.7 mg/L /Cond 573 umhos;
 Suburban. Storm sewers
 Periphyton on rocks, sewage smell; 2 flowing outfall pipes - possibly from adj pond

Station: AN0273
Preakness Brook, Mountain & French Hill Rd, Wayne Twp, Passaic County
Patterson USGS Quadrangle
Date Sampled: 10/21/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	49
Lumbriculidae	8	25
Hydropsychidae	4	8
Elmidae	4	8
Gammaridae	4	7
Empididae	6	2
Simuliidae	6	2
Tipulidae	3	1
Calopterygidae	5	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 104
% Contribution of Dominant Family: 47.12 % (Chironomidae)
Family Biotic Index: 6.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 7.69
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 121 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 34 ' / 1-2 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Shrubs/Fair
Canopy: Open....Other: Water temp. 13.0 C /pH 7.7 SU /DO 11.3 mg/L /Cond 573 umhos;
Suburban / recreational (located on golf course)
periphyton observed;

Station: AN0274
Passaic River, Riverview Drive, Totowa Boro, Passaic County
Paterson USGS Quadrangle
Date Sampled: 06/24/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	35
Gammaridae	4	31
Elmidae	4	10
Planariidae	4	6
BloodRed Chironomidae	8	4
Sphaeriidae	8	4
Empididae	6	3
Hydroptilidae	4	2
Chironomidae	6	2
Heptageniidae	4	2
Asellidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 35.00 % (Hydropsychidae)
Family Biotic Index: 4.46
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 39.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 149 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid, Brown....Flow: Moderate....Width/Depth (ft): 20' / 4'
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees/Fair
Canopy: Mostly Open....Other: Water temp. 23.0 C / pH 7.7 SU / DO 7.2 mg/L / Cond. 579
umhos; Urban, Forested
geese, trash, fish present

Station: AN0274A
 Passaic River, End Of Williard Lane, Montville Twp, Morris / Essex County
 Pompton Plains USGS Quadrangle
 Date Sampled: 06/30/04

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	66
Corbiculidae	8	9
Tubificidae	10	9
Sphaeriidae	8	8
Chironomidae	6	5
Gammaridae	4	2
Elmidae	4	1
Asellidae	8	1
Planariidae	4	1
Plagiostomidae	4	1
Leptoceridae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 105
 % Contribution of Dominant Family: 62.86 % (BloodRed Chironomidae)
 Family Biotic Index: 7.81
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 1.90
 NJIS Rating: 6
 Biological Condition: Severely Impaired
 Habitat Analysis: 92 (Marginal) USEPA Protocol
 Deficiency(s) noted: BloodRed Chironomidae Family Overwhelmingly Dominant -
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid, Brown....Flow: Moderate....Width/Depth (ft): 80' / 3' +
 Substrate: Gravel, Silt....StreamBank Vegetation/Stability: Trees, Weeds/Poor
 Canopy: Mostly Open....Other: Water temp. 22.1 C / pH 7.4 SU / DO 5.6 mg/L / Cond. 522 umhos; Suburban
 storm sewers present; trash - car engine, yard debris present, downstream of Forest Park sewage pumping station

Station: AN0275
 Peckman River, McBride Ave, West Paterson Boro, Passaic County
 Paterson USGS Quadrangle
 Date Sampled: 10/23/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	43
Elmidae	4	24
Simuliidae	6	15
Gammaridae	4	14
Planariidae	4	3
Chironomidae	6	1
Enchytraeidae	10	1
Tubificidae	10	1
Naididae	7	1
Cambaridae	5	1
Sphaeriidae	8	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 106
 % Contribution of Dominant Family: 40.57 % (Hydropsychidae)
 Family Biotic Index: 4.49
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 40.57
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 76 (Marginal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 9.5 ' / < 1.0 '
 Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees/Poor
 Canopy: Partly Open....Other: Water temp. 9.6 C /pH 7.4 SU /DO 11.2 mg/L /Cond 763
 umhos; Urban
 storm sewers; a lot of debris in stream;

