

State of New Jersey
Christine Todd Whitman, Governor

AMBIENT BIOMONITORING NETWORK
Watershed Management Areas 3, 4, 5, and 6
Passaic Region
1998 Benthic Macroinvertebrate Data



New Jersey Department of Environmental Protection
Robert C. Shinn, Jr., Commissioner

June 2000



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INTRODUCTION

Historical Perspective

Since the early 1970s the New Jersey Department of Environmental Protection (NJDEP) has conducted biological monitoring of the state's water bodies. These biomonitoring studies, currently conducted by the Bureau of Freshwater and Biological Monitoring (BFWM), have included both long-term ambient monitoring and short-term intensive surveys. The information gathered contributes significantly to State water quality management and pollution mitigation efforts. The United States Environmental Protection Agency (USEPA) has recognized that a thorough program of monitoring aquatic biota can be a cost-efficient means of gauging the quality of water and watershed areas [1, 2]. Because flora and fauna of various trophic levels can integrate the effects of water quality or habitat changes over time, they become very effective pollution indicators. For lotic (running water) systems, analysis of benthic macroinvertebrate communities provides the principal means of achieving this, particularly since macroinvertebrates are more stationary than fish, and less temporal than periphytic, or attached microscopic communities.

New Jersey's initial long-term ambient biological stream monitoring program, in the mid 1970s, included only a limited number (31) of "fixed stations," many of which proved later to be either inaccessible or in degraded condition. In 1991, however, the BFWM received numerous requests from the Office of Regulatory Policy to reinstate or upgrade long-term monitoring of benthic macroinvertebrate communities; the data obtained would be most beneficial in the generation of the 305b (Water Quality Inventory) biennial report [3], in the updating the 303d List (of water quality limited stream segments). Thus, the present Ambient Biomonitoring Network (AMNET) program was developed to provide NJDEP with the greater resolution of baseline data now necessary to support sound policy decisions in water quality/watershed management, and to direct regulatory, or "permit," activities. Initiated in 1992, AMNET samples over 800 stream sites statewide, with approximately 200 sites in each of five major drainage basins (upper and lower Delaware, greater Passaic, Raritan and Atlantic) once every five years. This ambitious project is facilitated by the use of Rapid Bioassessment Protocol II (RBPII) methods, devised by the USEPA, which provide an expedient tool for site ranking, screening and trend monitoring [2]. The present report, on the Passaic Region, marks the second round of AMNET sampling for this area.

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, water fleas, 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 species. The overall community thus is holistically reflective of conditions in its environment. Assessments of ambient water and habitat quality can then be made based upon standardized procedures, which can show perturbations measured as changes or differences in community structure [2, 4].

STUDY DESIGN

Data Quality Objectives

The major goal of AMNET is to establish a network of stream sites that would adequately represent New Jersey's major drainage basins and NJDEP's Watershed Management Areas (WMA). Twenty WMAs have recently been delineated within New Jersey's five basins. Each basin constitutes a "Water Region." Within each WMA are several sub-basins, delineated by the United States Geological Survey (USGS) as "hydrologic units," scale 11 (HUC11). The study area of the present report includes WMAs 3, 4, 5, and 6 (see Maps 1 – 7). The sampling frequency reflects a realistic temporal lag between cessation of an environmental perturbation and recovery of the impacted biological community. The 305b Water Quality Inventory [3], which reexamines 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.

Another program goal is to monitor a complete basin's complement of stations within a fiscal year (beginning July 1), giving our modelers and planners a snapshot of ambient biological impacts during that particular year. Monitoring will be rotated to a different basin each new fiscal year.

The spatial distribution of stations is adequate to provide biological impact data on a long-term, basin-wide or statewide scale. It is likely not sufficient, however, to assess the biological impact(s) of any one point source of pollution, as this would be better served by a site-specific or intensive survey of the stream segment in question.

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.

Site Selection

For the first round of AMNET (1993), a total of 119 stations had been established in the Northeast basin [5]. This area (shown in Figure 1) included all sub-basins that drain to the Arthur Kill (Rahway/Elizabeth/Woodbridge Rivers), Passaic, Hackensack, and Wallkill River basins. On the smallest tributaries, sampling sites were located as closely to headwaters as practical. To ensure enough flow for sampling, sites on "first-order" streams were 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 were situated on second-order streams (with only first-order streams as tributaries) and higher (with a greater hierarchy of tributaries). All sites were located in reasonably accessible and primarily wadable segments, proceeding downstream to near the head-of-tide.

For the second round of AMNET (FY99), the original study area was realigned to conform with the boundary between the newly established Water Regions. 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. In the Passaic Region (WMA #3, 4, 5, and 6), fourteen new sites were added, to the 90 previously established, with one site (AN0286) relocated for better access. This brought the total number of sampling sites in the Passaic Region to 104. One site, however, (AN0263) was not sampled due to low flow conditions (Figure 2).

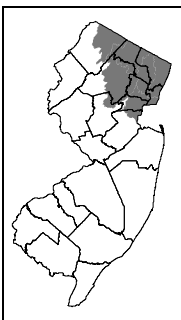


Figure 1

Map of 1993 study area

To maximize data correlation, AMNET, wherever possible, incorporated existing stations of the ambient Surface Water Chemical Monitoring Network, which is administered jointly by NJDEP and the USGS [7]. Furthermore, so as to gauge the effects of major tributaries and larger lakes, many AMNET sites were located near their confluence or outlet. Also considered when selecting sites were known sources of contamination (e.g. point-source discharges, agricultural operations) and significant natural features such as wetlands, parks or wildlife management areas.

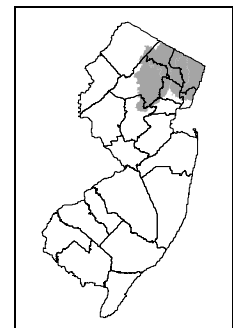


Figure 2

Map of 1998 study area

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 Geographical Information System (GIS) (see Maps 1 – 7, Appendix A).

FIELD & LABORATORY METHODS

Benthic macroinvertebrate sampling and analysis was performed in accordance with the NJDEP Field Procedures Manual [8], Rapid Bioassessment (RBP) Protocol II guidelines of the USEPA [2] and Standard Operating Procedures (SOP) of the BFWM Aquatic Biomonitoring Laboratory [9].

Field Collection

Because the low gradient of the southern regions precludes streams from having dominant riffle areas (the preferred sampling habitat) we modified the RBP field methods for New Jersey streams by collection of multi-habitat samples. This type of sampling includes both riffle and run areas, with various types of substrate (e.g. fine sediment, gravel/rocks, woody debris, stream and bank vegetation), plus coarse particulate matter or leaf litter (CPOM). This would minimize habitat or substrate variation between stations, and include all likely functional groups of macroinvertebrates. Samples were collected in semi-quantitative fashion either with a Surber Sampler, kick net, Petite Ponar dredge, or by hand picking. During the field investigation, semi-qualitative observations of habitat, surrounding land use, potential pollution sources, and other aquatic biota were recorded, although these did not figure into the final numerical rating. At each site, the entire sample was sieved (through standard #30 mesh), put into wide-mouth glass jars, and preserved with 5 to 10% formalin (to 20% in cases of excessive organic loading).

Sample Sorting & Identification

In the laboratory, subsamples of 100 individuals were taken by first evenly distributing the composited sample on a grid in a light-colored pan, then removing all organisms from randomly-selected grids until a total of at least 100 organisms was obtained. The macroinvertebrates were identified to species (where possible), or at least to family level, and counted using 7 to 30X stereozoom and 40 to 400X compound magnification. A comprehensive collection of taxonomic keys and other references, including functional (or niche) descriptions and pollution tolerance classifications for most species, is maintained in the laboratory. An indexed list of these is given in the Laboratory SOP [9]. Consultation with other scientists in the field provides added assistance and confirmation, when needed.

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); in excessive dominance of pollution-tolerant taxa such as Chironomidae (midges) and Oligochaeta (worms); in low overall taxa numbers, or with 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 a multiple approach, utilizing several "biometrics," that measure different components of community structure, including population and functional parameters, each with a different range of sensitivity to pollution stresses [2, 4]. 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 II protocols, results are based on 100 organism sub-samples, and scoring criteria are validated for family level taxonomy, giving three final rating categories (non-impaired, moderately impaired, and severely impaired).

The biometrics we employ are modified from RBP II methods, having been statistically validated for New Jersey based upon data from 200 stream sites throughout the state [10]. The final numerical rating is referred to as the "New Jersey impairment score" (NJIS). 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 assigned to individual families increase as water quality decreases; summarizes the overall pollution tolerance of the entire benthic macroinvertebrate community with a single value.

Comparison with 1993 Results

In evaluating the 1998 Passaic Region data against that for 1993, a significant improvement or decline is considered to have occurred if the difference in NJIS scores has changed the bioassessment rating. A complete list of site-by-site comparisons is presented in Table 2, where a (+) indicates a significant improvement, a (-) indicates a significant decline, and a (/) indicates no change in rating; a slash may have a (+) or a (-) indicating that the score improved or declined, but the bioassessment rating did not.

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.

In the course of identification, chironomid larvae were examined for abnormalities. These results are summarized by sample site in Table 3. For chironomidae, the data is displayed as (# of chironomids with abnormalities / # of chironomids examined). For all other taxa, just the number of individuals with abnormalities is presented. Deformities found in greater than five percent (> 5%) of chironomids examined were considered to be significant (personal communication — R. Bode, New York Department of Environmental Conservation; J. Kurtz, NJDEP). Abnormalities were considered to be "chronic" at a particular station if that site yielded > 5% abnormalities for both the 1993 and 1998 sampling periods (see Table 3). Photographic examples of abnormalities in midge larvae and amphipods (scuds), plus maps of the sites where these were found, are contained in Appendix B. AMNET sites found with significant and chronic abnormalities in chironomids are also indicated in Maps 1-7.

SUPPLEMENTAL ANALYSIS / EVALUATION

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, habitat degradation alone can account for biological impairment in a stream [2]. Parameters we evaluated included in-stream substrate, channel morphology, bank structural features, and riparian vegetation. The area evaluated included the sample site and its immediate surroundings (usually within a 100 – 200 foot radius).

The qualitative habitat assessment involves four condition categories, rating each parameter as optimal, suboptimal, marginal or poor based on recently revised USEPA criteria [11]. Habitat assessments may be temporarily downgraded by adverse weather conditions, such as excessive rainfall or prolonged

drought (which existed during this study period). 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. For each parameter, the range of conditions and the numerical rating scale are presented for high and low gradient streams, respectively, in Table 4. Comparisons of these final scores against the respective NJIS scores and relative trends are shown in Appendix C.

All streams in the northern portion of New Jersey, i.e. the Piedmont, Valley / Ridge and Highlands regions, are 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 region 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. These major physiographic subregions (or "ecoregions") are illustrated in the New Jersey State EcoMap [12]. The transition from high gradient to low gradient is marked by the “Fall Line”, a geologic / topographic feature, which bisects New Jersey in a southwest – northeasterly direction from the Delaware River at Trenton through the lower Raritan River near New Brunswick. The trajectory of the Fall Line is superficially traced by the lower Assunpink Creek, at the southwest juncture and its alignment with Lawrence Brook to the northeast in the Raritan River drainage. The Passaic Water Region is above the Fall Line, encompassing largely high gradient terrain in the northern Piedmont, Highlands and Reading Prong ecoregions [12].

Sediment Toxicity Testing

To supplement the results of the benthic macroinvertebrate sampling, the BFWM from 1996 to 1998 performed acute sediment toxicity tests on several AMNET sites that exhibited “severely impaired” biological conditions in the earlier survey of the present Passaic Water Region (formerly the "Northeast Basin"). The methods conformed to standardized USEPA protocols as reflected in our laboratory Standard Operating Procedures [9]. The amphipod, *Hyalella azteca*, was used as the test organism in the 10-day tests that measured effects on both survival and growth. Results from the test sites were compared to the responses observed in reference sediment from non-impaired AMNET sites that were similar in morphology or habitat features. Most of the AMNET sites tested have been in WMA 4, 5, and 6 (Maps 2-7). The test sites, and correlating reference sites are as follows:

Test Site	Reference Site Used
AN0224A Passaic River @ Rt. 512	AN0224 Passaic River @ Valley Rd.
AN0229 Passaic River @ Stanley Ave.	AN0224 Passaic River @ Valley Rd.
AN0276 Molly Ann Brook @ Totowa Ave.	AN0279 Saddle River @ Old Stone Church Rd.
AN0291 Saddle River @ Marcellus Place	AN0279 Saddle River @ Old Stone Church Rd.
AN0220 Loantaka Brook @ Blue Stone Terrace	AN0225 UNT to Dead River @ Somerville Rd.
AN0222 Black Brook @ Southern Blvd.	AN0225 UNT to Dead River @ Somerville Rd.
AN0223 Black Brook @ New Vernon Rd.	AN0225 UNT to Dead River @ Somerville Rd.
AN0234 Whippany River @ Ridgedale Ave.	AN0232 Whippany River @ Mount Pleasant Rd.
AN0209 Tenakill @ Cedar Lane	AN0208 Dwarskill @ Ruckman Rd.
AN0212 Overpeck Ck. @ Dean Drive	AN0208 Dwarskill @ Ruckman Rd.

RESULTS AND DISCUSSION

Overall, bioassessment ratings developed for each of the monitoring stations were used as the basis for evaluating the degree of biological impairment within the coincident stream segments. The estimated bioassessment ratings for each stream segment are presented as color-coded highlighted segments on the GIS maps # 1 through 7. In each WMA, starting from the AMNET station farthest downstream, estimated bioassessment ratings were assigned to the stream segments by interpolating from the downstream station to the next contiguous upstream station. These ratings are best estimates of the in-stream biological impairment based upon the available data. For any given segment, however, the actual in-situ conditions may vary due to unknown differences in habitat or sources of degradation. Detailed taxonomic and statistical data, bioassessment ratings, habitat assessment scores and observations for each AMNET site are given in Appendix D.

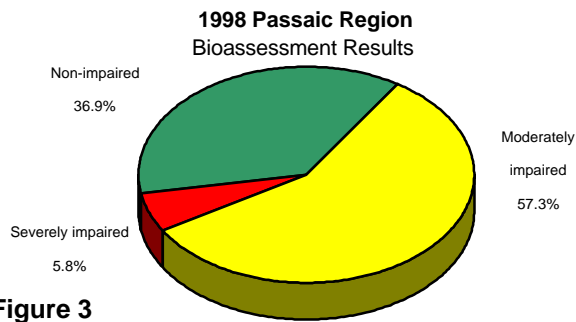


Figure 3

Overall, out of 103 monitoring stations sampled during this study period, 38 or **36.9%** were rated as "**non-impaired**", 59 or **57.3%** were rated as "**moderately impaired**", and 6 or **5.8%** were rated as "**severely impaired**" (see Figure 3).

For comparison, Figure 4 depicts the results obtained from the 88 AMNET sites presently in the Passaic Water Region, that were sampled during the 1993 study period.

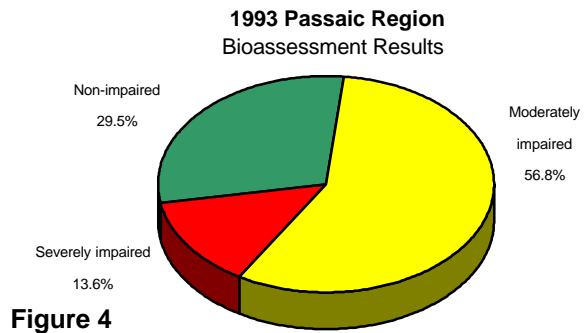


Figure 4

Figure 5 displays the percentage of change in rating that has occurred for the 88 sites sampled during the 1993 and 1998 monitoring periods. The green indicates a positive change, yellow indicates no change, and red indicates a change for the worse (see Table 2). Notably, more non-impaired and fewer severely impaired sites were found in 1998 than in 1993; however the 1998 data also revealed more moderately impaired sites than in 1993 (Figures 3 & 4).

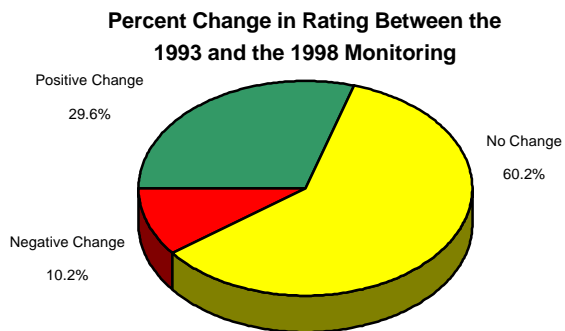


Figure 5

In the Passaic Water Region, the majority of NJIS Scores (57.3%) are in the "moderately impaired" range; over one-third of the sites (36.9%) fall into the "non-impaired" category, while only 6 sites (5.8%) are "severely impaired" (from Table 2 and Appendix D). 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 [12], which feature principally high-gradient terrain. Significantly, 24 of the 37 non-impaired sites are located within the Highlands and Reading Prong subregions (encompassing most of WMAs 3 and 6). This subregion, or "ecoregion", presumably features a greater proportion of forested upland than the Piedmont, where population and development are more concentrated than in the other ecoregions. Of the moderately impaired AMNET sites, 37 of 59 (63%) are located within the Piedmont ecoregion (WMAs 4,5, and part of 6). That only six of 102 AMNET sites in the Passaic Water Region are considered severely impaired is surprising, given the degree of industrialization of the New Jersey Piedmont area. This is partially attributed to the fact that few AMNET sites are situated in tidal reaches, i.e. the lower Passaic and Hackensack Rivers (Maps 3 and 4), where heavy industry is most concentrated.

Macroinvertebrate Abnormalities

A listing of all AMNET sites in the Passaic Water Region exhibiting macroinvertebrate abnormalities (primarily in the Chironomidae), including both the 1992/93 and 1998/99 sampling periods, is presented in Table 3. Also listed in Table 3 are numbers of "significant" and "chronic" abnormalities in the Chironomidae only. Locations of all AMNET sites yielding abnormalities in 1998/99, along with detailed pictorial examples of actual deformities, are shown in Appendix B. Those sites having "significant" abnormalities during the current sampling period are shown in Maps 1-7. From the current sampling of 103 sites, 48 were examined for abnormalities. Of these, 26 (54%) were found to have significant levels, with 15 (31%) being "chronic" (Table 3). Of the 26 sites with "significant" abnormalities, eight (AN0205, AN0243, AN0271, AN0275, AN0282, AN0287, AN0288, & AN0291) had significant levels in both 1992/93 and 1998/99 (Maps 1-7). Notably, 17 of the 26 were in the Passaic River mainstem sub-basin (WMAs 4 and 6), while four of the eight "significantly chronic" sites were in the Saddle River sub-basin (WMA 4). The occurrence of chronic abnormalities at a given site signifies the presence of chronic environmental stressor(s), possibly from toxicants, in the vicinity, therefore indicating that these areas should be more intensely investigated.

Habitat Assessment vs. Biological Condition

Habitat assessment scores and corresponding NJIS scores (from Appendix D) are plotted to show general trends along a spatial gradient (in Appendix C). In this scenario, paralleling of the trend lines in some degree would reflect a direct relationship or positive correlation between the two parameters. Conversely, in cases of biological impairment, declining NJIS scores, relative to habitat scores (i.e. divergent lines), would indicate that water quality or other physiochemical factors may be involved. In some situations, a non-impaired biological community may be found where habitat appears to be less than optimal. Sampling stations are arranged in approximate upstream-to-downstream order within each WMA (3 to 6) and, for the entire Passaic Water Region, in a (north) west to east sequence, in the following composite order: 3, 6, 4, 5 (Appendix C).

The general trend(s) within the Passaic Water Region (see graph labeled, "Comparative Scores of

Habitat vs NJIS, Combined" in Appendix C) are from borderline suboptimal/optimal to borderline suboptimal/marginal habitat scores, while the range of NJIS scores fall solidly within a "moderately" impaired range. Toward the right (downstream) there is a slightly greater decline in NJIS scores relative to habitat scores indicating that water quality or other physiochemical factors, in addition to habitat degradation, are contributing to biological impairment. The highest modal NJIS and habitat scores (optimal and near non-impaired levels) are seen in WMA 3; from there a gradual lowering of the respective values is seen through WMAs 6, 4 and 5. The NJIS trend is consistently in the "moderately" impaired range through WMAs 6 and 4. Habitat scores appear evenly distributed at the upper suboptimal level in WMA 6 and at the lower suboptimal level WMA 4. In WMA 5, both parameters exhibit a general decline from the upper to lower suboptimal/moderately impaired range (Appendix C). Further examination and statistical analysis is necessary to reveal underlying relationships between NJIS impairment levels and habitat assessments.

Sediment Toxicity Test Results

Acute toxicity, as measured by mortality, was demonstrated in sites AN0291, and AN0212. The survival responses observed were significantly different, based on statistical comparisons, with responses observed in the reference station. Site AN0222 demonstrated chronic toxicity, however; the results were inconclusive since the pooled percent survival results did not agree with the statistical analysis. The test did not exhibit chronic toxicity, as measured by the growth of test organisms however. The test should be repeated to ensure more conclusive results. There was no acute toxicity observed at the other sites. Growth responses (average dry weights), at all sites, were not significantly different from those of the control thus indicating no chronic effects, in this regard, over the ten-day test period. For the sites that indicated no acute toxicity or no adverse growth response, the severe impairment levels previously found are likely due to other causes, such as habitat alteration or various physiochemical factors. This also does not preclude the presence of toxic substances at low, but chronically toxic, levels undetectable by the present methodology, or which may have been introduced into the stream episodically, rather than continuously. Therefore, it is advisable by these study results that supplemental sampling be performed for target analytes such as fertilizer nutrients (usually forms of nitrogen and phosphorus), pesticides, or other suspected toxic compounds.

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, species 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. Lack of dissolved oxygen
2. Higher than normal temperature
3. Excessive turbidity
4. Presence of toxicants (in various chemical forms)
5. Eutrophication (= excessive nutrients promoting undesirable vegetation or algal blooms, and increased turbidity)
6. Degraded habitat (see Table 4)
 - a. lack of bank vegetation/canopy (= poor bank stability, lack of shade)
 - b. excessive sedimentation (= poor substrate and water clarity)
 - c. lack of streamflow (= low dissolved oxygen, possible sedimentation, undesirable vegetation)

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 discharge)
5. Artificial channelization or habitat alteration
6. Upstream impoundment, lake or pond
7. Drought conditions

As reflected in the present study results, human land uses and practices, superimposed on the physical terrain, play a major role in controlling the degree of pollution or degradation in a stream system.

Levels of benthic community impairment (or lack of it) have been statistically related to different physiographic land types, corresponding land uses and other anthropogenic factors, on a statewide scale, using data generated from the AMNET program [13].

The following section discusses observed impairment of AMNET sites within each Water Management Area of the Passaic Water Region, and possible contributing factors.

Evaluation by WMA

Watershed Management Area #3 includes eighteen AMNET sites in the Wanaque, Ramapo, Pequannock and Pompton River watersheds (see Map 1). Figure 6 shows that the majority of the sites (55%) were rated as non-impaired while the remaining 45% were rated as moderately impaired. No sites were found to be severely impaired. Figure 7 depicts the results of the same sixteen sites sampled during the 1993 survey for comparison. A significant improvement was seen at seven sites and a significant decline, at one site (see Table 2). Positive

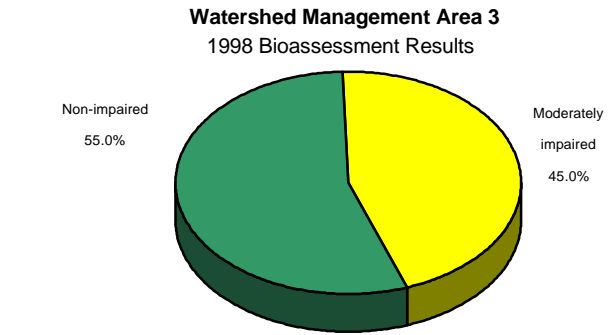


Figure 6

changes are seen in the current data set. While the relative proportion of non-impaired sites increased substantially over that of the earlier data (1993), the proportions of both moderately and severely impaired sites are substantially decreased (Figures 6 and 7). The trend for NJIS scores is near non-impairment through the entire WMA, while the trend for habitat scores declines from optimal to the higher suboptimal levels (Appendix C). Abnormalities in chironomid larvae were found to be chronic at two sites, while four additional sites, although not chronic at this time, exhibited significant levels of abnormalities in chironomid larvae only (see Table 3, Map 1).

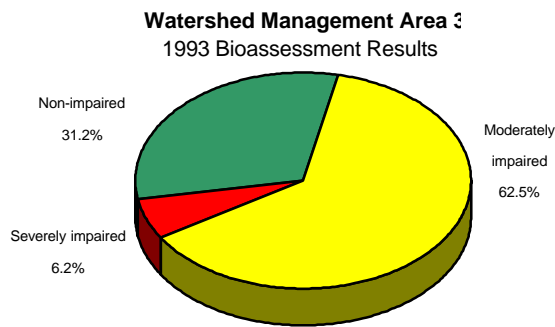
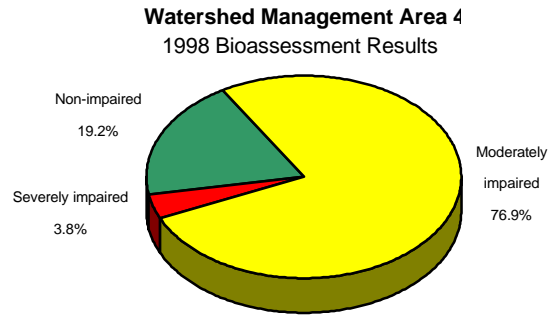


Figure 7

Watershed Management Area #4 includes twenty-six AMNET sites in the Saddle and lower Passaic River watersheds (see Maps 2, & 3). Figure 8 shows that 19.2% of the sites were rated non-impaired, and 76.9% of the sites were rated as moderately impaired. Only 3.8% of the sites were rated as severely impaired. Figure 9 depicts the results of the same twenty-six sites sampled during the 1993 survey for comparison. A significant improvement was seen at five sites, and a significant decline, at four sites (see Table 2). Negative changes are

Figure 8



seen in the current data set in that the number of non-impaired sites is considerably fewer, while the number of moderately impaired sites is greater than that of the earlier data (Figures 8 & 9). The number of severely impaired sites however, appears considerably lower than in 1993. Trends for habitat and NJIS scores appear fairly consistent at suboptimal/moderately impaired levels (Appendix C). A very slight decline, left to right, is seen in NJIS scores, suggesting that physiochemical conditions play a partial role in biological impairment. Abnormalities in chironomid larvae were found to be chronic at ten sites, while seven additional sites, although not chronic at this time, exhibited significant levels of abnormalities in chironomid larvae and other invertebrate families (see Table 3, Maps 2 & 3).

**Watershed Management Area 4
1993 Bioassessment Results**

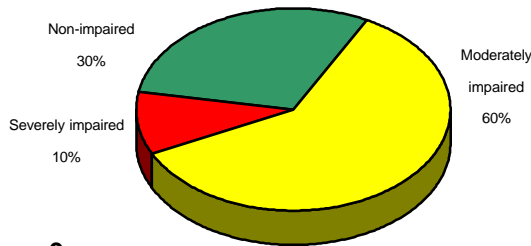


Figure 9

Watershed Management Area #5 includes eight AMNET sites in the Hackensack River watershed (see Map 4). Figure 10 shows that 25% of the sites were non-impaired; the majority of the sites (62.5%) were found to be moderately impaired, and the remaining sites (12.5%) were severely impaired. Figure 11 depicts the results of the same sites sampled during the 1993 survey for comparison. A significant improvement was apparent at two sites while no sites exhibited a decline in impairment rating. (see Table 2). Positive changes in NJIS scores are exhibited in the current data relative to the 1993 data. Although the percentage of moderately impaired sites remains constant, the percentage of non-impaired sites has doubled while the proportion of severely impaired sites is reduced by half (Figures 10 & 11). A declining trend in both NJIS and habitat scores is exhibited from mid-suboptimal levels at upstream sites to lower suboptimal levels farther downstream. There is a somewhat greater decline in NJIS scores relative to that of habitat scores (Appendix C), indicating that physiochemical conditions, as well as habitat degradation, are contributing to biological impairment. Abnormalities in chironomid larvae were found to be chronic at two sites. Two additional sites exhibited significant, although not chronic, levels of abnormalities in chironomid larvae only (see Table 3, Map 4).

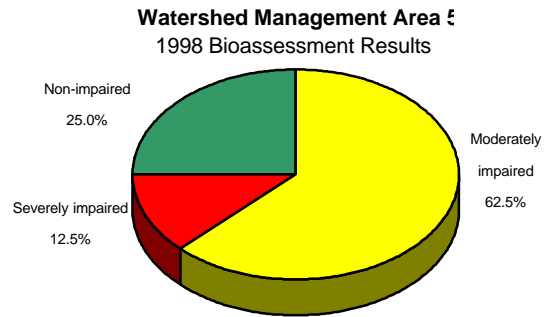


Figure 10

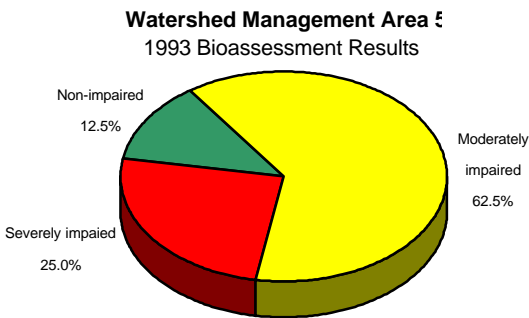


Figure 11

Watershed Management Area #6 includes forty-nine AMNET sites in the upper Passaic, Whippany, Rockaway and Dead River watersheds (see Maps 5, 6, & 7). Figure 12 shows that 40.8% of the sites were non-impaired, the majority of sites (51%) were moderately impaired, and the remaining sites (8.2%) were rated as severely impaired. A significant improvement was seen at twelve sites, and a significant decline, at four sites (see Table 2).

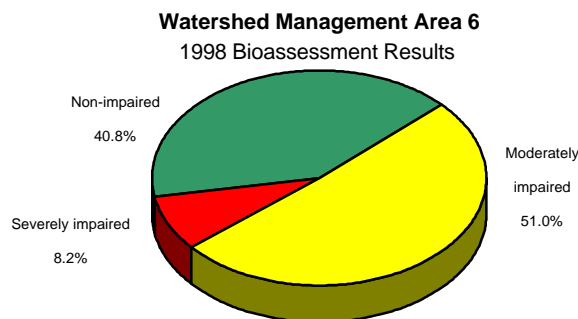


Figure 12

Figure 13 depicts the results of the same sites sampled during the 1993 survey for comparison. The number of non-impaired sites is considerably increased over that of the earlier sampling, while the number of severely impaired sites is reduced by a similar percentage, and the proportion of moderately impaired sites remains fairly constant (Figures 12 & 13).