Station: AN0275A
Peckman River, Bradford Ave, Cedar Grove Twp, Essex County
Orange USGS Quadrangle
Date Sampled: 10/30/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	98
Chironomidae	6	4
Tipulidae	3	3
Planariidae	4	1
Lumbriculidae	8	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 108
% Contribution of Dominant Family: 90.74 % (Hydropsychidae)
Family Biotic Index: 4.11
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 90.74
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 168 (Optimal) USEPA Protocol
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid, greenish brown....Flow: Moderate....Width/Depth (ft): 32
' / < 1.0 - 1.5 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Mostly Open....Other: Water temp. 13.2 C /pH 7.8 SU /DO 10.2 mg/L /Cond 420
umhos; Suburban
storm sewers; sewage odor; upstream of treatment plant;

Station: AN0276

Molly Ann Brook, Westside Park (Totowa Avenue), Prospeck Park Boro, Passaic County

Paterson USGS Quadrangle

Date Sampled: 06/30/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	34
BloodRed Chironomidae	8	28
Gammaridae	4	12
Naididae	7	8
Chironomidae	6	7
Physidae	7	4
Glossiphoniidae	8	3
Asellidae	8	2
Lumbriculidae	10	2
Baetidae	4	1
Hydropsychidae	4	1
Corixidae	9	1
Planariidae	4	1
Erpobdellidae	8	1
Planorbidae	6	1
Mesoveliidae	9	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 17

Total Number of Individuals: 108

% Contribution of Dominant Family: 31.48 % (Tubificidae)

Family Biotic Index: 7.83

E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2

% EPT: 1.85

NJIS Rating: 12

Biological Condition: Moderately Impaired

Habitat Analysis: 94 (Marginal) USEPA Protocol

Deficiency(s) noted:

- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid, Brown....Flow: Slow....Width/Depth (ft): 49' / 3' - 4'

Substrate: Cobbles, Silt....StreamBank Vegetation/Stability: Grasses, Weeds, Trees/Fair

Canopy: Open....Other: Water temp. 22.5 C / pH 7.4 SU / DO 7.0 mg/L / Cond. 438 umhos;

Urban, in park

Geese and fish present, Trash/Recyclables present; Purple loosestrife present

Station: AN0277
Goffle Brook, Wagaraw Rd, Hawthorne Boro, Passaic County
Paterson USGS Quadrangle
Date Sampled: 10/30/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	55
Gammaridae	4	16
Chironomidae	6	15
Empididae	6	3
Asellidae	8	1
Simuliidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 7
Total Number of Individuals: 92
% Contribution of Dominant Family: 59.78 % (Hydropsychidae)
Family Biotic Index: 4.46
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 59.78
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 135 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 18.5 ' / < 1.0-1.5 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Fair
Canopy: Mostly Open....Other: Water temp. 11.8 C /pH 7.8 SU /DO 8.3 mg/L /Cond 387
umhos; Urban / industrial; storm sewers
new bridge; riprap on both stream banks;

Station: AN0277A
 Goffle Brook, Wykoff Avenue, Ridgewood Village, Bergen County
 Paterson USGS Quadrangle
 Date Sampled: 07/01/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	31
Simuliidae	6	18
Hydropsychidae	4	11
Baetidae	4	9
BloodRed Chironomidae	8	9
Gammaridae	4	5
Naididae	7	3
Tipulidae	3	3
Empididae	6	2
Hydroptilidae	4	2
Tubificidae	10	2
Planariidae	4	1
Hydrophilidae	5	1
Lumbricidae	10	1
Cambaridae	5	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 31.00 % (Chironomidae)
 Family Biotic Index: 5.64
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 22.00
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 144 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12.0' / <1' - 1.0'
 Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Grass, Shrub/Fair
 Canopy: Mostly Closed....Other: Water temp. 21.6 C / pH 7.3 SU / DO 8.4 mg/L / Cond. 672 umhos; Urban. storm sewers
 gas smell coming from storm drain upstream.; construction on bridge and storm drains, rip-rap on banks and under bridge

Station: AN0278
Diamond Brook, Harristown Rd, Fair Lawn Boro, Bergen County
Paterson USGS Quadrangle
Date Sampled: 11/06/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	44
Lumbriculidae	8	35
Chironomidae	6	12
Hydropsychidae	4	3
Planariidae	4	2
Tetrastemmatidae	7	2
Planorbidae	6	1
Erpobdellidae	8	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 101
% Contribution of Dominant Family: 43.56 % (Gammaridae)
Family Biotic Index: 5.78
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.97
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 119 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 33 ' / < 1.0-2 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, grasses/Poor
Canopy: Partly Open....Other: Water temp. 14.4 C /pH 7.0 SU /DO 7.4 mg/L /Cond 569 umhos; Suburban / light industrial / recreational-ball fields
storm sewers flowing; left bank stabilized with concrete blocks; ducks