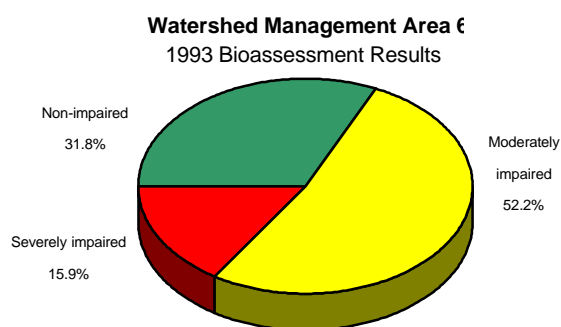


Figure 13

The trend for both NJIS and habitat scores is relatively constant, with both at suboptimal levels (Appendix C). Abnormalities in chironomid larvae were found to be chronic at one site, while four additional sites, although not chronic at this time, exhibited significant levels of abnormalities in chironomid larvae only (see Table 3, Maps 5, 6 & 7).

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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
Non-impaired	24-30
Moderately Impaired	9-21
Severely Impaired	0-6

Attributes

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

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

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

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

Table 2

Comparative Scores / Ratings (see notes)

Watershed Management Areas 3, 4, 5, and 6

Station	NJ Impairment Score		Change in Rating	Habitat Score		Station	NJ Impairment Score		Change in Rating	Habitat Score		Station	NJ Impairment Score		Change in Rating	Habitat Score
	92 / 93	98 / 99					92 / 93	98 / 99					92 / 93	98 / 99		
205	15	18	/+	128		240	12	30	+	170		277	15	12	/-	116
206	9	15	/+	104		241	15	15	/	125		277A	-	9		85
207	18	24	+	144		242	9	15	/+	121		278	12	12	/	144
208	24	30	/+	183		243	30	27	/-	141		279	30	24	/-	147
209	6	6	/	121		244	24	15	-	139		280	27	21	-	106
210	12	18	/+	131		245	30	30	/	163		281	24	21	-	76
211	12	15	/+	129		246	9	15	/+	107		282	24	24	/	152
212	6	15	+	103		247	3	30	+	169		283	12	24	+	169
213	18	24	+	145		248	30	27	/-	117		284	15	15	/	93
214	30	30	/	170		249	9	9	/	109		285	24	21	-	156
215	30	30	/	197		250	24	18	-	152		286	6	6	/	143
216	21	30	+	129		251	18	12	/-	149		287	24	18	-	115
217	30	30	/	105		252	30	30	/	181		288	15	18	/+	133
218	21	12	/-	117		253	15	21	/+	172		289	18	18	/	138
219	12	9	/-	172		254	9	27	+	156		290	12	12	/	90
220	0	15	+	124		255	30	30	/	182		291	6	21	+	114
221	15	9	/-	172		255C	-	15		191		292	18	21	/+	134
222	3	3	/	140		255D	-	30		177		292A	-	12		146
223	6	12	+	146		256	9	12	/+	132		292O	-	15		140
224	27	30	/+	140		256A	-	18		116		293	-	21		110
225	24	18	-	162		257	18	24	+	129						
226	24	27	/+	158		258	12	15	/+	142						
227	9	18	/+	118		259	24	21	-	180						
227A	-	21		149		260	21	30	+	171						
228	18	18	/	134		261	3	24	+	171						
229	6	15	+	133		262	18	24	+	141						
230	3	12	+	130		263	24	-		-						
231	9	6	-	84		264	24	24	/	168						
231A	-	3		100		265	30	27	/-	185						
231C	-	6		141		266	18	27	+	134						
231D	-	12		157		267	18	27	+	145						
231E	-	15		125		268	15	24	+	149						
232	30	30	/	187		269	15	15	/	132						
233	21	21	/	131		270	12	18	/+	124						
234	6	27	+	121		271	9	9	/	95						
234A	15	24	+	181		272	18	24	+	109						
235	12	9	/-	128		273	18	18	/	129						
236	9	15	/+	160		274	15	24	+	174						
237	18	27	+	188		274A	-	18		115						
238	18	12	/-	110		275	21	15	/-	143						
238B	-	27		173		275A	-	15		138						
239	24	30	/+	166		276	3	9	+	105						

NOTES:

Comparison of NJ impairment score with earlier study results:

- + 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

Abnormalities (see notes)

Watershed Management Areas 3, 4, 5, and 6

Station	1992 / 93	1998 / 99	Station	1992 / 93	1998 / 99	Station	1992 / 93	1998 / 99
205	2/26*	4/23*	264		+1			
206	1/9*	+2	266	1/24				
207	1/26		268		+6			
208		2/26*	269		3/16*			
209	2/50		271	2/36*	7/44*			
210		1/14*	272		+1			
211		1/29	273		1/24			
212	4/35*		274		1/11*			
213		1/10*	274A		1/18*			
218		1/24	275	2/25*	2/36*			
219		+1	275A		1/11*			
221		+1	276	2/4*	1/24			
223		3/25*	277		5/26*			
224		1/20	278		2/25*			
225		+3	281	2/13*	1/22			
227		1/20+1	282	1/9*	1/11*+2			
228	4/158		283		1/18*+1			
229	33/266*		284	4/44*				
230	10/89*		285	14/30*	+1			
231	3/33*		286		3/15*			
231A	2/13*, 5/53*		287	2/13*	1/8*			
231C		2/27*	288	4/36*	1/8*+2			
234		+2	289	1/17*	2/40			
236		+1	290	1/8*	+1			
238		+2	291	2/15*	4/21*			
240	2/37*		292A		2/14*			
242	3/51*		292O		2/32*			
243	1/15*	1/5*	293		+5			
247		4/25*						
251	2/38*							
254		+1						
255	8/87*							
256	2/51	2/30*+1						
257	5/24*							
259		3/34*						

NOTES:

chironomids with deformities / # chironomids examined

+ — indicates the number of non-chironomids having abnormalities.

* — indicates significant levels (> 5%), although not statistically evaluated.

abnormalities considered chronic if they appear in both the 1992 / 1993 and the 1998 / 1999 columns.

Table 4 — HABITAT ASSESSMENT FOR HIGH GRADIENT STREAMS

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. 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. Riffle Quality	Well-developed riffle and run; riffle is as wide as stream and length extends two times the width of stream; abundance of cobble. (Boulders prevalent in headwater streams).	Riffle is as wide as stream but length is less than two times width; abundance of cobble; boulders and gravel common.	Run area may be lacking; riffle not as wide as stream and its length is less than 2 times the stream width; gravel or bedrock prevalent; some cobble present.	Riffles or runs virtually nonexistent; bedrock prevalent; cobble lacking
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. All 4 velocity/depth patterns present.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15. Only 3 of 4 velocity/depth patterns present (i.e. slow [< 0.3 m/s]-deep [> 0.5 m]; slow-shallow; fast-deep; fast-shallow).	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25. May be only 2 velocity/depth patterns present; usually lacking deep areas.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of > 25. Dominated by one velocity/depth pattern.
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 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

MAPS

1999 Passaic 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 1-7. Also identified are sites that exhibited significant and chronic macroinvertebrate abnormalities.

Appendix A — Station Numbers and Locations for the 1999 Passaic Region AMNET Study

Site	Waterbody	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
AN0232	Whippany River	40 48'43.679"N 74 34'09.368"W	6

Site	Waterbody	Latitude Longitude	Watershed Management Area
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
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

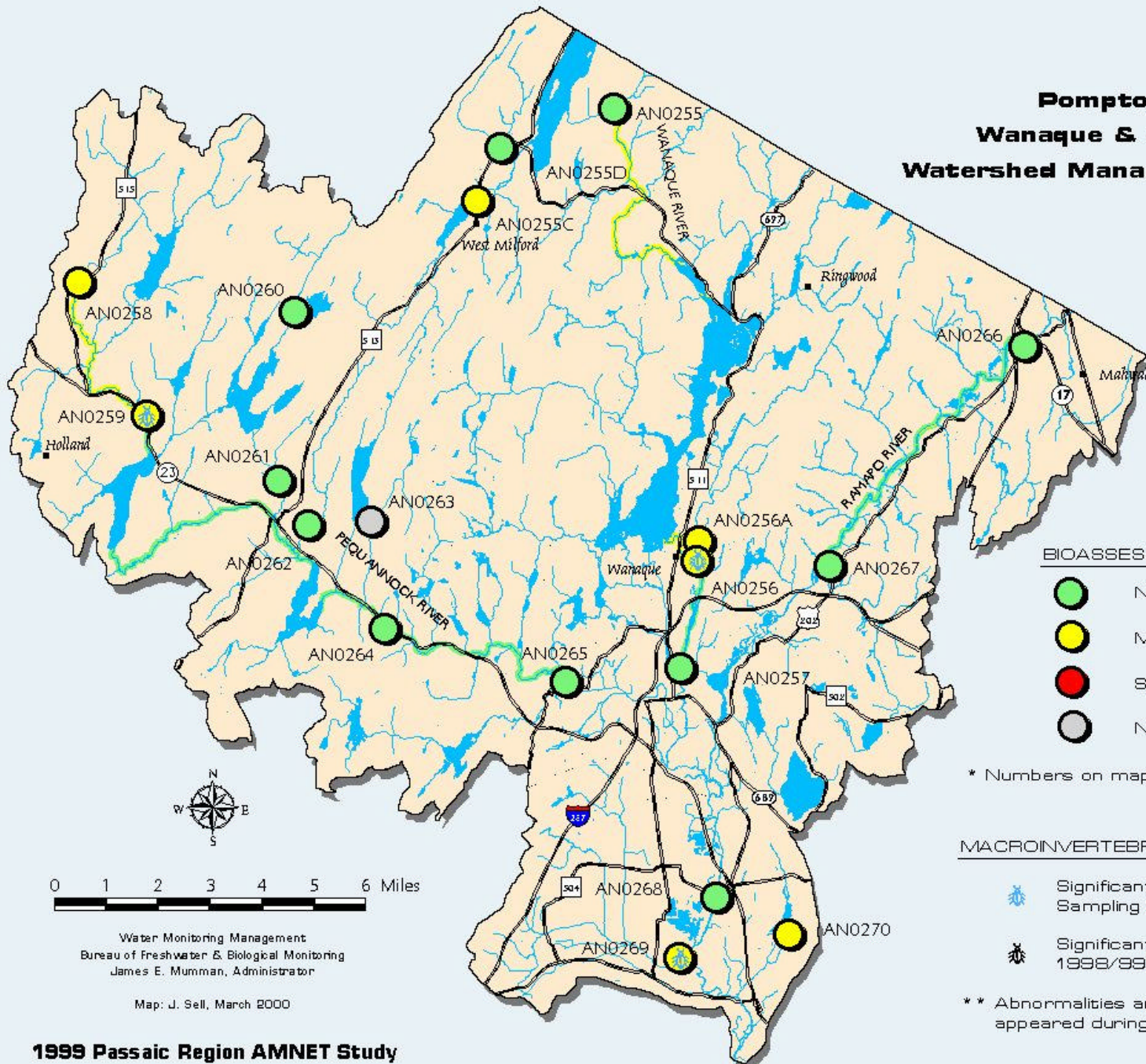
Appendix A — Station Numbers and Locations for the 1999 Passaic Region AMNET Study

Site	Waterbody	Latitude Longitude	Watershed Management Area
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
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

Site	Waterbody	Latitude Longitude	Watershed Management Area
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

MAP 1

**Pompton, Pequannock, Wanaque & Ramapo Rivers
Watershed Management Area 3**



BIOASSESSMENT RATING *

- Non-Impaired
- Moderately Impaired
- Severely Impaired
- Not Sampled

* Numbers on map indicate sampling sites

MACROINVERTEBRATE ABNORMALITIES **

- Significant during 1998/99 Sampling Period Only
- Significant during 1992/93 and 1998/99 Sampling Periods

** Abnormalities are considered chronic if they appeared during both sampling periods



0 1 2 3 4 5 6 Miles

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James E. Mumman, Administrator

Map: J. Sell, March 2000

1999 Passaic Region AMNET Study

Map 2

Saddle River Watershed Management Area 4 [Part]



BIOASSESSMENT RATING *

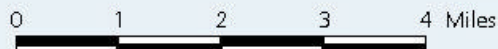
- Non-Impaired
- Moderately Impaired
- Severely Impaired

* Numbers on map indicate sampling sites

MACROINVERTEBRATE ABNORMALITIES **

- Significant during 1998/99 Sampling Period Only
- Significant during 1992/93 and 1998/99 Sampling Periods

** Abnormalities are considered chronic if they appeared during both sampling periods

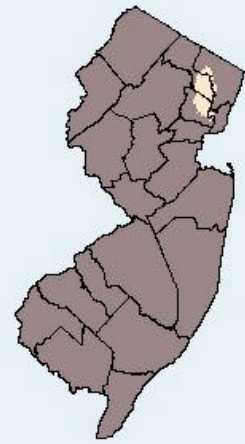
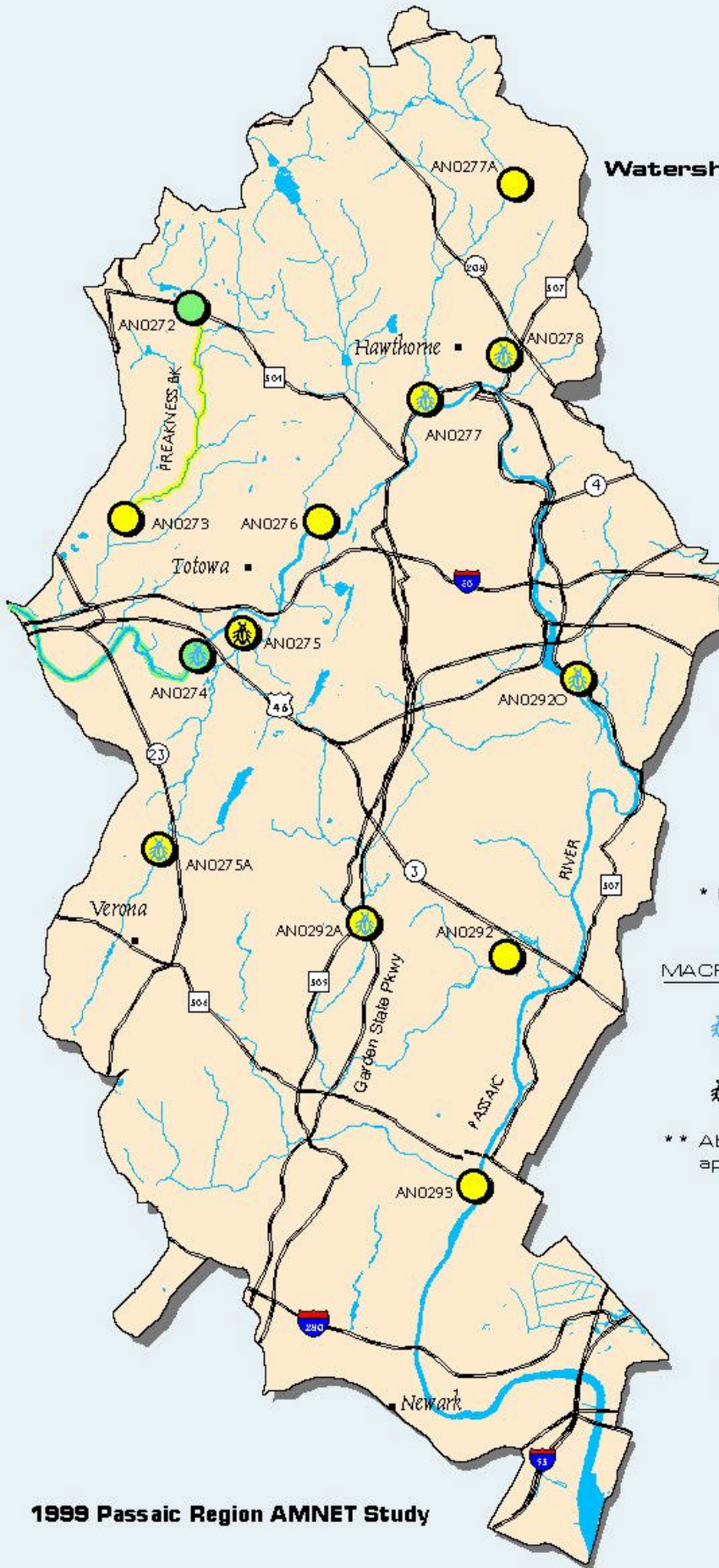


Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator

Map: J. Sell, March 2000

MAP 3

**Lower Passaic River
Watershed Management Area 4 (Part)**



BIOASSESSMENT RATING *

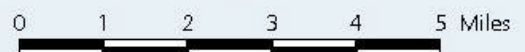
- Non-Impaired
- Moderately Impaired
- Severely Impaired

* Numbers on map indicate sampling sites

MACROINVERTEBRATE ABNORMALITIES **

- Significant during 1998/99 Sampling Period Only
- Significant during 1992/93 and 1998/99 Sampling Periods

** Abnormalities are considered chronic if they appeared during both sampling periods

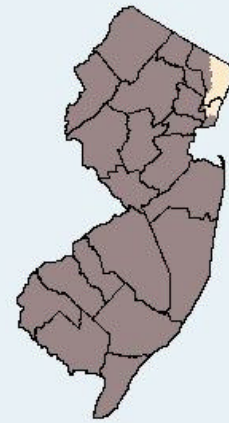
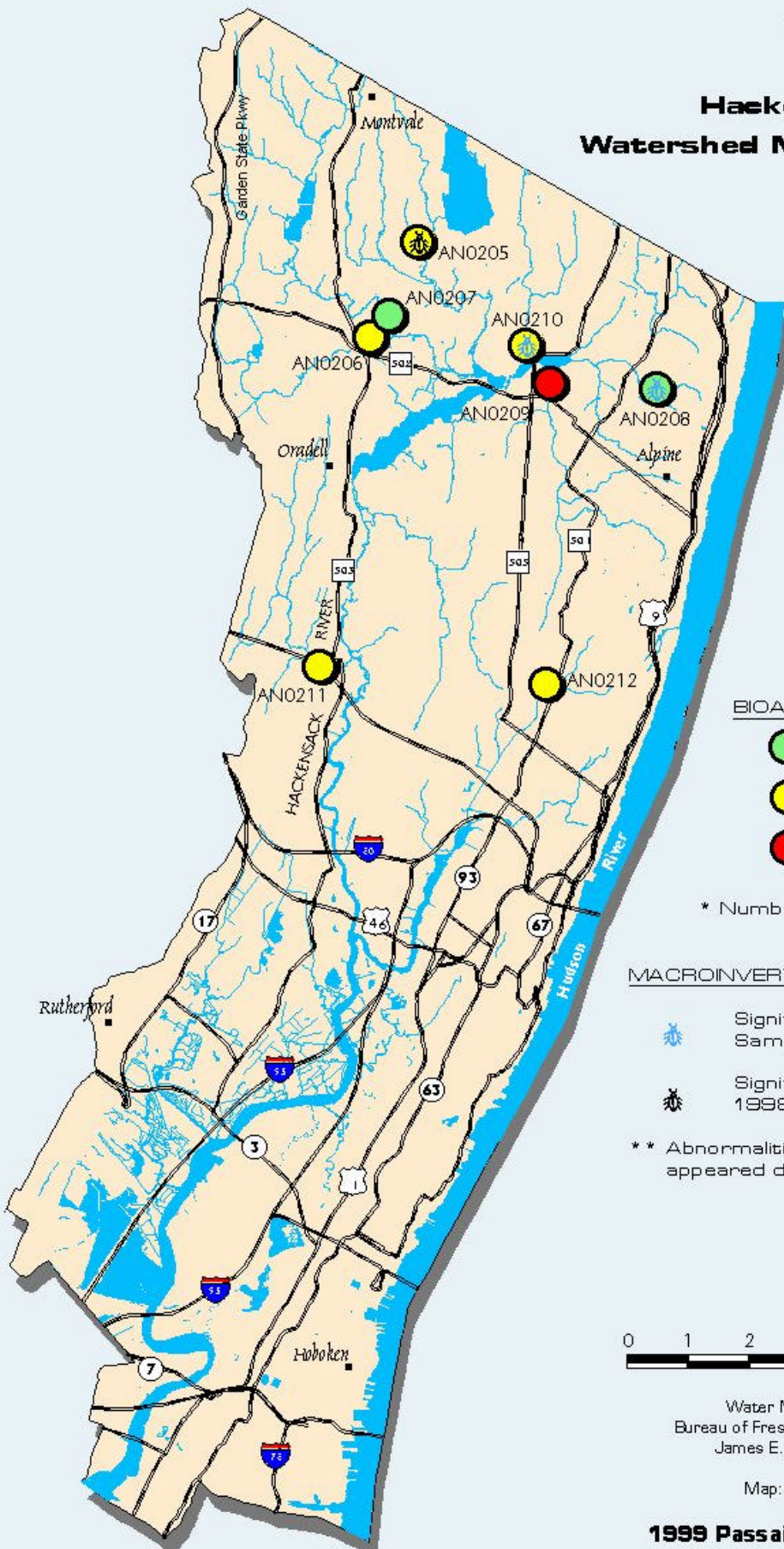


Water Monitoring Management
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James E. Mumman, Administrator

Map: J. Sell, March 2000

MAP 4

Hackensack River Watershed Management Area 5





BIOASSESSMENT RATING *

-  Non-Impaired
-  Moderately Impaired
-  Severely Impaired

* Numbers on map indicate sampling sites

MACROINVERTEBRATE ABNORMALITIES **

-  Significant during 1998/99 Sampling Period Only
-  Significant during 1992/93 and 1998/99 Sampling Periods

** Abnormalities are considered chronic if they appeared during both sampling periods



Water Monitoring Management,
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator

Map: J. Sell, March 2000

MAP 5



**Rockaway River
Watershed Management Area 6 (Part)**

BIOASSESSMENT RATING *

-  Non-Impaired
-  Moderately Impaired
-  Severely Impaired

* Numbers on map indicate sampling sites

MACROINVERTEBRATE ABNORMALITIES **

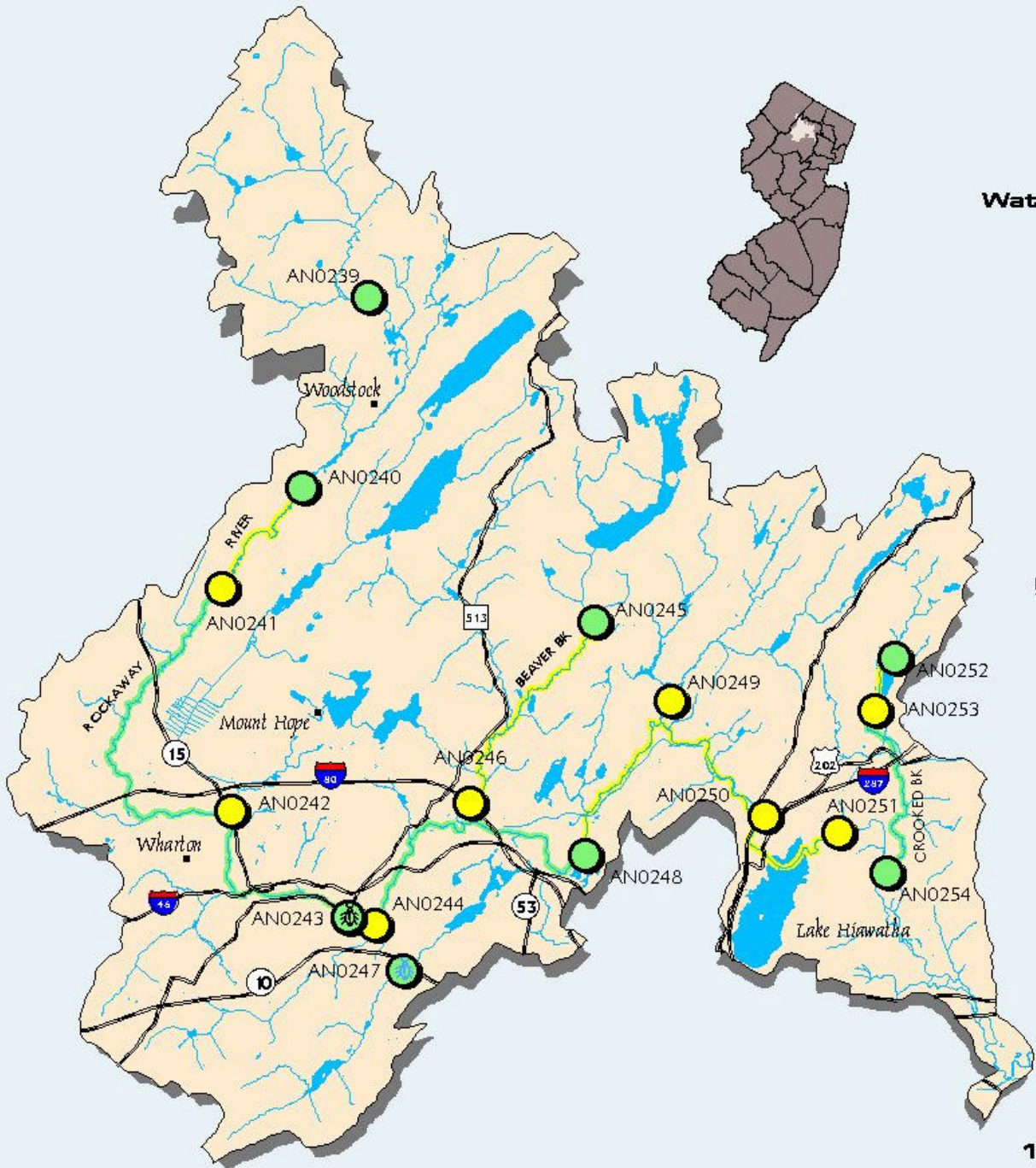
-  Significant during 1998/99 Sampling Period Only
-  Significant during 1992/93 and 1998/99 Sampling Periods

** Abnormalities are considered chronic if they appeared during both sampling periods



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Map: J. Sell, March 2000



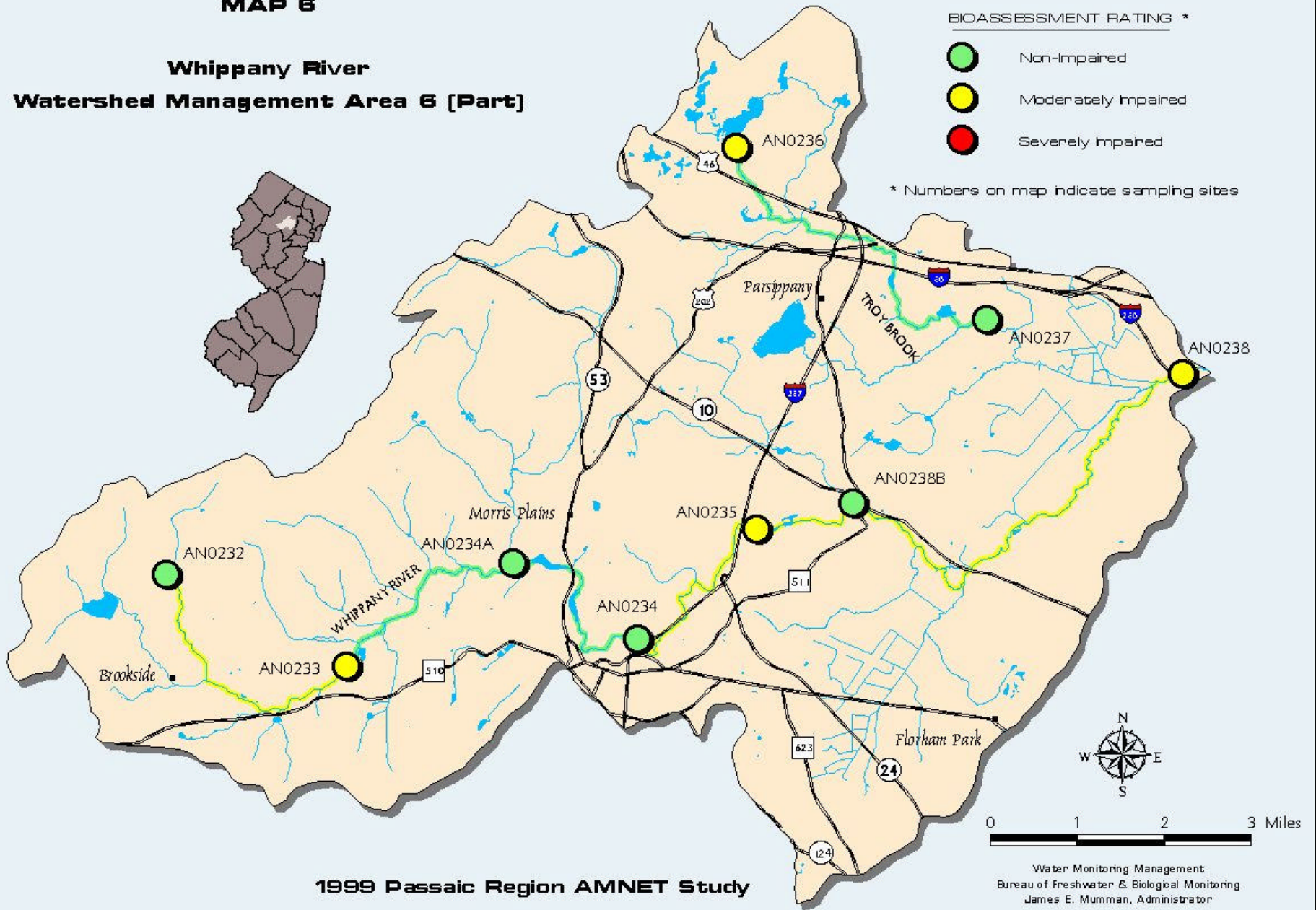
MAP 6

Whippany River Watershed Management Area 6 [Part]