Station: AN0279
 Saddle River, Old Stone Church Rd, Upper Saddle River Boro, Bergen County
 Park Ridge USGS Quadrangle
 Date Sampled: 07/08/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	23
Baetidae	4	20
Simuliidae	6	11
Hydropsychidae	4	7
Lumbriculidae	8	7
Gammaridae	4	6
Hydroptilidae	4	6
Elmidae	4	6
Tipulidae	3	3
Asellidae	8	3
Glossosomatidae	0	3
Physidae	7	3
Planariidae	4	2
Tubificidae	10	2
Naididae	7	2
Philopotamidae	3	1
Coenagrionidae	9	1
Lumbricidae	10	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 107
 % Contribution of Dominant Family: 21.50 % (Chironomidae)
 Family Biotic Index: 5.21
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 34.58
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 191 (Optimal) EPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40 ' / < 1.0'
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
 Canopy: Partly Open....Other: Water temp. 20.2 C /pH 7.9 SU /DO 8.8 mg/L /Cond 680
 umhos; Suburban
 Storm sewers and water fowl observed. ; A pond drains into stream

Station: AN0280
 West Branch Saddle River, Old Stone Church Rd, Upper Saddle River Boro, Bergen County
 Park Ridge USGS Quadrangle
 Date Sampled: 07/08/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	29
Baetidae	4	28
Lumbriculidae	8	11
Tubificidae	10	9
Hydropsychidae	4	6
Glossosomatidae	0	4
Physidae	7	3
Tipulidae	3	2
Elmidae	4	2
Dytiscidae	5	1
Empididae	6	1
Planariidae	4	1
Planorbidae	6	1
Hydroptilidae	4	1
Lumbricidae	10	1
Nematoda	6	1
Simuliidae	6	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 103
 % Contribution of Dominant Family: 28.16 % (Chironomidae)
 Family Biotic Index: 5.60
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 37.86
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 168 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 22 ' / < 1.0 - 1.5 '
 Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
 Canopy: Mostly Closed....Other: Water temp. 22.5 C /pH 8.0 SU /DO 8.3 mg/L /Cond 719
 umhos; Suburban. Storm sewers

Station: AN0281
 Saddle River, E. Allendale Rd, Saddle River Boro, Bergen County
 Park Ridge USGS Quadrangle
 Date Sampled: 07/10/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	43
Gammaridae	4	9
Simuliidae	6	9
Hydropsychidae	4	8
Baetidae	4	6
Asellidae	8	5
BloodRed Chironomidae	8	5
Tricorythidae	4	5
Elmidae	4	4
Tubificidae	10	3
Hydroptilidae	4	2
Aeshnidae	3	1
Tipulidae	3	1
Philopotamidae	3	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 103
 % Contribution of Dominant Family: 41.75 % (Chironomidae)
 Family Biotic Index: 5.57
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 21.36
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 145 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 41 ' / < 1.0 - 1.5 '
 Substrate: Cobbles, gravel....StreamBank Vegetation/Stability: Trees, grass, shrubs/Good
 Canopy: Partly Open....Other: Water temp. 17.6 C /pH 7.8 SU /DO 8.8 mg/L /Cond 637
 umhos; Suburban. Storm sewers flowing
 Construction adjacent to stream. ; Stabilization structures on both banks.

Station: AN0282
Saddle River, E. Ridgewood Ave, Ridgewood Village, Bergen County
Hackensack USGS Quadrangle
Date Sampled: 10/28/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	58
Gammaridae	4	17
Chironomidae	6	13
Elmidae	4	7
Glossosomatidae	0	4
Tipulidae	3	3
Philopotamidae	3	2
Asellidae	8	1
Empididae	6	1
Lumbricidae	10	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 108
% Contribution of Dominant Family: 53.70 % (Hydropsychidae)
Family Biotic Index: 4.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 59.26
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 175 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 56 ' / 2-2.5 '
Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs/Good
Canopy: Mostly Open....Other: Water temp. 12.5 C /pH 7.8 SU /DO 9.4 mg/L /Cond 334
umhos; Suburban; storm sewers
site downstream of drainage from pond in park; fish, many ducks