BIOASSESSMENT RATING *

-  Non-Impaired
-  Moderately Impaired
-  Severely Impaired

* Numbers on map indicate sampling sites



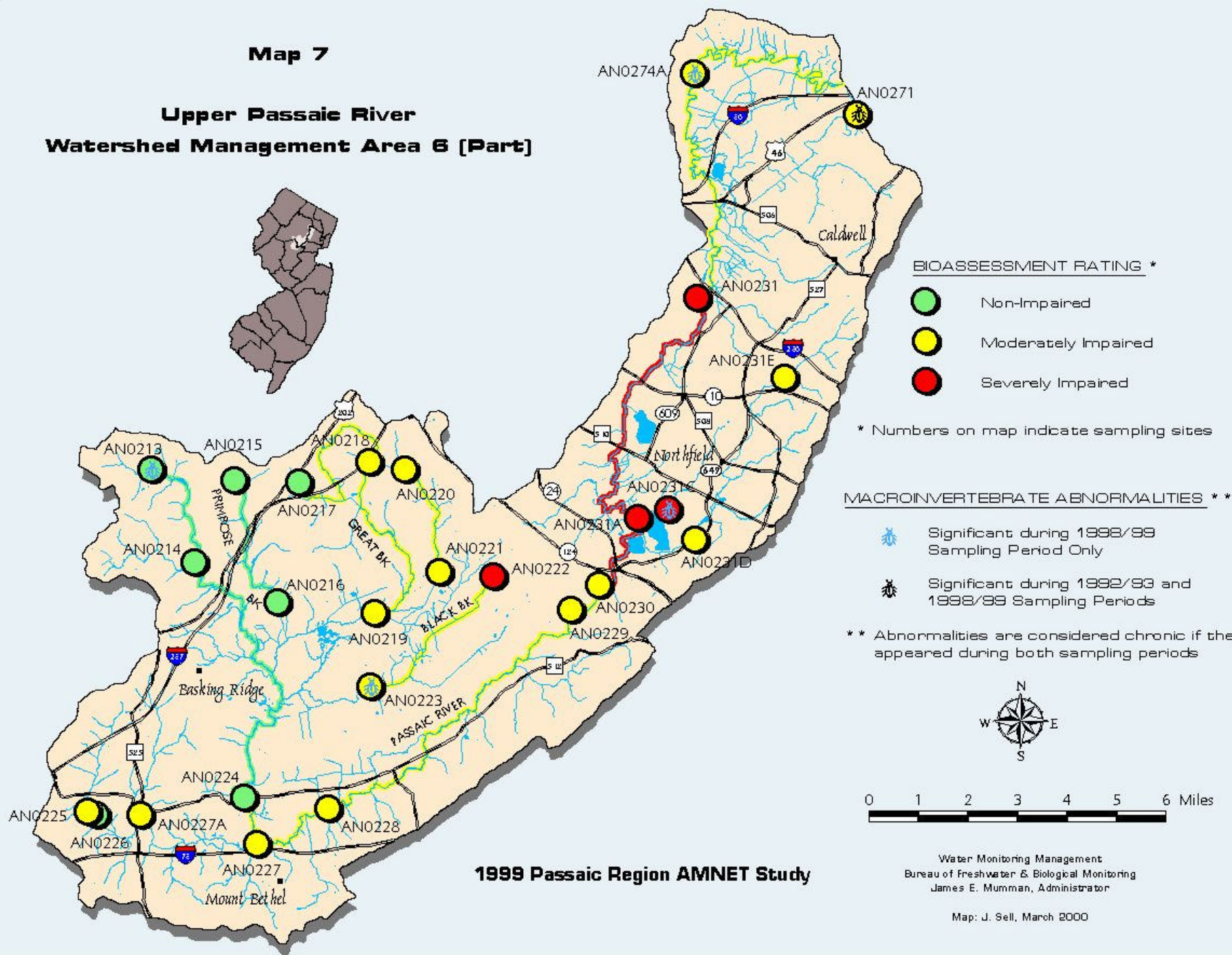
1999 Passaic Region AMNET Study

Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator

Map: J. Sell, March 2000

Map 7

Upper Passaic River Watershed Management Area 6 (Part)



BIODIVERSITY RATING *

- Non-Impaired
- Moderately Impaired
- Severely Impaired

* Numbers on map indicate sampling sites

MACROINVERTEBRATE ABNORMALITIES **

- Significant during 1998/99 Sampling Period Only
- Significant during 1992/93 and 1998/99 Sampling Periods

** Abnormalities are considered chronic if they appeared during both sampling periods



1999 Passaic Region AMNET Study

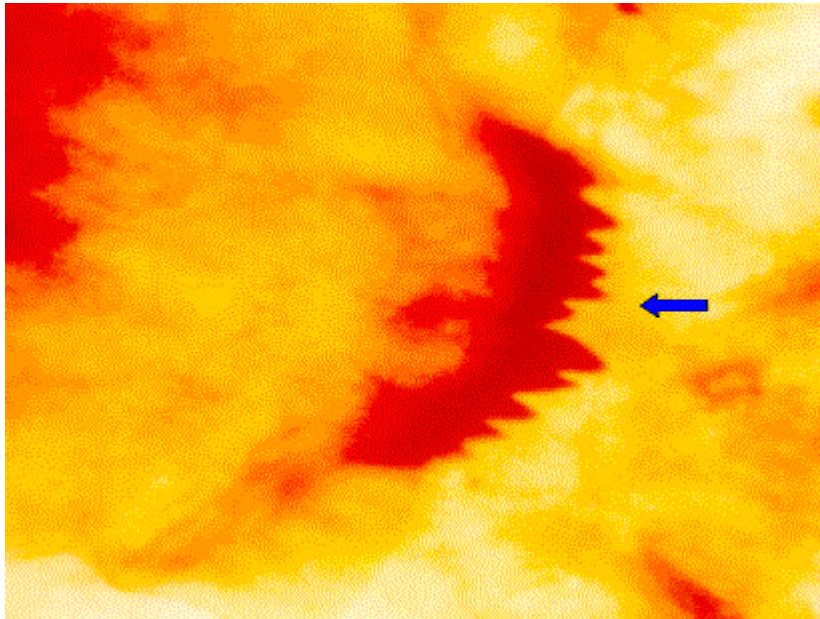
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator

Map: J. Sell, March 2000

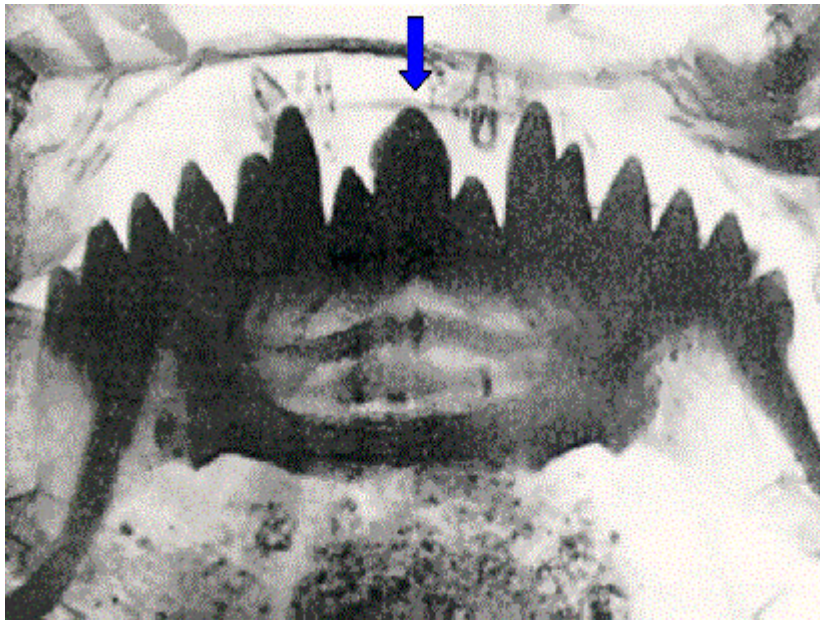
APPENDIX B

Pictures and Site Locations of Morphological Abnormalities in
Larval Chironomidae and Amphipoda Recovered in the 1999
Passaic Region AMNET Study

Chironomus riparius — Note the abnormal teeth in the top picture and the normal teeth in the bottom picture.



ABNORMAL*

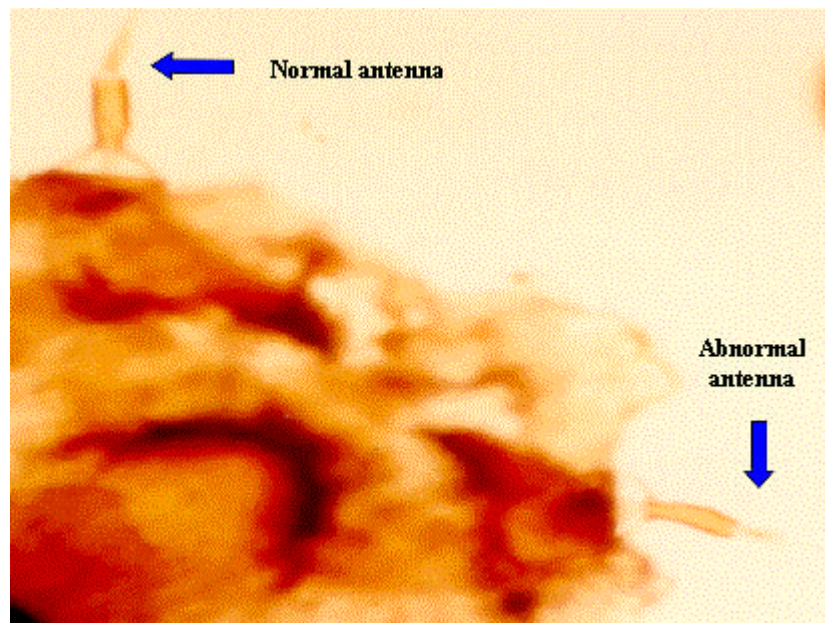


NORMAL**

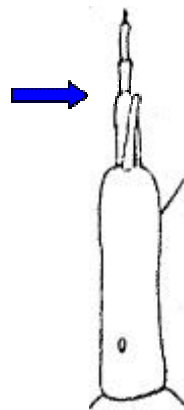
* Photograph taken by J. Kurtz, NJDEP.

** From: *A Key to Some Larvae of Chironomidae (Diptera) From the Mackenzie & Porcupine River Watersheds*, D.R. Oliver, D. McClymont, & M.E. Roussel, 1978, Fisheries & Marine Service Technical Report # 791.

Dicrotendipes nervosus — Note that the antenna on the right is abnormal. The antennae on the left and in the bottom picture are normal.



Antenna*

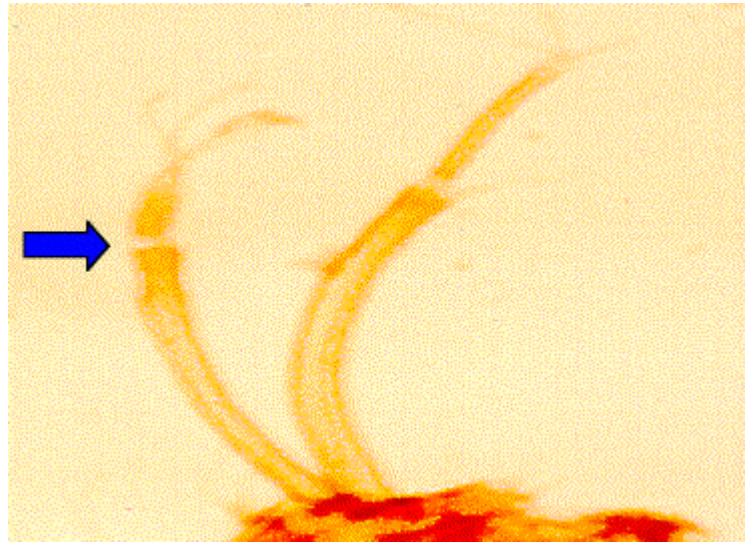


NORMAL antenna**

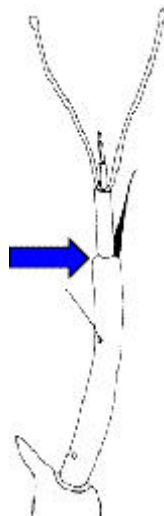
* Photograph taken by J. Kurtz, NJDEP.

** From: *An Introduction to the Aquatic Insects of North America*, second edition, R.W. Merritt & K.W. Cummins, 1988, Kendall/Hunt Publ. Co.

Micropsectra deflecta — In the top picture note the left antenna is abnormal as compared to the normal antenna in the bottom picture.



ABNORMAL*

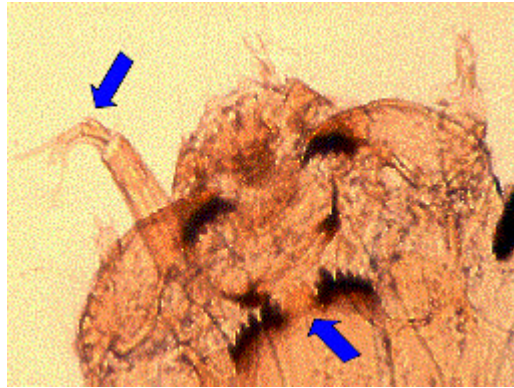


NORMAL**

* Photograph taken by J. Kurtz, NJDEP.

** From: *An Introduction to the Aquatic Insects of North America*, second edition, R.W. Merritt & K.W. Cummins, 1988, Kendall/Hunt Publ. Co.

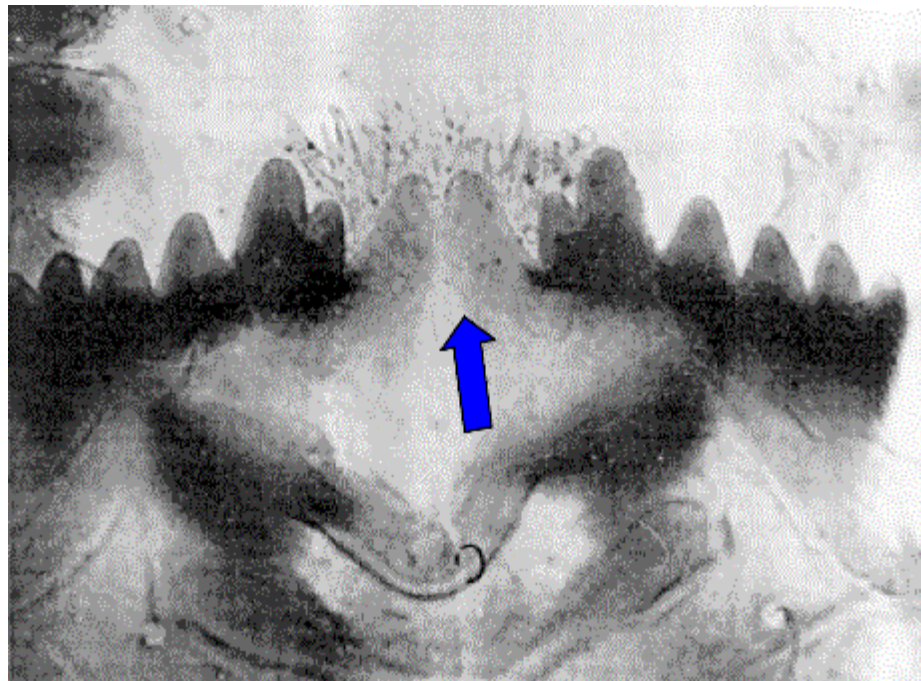
Microtendipes sp. — Note the abnormal teeth and antenna in the top picture compared to the bottom pictures, which depict normal antenna and teeth. The normal pictures on the bottom are magnified to show detail.



ABNORMAL*



NORMAL antenna**



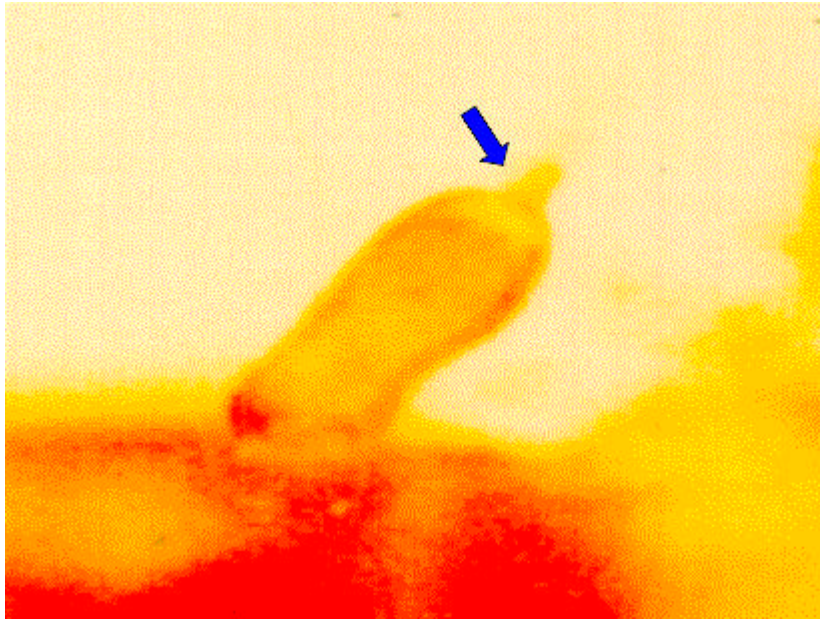
NORMAL teeth***

* Photograph taken by J. Kurtz, NJDEP.

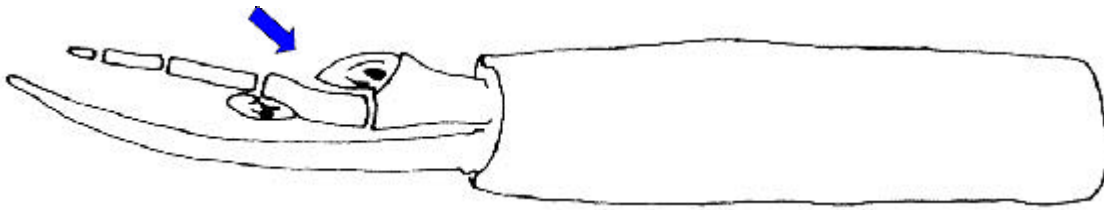
** From: *An Introduction to the Aquatic Insects of North America*, second edition, R.W. Merritt & K.W. Cummins, 1988, Kendall/Hunt Publ. Co.

*** From: *A Key to Some Larvae of Chironomidae (Diptera) From the Mackenzie & Porcupine River Watersheds*, D.R. Oliver, D. McClymont, & M.E. Roussel, 1978, Fisheries & Marine Service Technical Report # 791.

Microtendipes caducus — Note the abnormal antenna in the top picture and compare to the lower picture, which depicts a normal antenna.



ABNORMAL antenna *

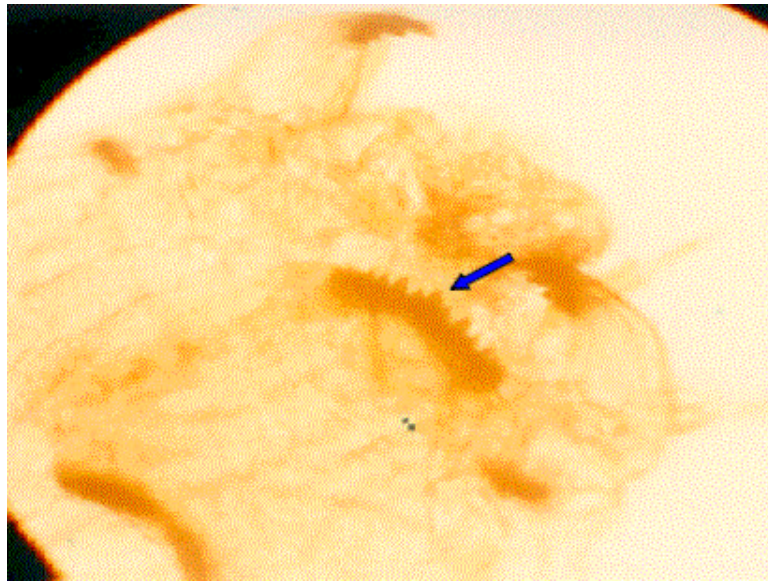


NORMAL antenna**

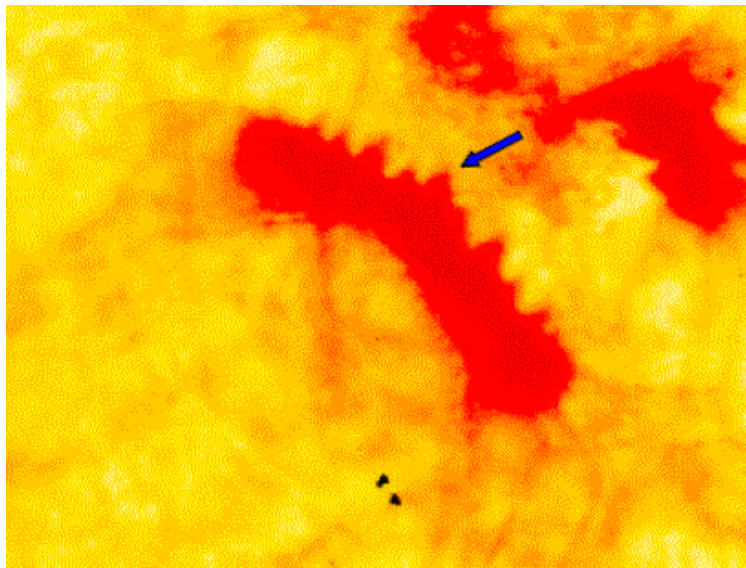
* Photograph taken by J. Kurtz, NJDEP.

** From: *An Introduction to the Aquatic Insects of North America*, second edition, R.W. Merritt & K.W. Cummins, 1988, Kendall/Hunt Publ. Co.

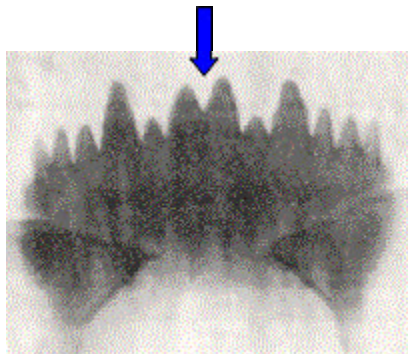
Polypedilum convictum — The first two pictures show abnormal teeth as compared to the normal teeth depicted in the picture below. The second picture is a higher magnification of the first one.



ABNORMAL*



ABNORMAL*

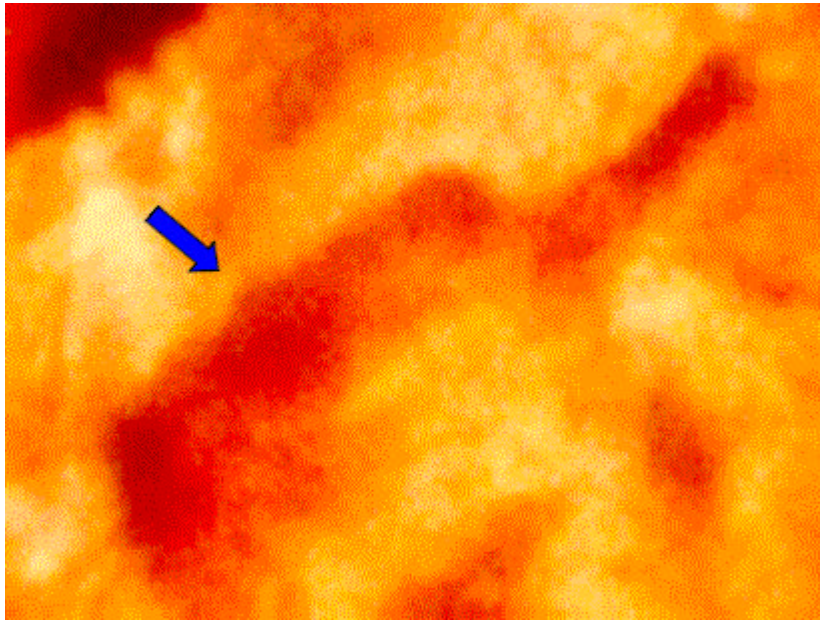


NORMAL**

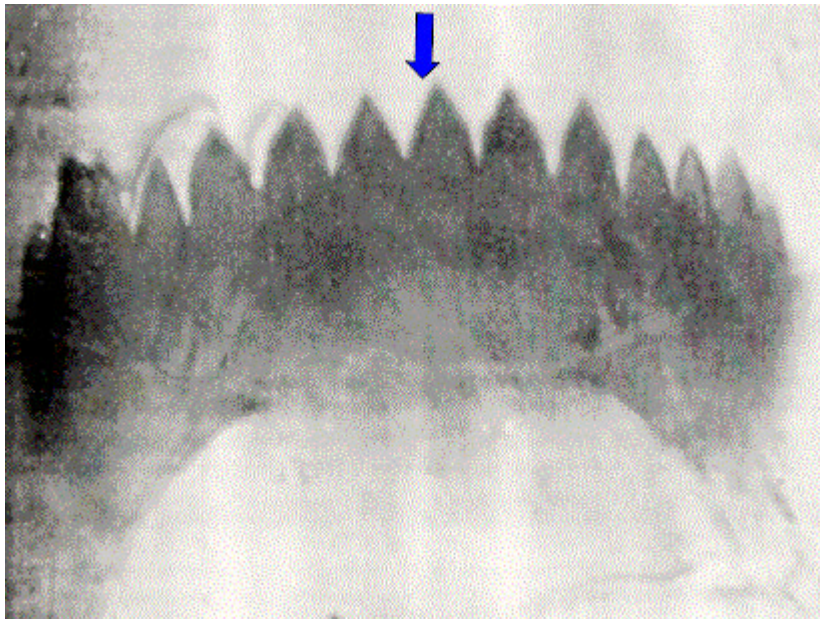
* Photograph taken by J. Kurtz, NJDEP.

** From *A Key to Some Larvae of Chironomidae (Diptera) From the Mackenzie & Porcupine River Watersheds*, D.R. Oliver, D. McClymont, & M.E. Roussel, 1978, Fisheries & Marine Service Technical Report # 791.

Polypedilum fallax— Note that in the top picture the teeth are absent or abnormal. Compare with the lower picture that shows a normal tooth pattern.



ABNORMAL*



NORMAL**

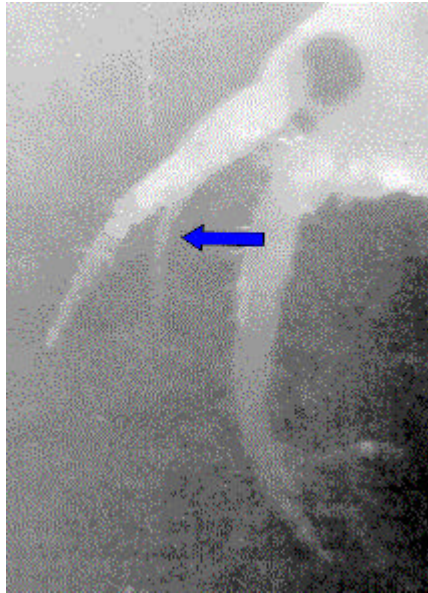
* Photograph taken by J. Kurtz, NJDEP.

** From: *A Key to Some Larvae of Chironomidae (Diptera) From the Mackenzie & Porcupine River Watersheds*, D.R. Oliver, D. McClymont, & M.E. Roussel, 1978, Fisheries & Marine Service Technical Report # 791.

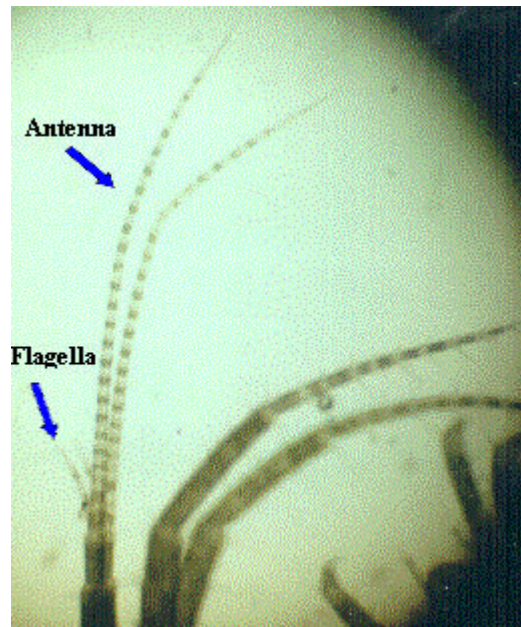
Gammarus fasciatus — Note in the first three pictures that the left 1st antenna and flagella are deformed and reduced. The right 1st antenna is broken. The fourth picture shows normal flagella and antennae.



Close-up of flagella on abnormal 1st antenna



Close-up of last segment on abnormal 1st antenna with normal setae.