Station: AN0283
 Hohokus Brook, Old Mill Rd, Franklin Lakes Boro, Bergen County
 Ramsey USGS Quadrangle
 Date Sampled: 07/10/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	32
Simuliidae	6	17
BloodRed Chironomidae	8	14
Gammaridae	4	9
Hydropsychidae	4	8
Naididae	7	4
Asellidae	8	3
Sphaeriidae	8	3
Physidae	7	3
Baetidae	4	2
Planariidae	4	1
Planorbidae	6	1
Empididae	6	1
Erpobdellidae	8	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 32.00 % (Chironomidae)
 Family Biotic Index: 6.07
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 11.00
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 186 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 4 ' / 1.0 - 1.5 '
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, shrubs, grass/Good
 Canopy: Mostly Open....Other: Water temp. 19.4 C /pH 7.9 SU /DO 7.2 mg/L /Cond 965
 umhos; Suburban. Downstream of lake. Storm sewers.
 Concrete substrate under bridge; crayfish, minnows, filamentous algae

Station: AN0284
 Valentine Brook, Forest Ave, Allendale Boro, Bergen County
 Ramsey USGS Quadrangle
 Date Sampled: 07/30/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	40
Hydropsychidae	4	19
Simuliidae	6	15
BloodRed Chironomidae	8	12
Tubificidae	10	4
Planorbidae	6	2
Naididae	7	2
Tipulidae	3	1
Empididae	6	1
Lumbricidae	10	1
Haliplidae	5	1
Physidae	7	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 13
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 40.00 % (Chironomidae)
 Family Biotic Index: 6.07
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 19.00
 NJIS Rating: 15
 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): 12 ' / < 1.0 - 1.5 '
 Substrate: Cobbles, gravel/sand....StreamBank Vegetation/Stability: Trees, shrubs, grass/Fair
 Canopy: Closed....Other: Water temp. 18.0 C /pH 7.7 SU /DO 8.1 mg/L /Cond 956 umhos;
 Suburban. Storm sewers. Trout stocked waters
 minnows observed;

Station: AN0285
Hohokus Brook, Park Avenue, Allendale Boro, Bergen County
Ramsey USGS Quadrangle
Date Sampled: 07/01/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	33
Chironomidae	6	19
Planariidae	4	14
Elmidae	4	9
Gammaridae	4	8
Philopotamidae	3	6
Simuliidae	6	5
Naididae	7	3
BloodRed Chironomidae	8	3
Baetidae	4	2
Ancylidae	6	1
Tipulidae	3	1
Asellidae	8	1
Lumbriculidae	8	1
Leptoceridae	4	1
Corydalidae	0	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 109
% Contribution of Dominant Family: 30.28 % (Hydropsychidae)
Family Biotic Index: 4.65
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 38.53
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 170 (Optimal) USEPA Protocol
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 15' / 1'-2'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Closed....Other: Water temp. 21.8 C / pH 7.5 SU / DO 7.8 mg/L / Cond. 718
umhos; Suburban
storm sewers present; easily flooded during heavy rains, crayfish present

Station: AN0286
 Ramsey Brook, Masonicus Rd, Mahwah Twp, Bergen County
 Park Ridge USGS Quadrangle
 Date Sampled: 07/10/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	43
Hydropsychidae	4	12
Simuliidae	6	10
Elmidae	4	6
BloodRed Chironomidae	8	5
Baetidae	4	3
Philopotamidae	3	3
Naididae	7	3
Tubificidae	10	2
Gammaridae	4	2
Enchytraeidae	10	2
Veliidae	9	2
Calopterygidae	5	1
Cambaridae	5	1
Planariidae	4	1
Gerridae	8	1
Limnephilidae	4	1
Physidae	7	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 43.00 % (Chironomidae)
 Family Biotic Index: 5.81
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 19.00
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 179 (Optimal) USEPA Protocol
 Deficiency(s) noted:
 -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 10 ' / < 1.0 -1.5 '
 Substrate: Cobbles, gravel/sand, boulders....StreamBank Vegetation/Stability: Trees, grass, shrubs/Good
 Canopy: Mostly Closed....Other: Water temp. 19.4 C /pH 7.7 SU /DO 6.6 mg/L /Cond 579 umhos; Suburban
 Fish observed;