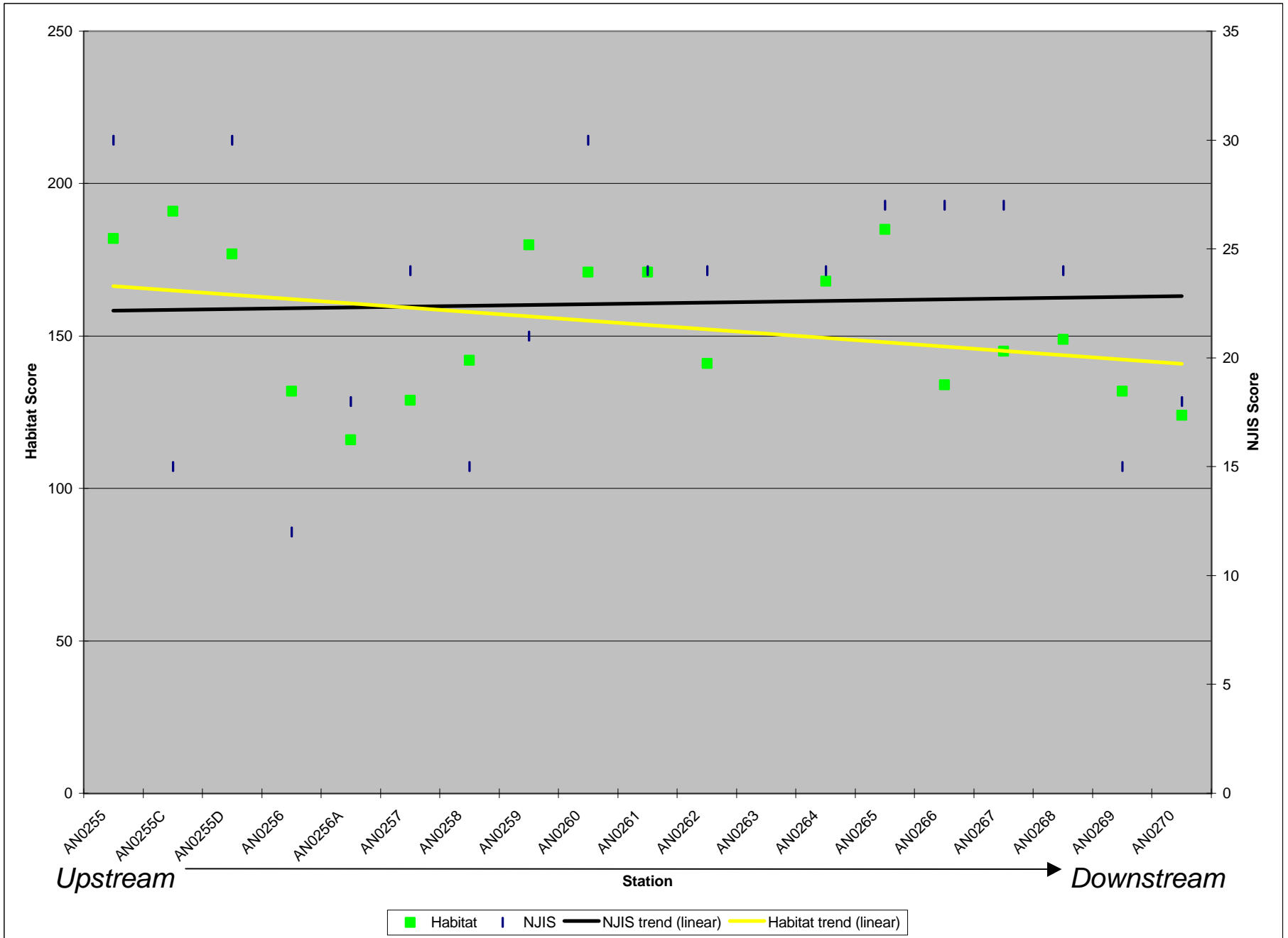
Normal 1st antennae and flagella

APPENDIX C

Graphical Comparison of Habitat Assessment Scores and New Jersey Impairment Scores from the 1999 Passaic Region AMNET Study

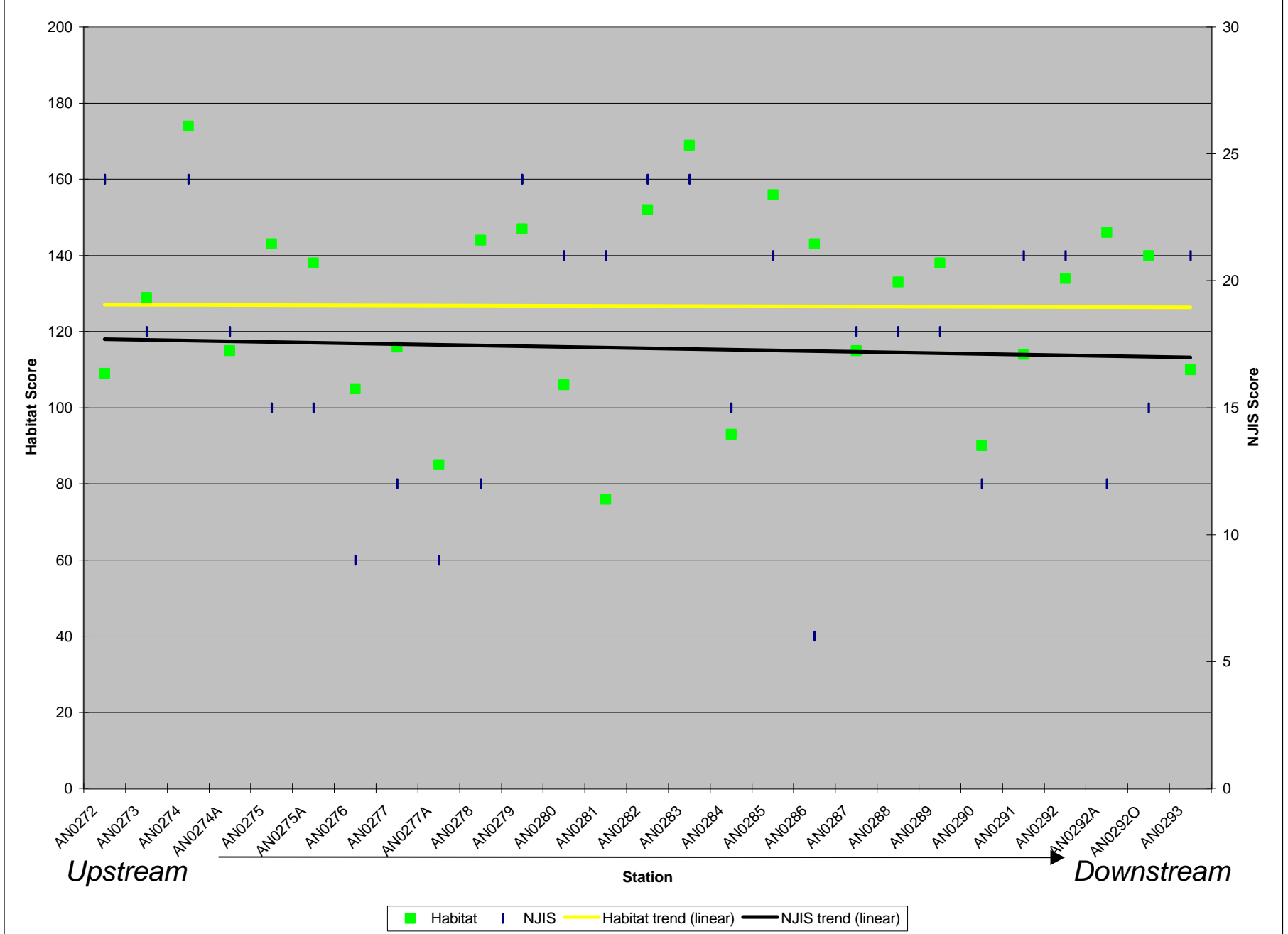
Comparative Scores of HABITAT vs. NJIS

WMA 3
1998



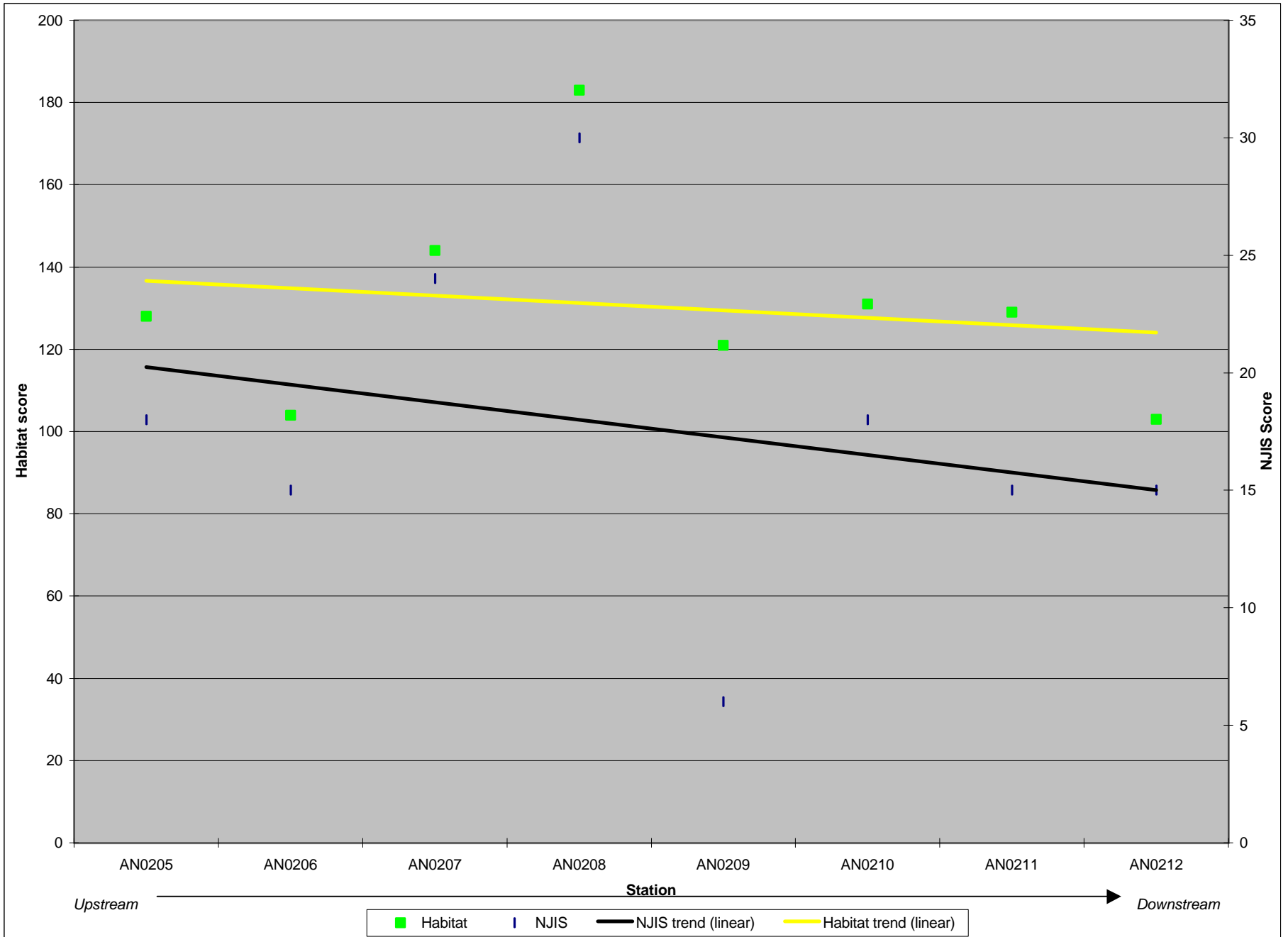
Comparative Scores of HABITAT vs. NJIS

WMA 4
1998



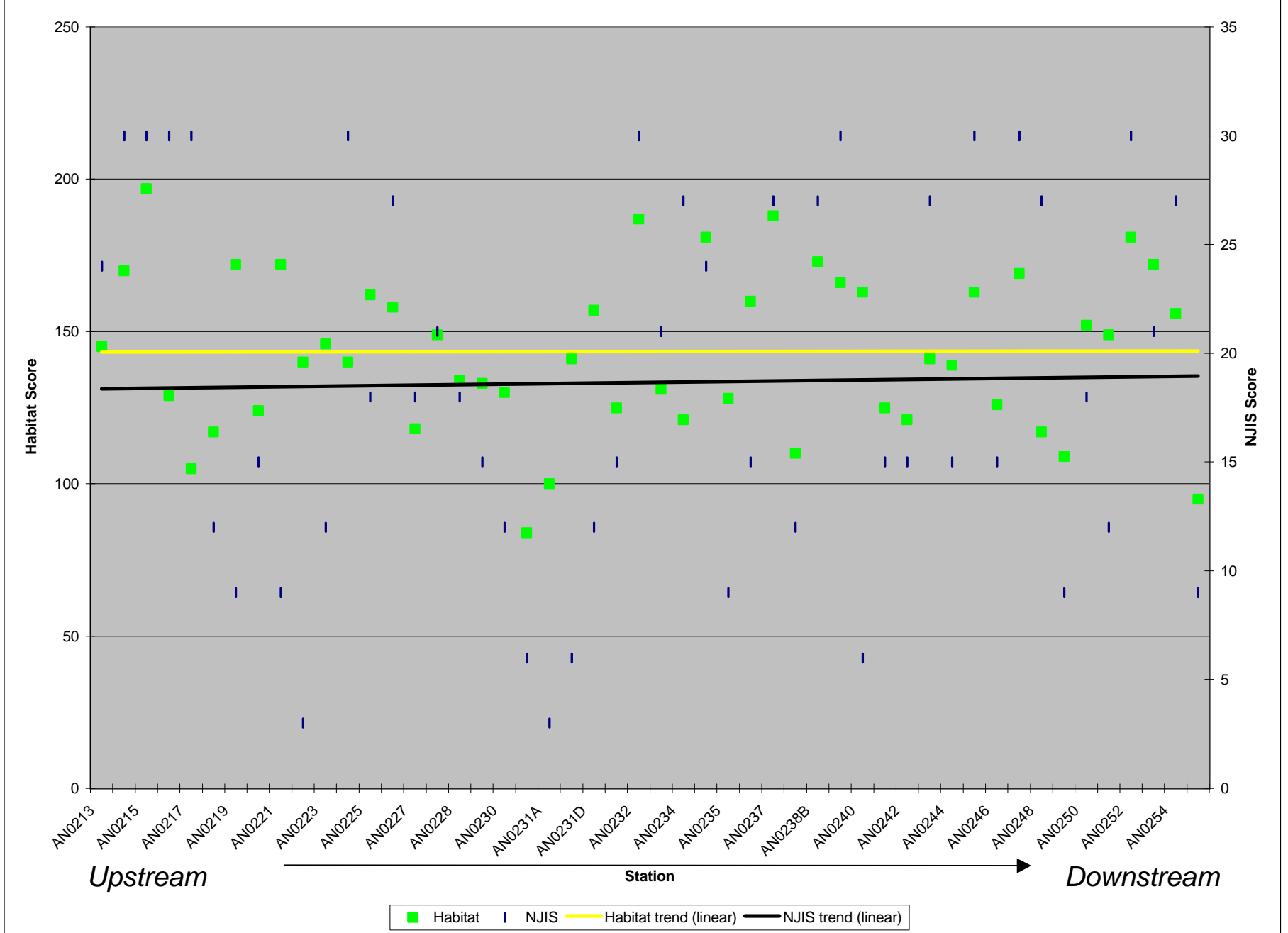
Comparative Scores of HABITAT vs. NJIS

WMA 5
1998

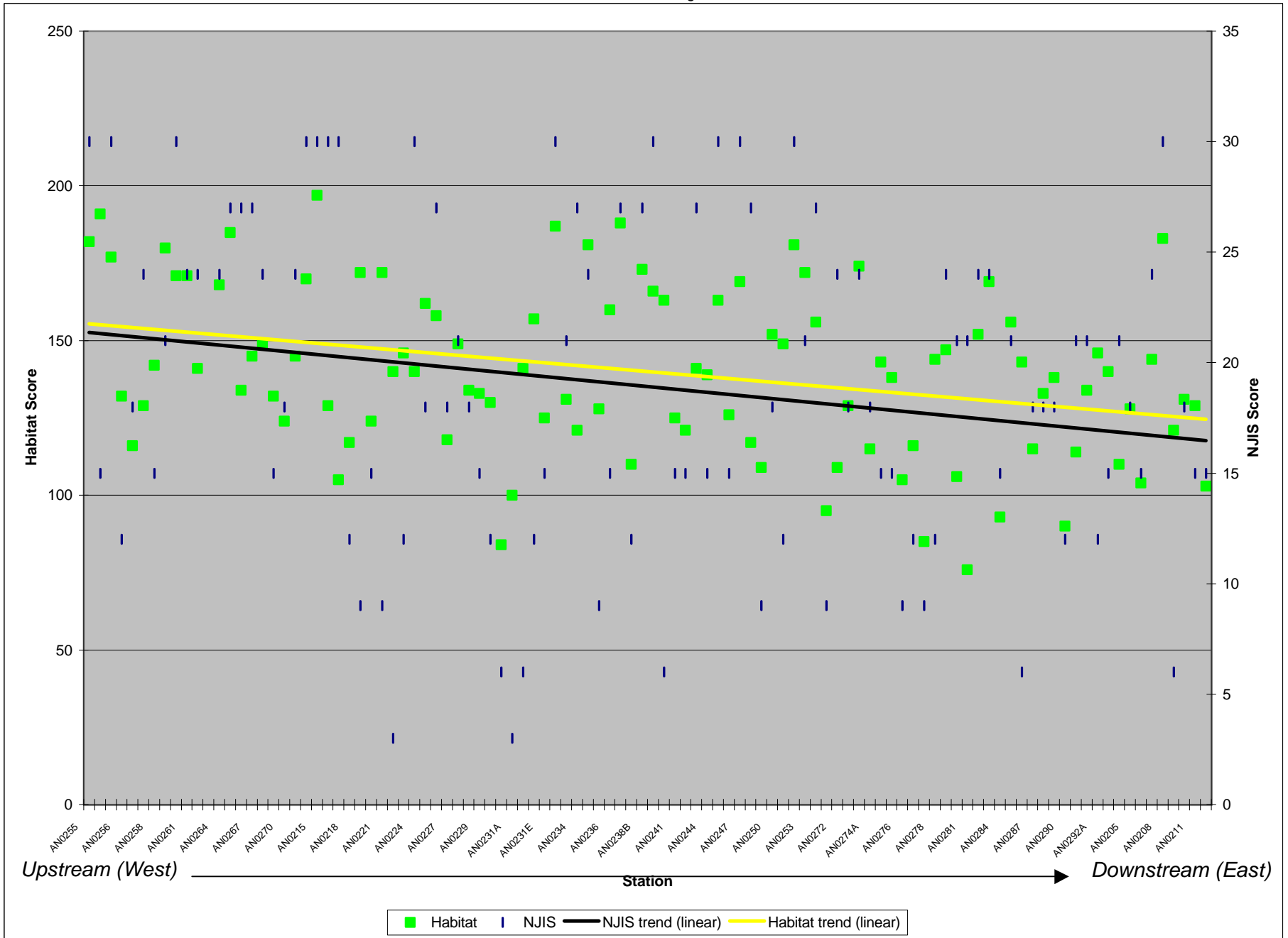


Comparative Scores of HABITAT vs. NJIS

WMA 6
1998



**Comparative Scores of
HABITAT vs. NJIS
COMBINED**
Passaic Watershed Region 1998



APPENDIX D

Taxonomic and Statistical Data, NJIS Scores*, Habitat Assessment Scores and Observations from the 1999 Passaic Region AMNET Study