Station: AN0287
Ramsey Brook, Park Avenue, Allendale Boro, Bergen County
Ramsey USGS Quadrangle
Date Sampled: 07/01/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	60
BloodRed Chironomidae	8	20
Naididae	7	8
Planariidae	4	6
Lumbriculidae	8	3
Tubificidae	10	2
Tetrastemmatidae	7	2
Simuliidae	6	2
Ancylidae	6	1
Enchytraeidae	10	1
Erpobdellidae	8	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 107
% Contribution of Dominant Family: 56.07 % (Chironomidae)
Family Biotic Index: 6.52
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 154 (Suboptimal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 17' / 1.0'-1.5'
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, Grass, Shrubs/Fair
Canopy: Mostly Closed....Other: Water temp 21.6 C / pH 8.1 SU / DO 7.8 mg/L / Cond. 618 umhos; Suburban
storm sewers present; fish present

Station: AN0288
 Hohokus Brook, Spring St, Ridgewood Village, Bergen County
 Hackensack USGS Quadrangle
 Date Sampled: 10/28/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	25
Gammaridae	4	14
Hydrobiidae	8	12
Coenagrionidae	9	12
Planorbidae	6	10
Sphaeriidae	8	6
Enchytraeidae	10	4
Ancylidae	6	2
Hydropsychidae	4	2
Lumbricidae	10	2
Gerridae	8	2
Asellidae	8	1
Libellulidae	9	1
Veliidae	9	1
Haliplidae	5	1
Physidae	7	1
Corduliidae	5	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 98
 % Contribution of Dominant Family: 25.51 % (Tubificidae)
 Family Biotic Index: 7.76
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 2.04
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 119 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 53 ' / 2-3 '
 Substrate: Cobbles, sand....StreamBank Vegetation/Stability: Trees/Poor
 Canopy: Partly Open....Other: Water temp. 13.5 C /pH 7.8 SU /DO 9.3 mg/L /Cond 618 umhos;
 Suburban / recreational (adj to ball fields upstream)
 Storm sewers; fish observed; bare and scoured banks ;

Station: AN0289
 Saddle River, End Of Dunkerhook Rd, Fair Lawn Boro, Bergen County
 Hackensack USGS Quadrangle
 Date Sampled: 10/28/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	64
Asellidae	8	15
Chironomidae	6	9
Gammaridae	4	7
Glossiphoniidae	8	2
Naididae	7	1
Planariidae	4	1
Empididae	6	1
BloodRed Chironomidae	8	1
Simuliidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 103
 % Contribution of Dominant Family: 62.14 % (Hydropsychidae)
 Family Biotic Index: 4.94
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 62.14
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 180 (Optimal) USEPA Protocol
 Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Fast....Width/Depth (ft): 30 ' / 2.5 '
 Substrate: Cobbles, snags....StreamBank Vegetation/Stability: Trees, shrubs/Fair
 Canopy: Partly Open....Other: Water temp. 13.3 C /pH 7.6 SU /DO 8.6 mg/L /Cond 485
 umhos; Suburban / forested (adjacent to park)

Station: AN0290
 Saddle River, Railroad Ave, Rochelle Park Twp, Bergen County
 Hackensack USGS Quadrangle
 Date Sampled: 11/06/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	40
Hydropsychidae	4	14
Chironomidae	6	11
BloodRed Chironomidae	8	7
Corixidae	9	5
Asellidae	8	4
Hydrobiidae	8	2
Calopterygidae	5	1
Gammaridae	4	1
Coenagrionidae	9	1
Lumbricidae	10	1
Enchytraeidae	10	1
Stratiomyidae	10	1

Statistical Analysis

Number of Taxa: 13
 Total Number of Individuals: 89
 % Contribution of Dominant Family: 44.94 % (Tubificidae)
 Family Biotic Index: 8.08
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 15.73
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 110 (Suboptimal) USEPA Protocol
 Deficiency(s) noted:
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 50 ' / 2 - 4 '
 Substrate: Mud, silt....StreamBank Vegetation/Stability: Trees, shrubs, grass/Poor
 Canopy: Open....Other: Water temp. 14.0 C /pH 7.0 SU /DO 7.8 mg/L /Cond 599 umhos;
 Suburban / recreational (park)
 storm sewers; ducks, minnows

Station: AN0291
 Saddle River, Marsellus Place/Saddle River Ave, Garfield, Bergen County
 Weehauken USGS Quadrangle
 Date Sampled: 11/13/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	48
Hydropsychidae	4	17
Chironomidae	6	17
Hydroptilidae	4	7
Asellidae	8	5
Corbiculidae	8	4
BloodRed Chironomidae	8	2
Tubificidae	10	2
Hydrobiidae	8	1
Planorbidae	6	1
Naididae	7	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 106
 % Contribution of Dominant Family: 45.28 % (Gammaridae)
 Family Biotic Index: 4.97
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 22.64
 NJIS Rating: 18
 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): 67 ' / 1-1.5 '
 Substrate: Cobbles, gravel/sand, silt....StreamBank Vegetation/Stability: Shrubs, trees/Fair
 Canopy: Open....Other: Water temp. 10.9 C /pH 7.2 SU /DO 8.6 mg/L /Cond 648 umhos;
 Urban / light industrial; storm sewers
 site adjacent to NJ Transit RR;

Station: AN0292
Third River, Kingland Rd, Outlet Of Yantacaw Pond, Clifton, Passaic County
Orange USGS Quadrangle
Date Sampled: 11/13/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	53
Sphaeriidae	8	29
Hydropsychidae	4	10
Planariidae	4	5
Chironomidae	6	4
Elmidae	4	3
Planorbidae	6	2
Asellidae	8	1
Pleuroceridae	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 108
% Contribution of Dominant Family: 49.07 % (Gammaridae)
Family Biotic Index: 5.24
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 9.26
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 85 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 40 ' / < 1.0 - 2 '
Substrate: Cobbles....StreamBank Vegetation/Stability: Grasses, few trees and shrubs/Poor
Canopy: Partly Open....Other: Water temp. 10.9 C /pH 7.1 SU /DO 9.8 mg/L /Cond 545;
Suburban / industrial (plastics company)
storm sewers; brick banks;

Station: AN0292A
 Third River, W. Passaic Ave, Bloomfield, Bergen / Passaic County
 Orange USGS Quadrangle
 Date Sampled: 11/13/03

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	38
Tubificidae	10	25
Sphaeriidae	8	15
Planorbidae	6	5
Chironomidae	6	4
Asellidae	8	3
Hydropsychidae	4	3
Plagiostomidae	4	2
BloodRed Chironomidae	8	2
Tetrastemmatidae	7	1
Simuliidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 38.00 % (Gammaridae)
 Family Biotic Index: 6.53
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 3.00
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 101 (Marginal) USEPA Protocol
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 12 ' / < 1.0 - 1.5
 Substrate: Gravel, mud, silt....StreamBank Vegetation/Stability: Trees, grass/Poor
 Canopy: Partly Open....Other: Water temp. 12.0 C /pH 7.2 SU /DO 7.9 mg/L /Cond 362
 umhos; Urban; adjacent to GSP; storm sewers
 leaf litter, trash, ducks, fish;

Station: AN02920

Passaic River, outlet of Dundee Dam off River Rd, Garfield, Bergen / Passaic County
Paterson USGS Quadrangle

Date Sampled: 11/13/03

.	Family Tolerance	Number of
Family	Value (FTV)	Individuals

Other: THIS SITE WAS NOT SAMPLED

Station: AN0293
Second River, Mccarthy Highway And Main Street, Newark, Essex County
Orange USGS Quadrangle
Date Sampled: 06/24/04

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	33
BloodRed Chironomidae	8	19
Chironomidae	6	15
Enchytraeidae	10	7
Baetidae	4	5
Naididae	7	5
Hydroptilidae	4	2
Lumbricidae	10	2
Tipulidae	3	1
Ptychopteridae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 90
% Contribution of Dominant Family: 36.67 % (Tubificidae)
Family Biotic Index: 8.18
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 7.78
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 87 (Marginal) USEPA Protocol
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 47' / 2'
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Trees, Weeds/Fair
Canopy: Open....Other: Water Temp. 20.6 C / pH 7.6 SU / DO 8.5 mg/L / Cond. 803 umhos;
Industrial
Storm Sewers present; fish, ducks, trash, recyclables, concrete walls, sewage and chemical odor present