* Statistical data includes those biometric results that are applied to the NJIS rating. We also include certain biometrics that are utilized in standard RBPII (and RBPIII) analyses [2], but not for the NJIS.

Not employed in the NJIS analysis are certain ratios of pollution-sensitive to pollution-tolerant types, or relative abundance of different feeding types. These can be indicative of environmental stress caused by organic enrichment and/or the presence of toxicants in the stream system:

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, reflects a good biotic condition; dominance of chironomids reflects environmental stress.

Station: AN0205
Hackensack R, Rivervale Rd , Old Tappan / Rivervale, Bergen County
Park Ridge USGS Quadrangle
Date Sampled: 07/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	38
Hydropsychidae	4	18
Tubificidae	10	17
Elmidae	4	16
Simuliidae	6	4
Planariidae	4	2
BloodRed Chironomidae	8	1
Empididae	6	1
Talitridae	8	1
Lumbriculidae	8	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 38.00 % (Chironomidae)
Family Biotic Index: 6.03
Scraper/Filterer Collector Ratio: 0.70
Shredder/Total Ratio: 0.39
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 18.00
EPT/C: 0.46
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 128

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 25/2
Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability:
Trees, shrubs, vines/Unstable
Canopy: Mostly Closed....Other: Suburban; Water temp.22.2 /pH 6.5 /DO 5.5 /Cond.419
Road name correction;

Station: AN0206
Musquapsink Bk, Harrington Ave , Westwood, Bergen County
Hackensack USGS Quadrangle
Date Sampled: 07/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	35
Elmidae	4	19
Asellidae	8	12
Tubificidae	10	9
Chironomidae	6	9
BloodRed Chironomidae	8	5
Hydropsychidae	4	4
Heptageniidae	4	4
Planariidae	4	1
Planorbidae	6	1
Cambaridae	5	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 35.00 % (Gammaridae)
Family Biotic Index: 5.43
Scraper/Filterer Collector Ratio: 1.85
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 8.00
EPT/C: 0.57
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 104

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 20/2
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.20.1 /pH 7.1 /DO 8.1 /Cond.532

Station: AN0207
Pascack Bk, Westwood Ave , Westwood / Rivervale, Bergen County
Hackensack USGS Quadrangle
Date Sampled: 07/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	38
Elmidae	4	20
Chironomidae	6	17
Planariidae	4	8
Asellidae	8	4
Tipulidae	3	3
Baetidae	4	3
Tetrastemmatidae	7	3
Tubificidae	10	2
Lumbriculidae	8	2
Nematoda	6	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 102
% Contribution of Dominant Family: 37.25 % (Hydropsychidae)
Family Biotic Index: 4.80
Scraper/Filterer Collector Ratio: 0.53
Shredder/Total Ratio: 0.17
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 40.20
EPT/C: 2.23
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 144

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 35/1
Substrate: Cobbles,sand....StreamBank Vegetation/Stability: Trees,shrubs,weeds/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.19.5 /pH 6.8 /DO 8.6 /Cond.514
Trash , tires , and PVC pipes;

Station: AN0208
 Dwars Kill, End Of Anderson Ave. , Closter, Bergen County
 Yonkers USGS Quadrangle
 Date Sampled: 07/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	34
Lumbriculidae	8	13
Peltoperlidae	1	8
Baetidae	4	7
Lepidostomatidae	1	6
Leptophlebiidae	2	4
BloodRed Chironomidae	8	4
Hydropsychidae	4	4
Tipulidae	3	3
Odontoceridae	0	3
Simuliidae	6	3
Perlidae	1	2
Enchytraeidae	10	2
Perlodidae	2	2
Limnephilidae	4	2
Corydalidae	0	2
Tetrastemmatidae	7	2
Elmidae	4	1
Psephenidae	4	1
Rhyacophilidae	0	1
Sialidae	4	1
Gerridae	8	1

Statistical Analysis

Number of Taxa: 22
 Total Number of Individuals: 106
 % Contribution of Dominant Family: 32.08 % (Chironomidae)
 Family Biotic Index: 4.73
 Scraper/Filterer Collector Ratio: 1.43
 Shredder/Total Ratio: 0.45
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
 % EPT: 36.79
 EPT/C: 0.97
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 183

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 8/<1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Closed....Other: Suburban/Forested; Water temp.17.9 /pH 8.0 /DO 7.0 /Cond.105

Station: AN0209
Tenakill Bk., Cedar Ln , Closter, Bergen County
Yonkers USGS Quadrangle
Date Sampled: 07/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	56
BloodRed Chironomidae	8	22
Gammaridae	4	10
Asellidae	8	5
Physidae	7	2
Chironomidae	6	1
Plagiostomidae	4	1
Paludicellidae	7	1
Dendrocoelidae	4	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 56.00 % (Tubificidae)
Family Biotic Index: 8.59
Scraper/Filterer Collector Ratio: 1.00
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 121

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 20/3
Substrate: Cobbles,sand,mud,snags....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Suburban/Forested/Channelized; Water temp.19.2 /pH 7.2 /DO 7.1 /Cond.531
Trash;

Station: AN0210
 Dorotockeys Run, Tappan Rd , Harrington Park, Bergen County
 Yonkers USGS Quadrangle
 Date Sampled: 07/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	15
Chironomidae	6	15
Asellidae	8	11
Planariidae	4	10
Fredericellidae	2	10
Gammaridae	4	7
Simuliidae	6	6
Naididae	7	5
Tubificidae	10	4
Physidae	7	4
Gerridae	8	4
Sphaeriidae	8	3
Elmidae	4	2
Plagiostomidae	4	1
Lumbriculidae	8	1
Planorbidae	6	1
Veliidae	9	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 101
 % Contribution of Dominant Family: 14.85 % (Hydropsychidae & Chironomidae)
 Family Biotic Index: 5.58
 Scraper/Filterer Collector Ratio: 0.21
 Shredder/Total Ratio: 0.26
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 14.85
 EPT/C: 0.93
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 131

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 20/2
 Substrate: Cobbles,sand,silt....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Open....Other: Suburban; Water temp.22.2 /pH 7.2 /DO 7.0 /Cond.580

Station: AN0211
Van Saun Bk, Main St & Rt 4 , N Hackensack, Bergen County
Hackensack USGS Quadrangle
Date Sampled: 07/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	47
Hydropsychidae	4	11
Paludicellidae	7	10
BloodRed Chironomidae	8	6
Fredericellidae	2	5
Tubificidae	10	5
Planorbidae	6	5
Physidae	7	5
Sphaeriidae	8	4
Planariidae	4	2
Naididae	7	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 101
% Contribution of Dominant Family: 46.53 % (Chironomidae)
Family Biotic Index: 6.10
Scraper/Filterer Collector Ratio: 0.53
Shredder/Total Ratio: 0.47
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 10.89
EPT/C: 0.21
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 129

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/<1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Urban; Water temp.21.4 /pH 7.8 /DO 5.3 /Cond.629

Station: AN0212
 Overpeck Ck, Dean Dr , Englewood, Bergen County
 Yonkers USGS Quadrangle
 Date Sampled: 07/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	60
Naididae	7	12
Simuliidae	6	9
Baetidae	4	7
Hydropsychidae	4	4
Lumbricidae	10	3
Tubificidae	10	2
Enchytraeidae	10	1
Lumbriculidae	8	1
BloodRed Chironomidae	8	1
Physidae	7	1
Sphaeriidae	8	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 13
 Total Number of Individuals: 103
 % Contribution of Dominant Family: 58.25 % (Chironomidae)
 Family Biotic Index: 6.20
 Scraper/Filterer Collector Ratio: 0.14
 Shredder/Total Ratio: 0.58
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 10.68
 EPT/C: 0.18
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 103

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/<1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Open....Other: Urban/Channelized; Water temp.18.8 /pH 7.7 /DO 8.9 /Cond.446

Station: AN0213
 Passaic R, Tempe Wick Rd , Mendham Twp, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 02/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	39
Paludicellidae	7	29
Simuliidae	6	12
Chironomidae	6	9
Elmidae	4	3
Ephemerellidae	1	2
BloodRed Chironomidae	8	1
Tipulidae	3	1
Empididae	6	1
Limnephilidae	4	1
Leptoceridae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 39.00 % (Hydropsychidae)
 Family Biotic Index: 5.28
 Scraper/Filterer Collector Ratio: 0.06
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 44.00
 EPT/C: 4.40
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 145

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 5/1
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Mostly Open....Other: Suburban/Forested; Water temp.2.8 /pH 8.3 /DO 15.0 /Cond.-

Station: AN0214
Indian Grave Bk, Hardscrabble Rd , Nr Bernardsville, Somerset County
Bernardsville USGS Quadrangle
Date Sampled: 02/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	29
Simuliidae	6	21
Ephemerellidae	1	12
Taeniopterygidae	2	12
Nemouridae	2	8
Philopotamidae	3	7
Chironomidae	6	7
Perlidae	1	3
Heptageniidae	4	3
Glossosomatidae	0	2
Gammaridae	4	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 106
% Contribution of Dominant Family: 27.36 % (Hydropsychidae)
Family Biotic Index: 3.61
Scraper/Filterer Collector Ratio: 0.30
Shredder/Total Ratio: 0.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 71.70
EPT/C: 10.24
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 170

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 7/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Forested; Water temp.2.2 /pH 8.7 /DO 15.9 /Cond.-

Station: AN0215
 Primrose Bk, Jockey Hollow Nat'l Pk , Jockey Hollow, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 02/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	29
Ephemerellidae	1	22
Chironomidae	6	10
Nemouridae	2	6
Tipulidae	3	5
Heptageniidae	4	4
Leuctridae	0	3
Leptophlebiidae	2	3
Capniidae	1	2
Limnephilidae	4	2
Hydropsychidae	4	2
Ceratopogonidae	6	2
Rhyacophilidae	0	2
Peltoperlidae	1	2
Perlidae	1	1
Siphonuridae	7	1
Tubificidae	10	1
Naididae	7	1
Polycentropodidae	6	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 20
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 29.00 % (Simuliidae)
 Family Biotic Index: 3.74
 Scraper/Filterer Collector Ratio: 0.88
 Shredder/Total Ratio: 0.13
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 13
 % EPT: 51.00
 EPT/C: 5.10
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 197

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5/<1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Closed....Other: Rural/Forested; Water temp.3.5 /pH 8.0 /DO 12.6 /Cond.97

Station: AN0216
 Primrose Bk, Lees Mill Rd , Harding Twp, Morris County
 Bernardsville USGS Quadrangle
 Date Sampled: 02/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	22
Heptageniidae	4	17
Tubificidae	10	11
Chironomidae	6	10
Ephemerellidae	1	8
Nemouridae	2	8
Baetidae	4	6
Leptophlebiidae	2	6
Taeniopterygidae	2	5
Capniidae	1	4
Hydropsychidae	4	3
Philopotamidae	3	2
Limnephilidae	4	2
Siphonuridae	7	1
Asellidae	8	1
Aeshnidae	3	1
Elmidae	4	1
Psychomyiidae	2	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 110
 % Contribution of Dominant Family: 20.00 % (Gammaridae)
 Family Biotic Index: 4.15
 Scraper/Filterer Collector Ratio: 1.27
 Shredder/Total Ratio: 0.18
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
 % EPT: 57.27
 EPT/C: 5.73
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 129

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 6/1
 Substrate: Cobbles,gravel,sand,clay....StreamBank Vegetation/Stability:
 Trees,vines,weeds/Unstable
 Canopy: Mostly Open....Other: Rural; Water temp.1.7 /pH 8.4 /DO 15.9 /Cond.-

Station: AN0217
 Great Bk, Blackwells Place , Harding Twp, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 02/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	31
Siphonuridae	7	13
Chironomidae	6	12
Hydropsychidae	4	9
Baetidae	4	5
Tubificidae	10	4
Simuliidae	6	4
Heptageniidae	4	4
Capniidae	1	3
Tipulidae	3	3
Perlodidae	2	3
Lumbricidae	10	2
Rhyacophilidae	0	2
Enchytraeidae	10	1
Chloroperlidae	1	1
Lumbriculidae	8	1
Elmidae	4	1
Peltoperlidae	1	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 31.00 % (Ephemerellidae)
 Family Biotic Index: 3.92
 Scraper/Filterer Collector Ratio: 2.77
 Shredder/Total Ratio: 0.04
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
 % EPT: 72.00
 EPT/C: 6.00
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 105

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 3/1
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,grass/Unstable
 Canopy: Mostly Open....Other: Suburban; Water temp.4.3 /pH 8.5 /DO 14.8 /Cond.-

Station: AN0218
 Great Bk, Blackberry Ln , Harding Twp, Morris County
 Morristown USGS Quadrangle
 Date Sampled: 02/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	55
Gammaridae	4	20
Tubificidae	10	12
Planariidae	4	4
Asellidae	8	3
BloodRed Chironomidae	8	3
Elmidae	4	2
Hydropsychidae	4	2
Tabanidae	6	2
Cypridae	6	1
Planorbidae	6	1
Physidae	7	1
Tetrastemmatidae	7	1
Simuliidae	6	1
Lymnaeidae	6	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 110
 % Contribution of Dominant Family: 50.00 % (Chironomidae)
 Family Biotic Index: 6.09
 Scraper/Filterer Collector Ratio: 0.07
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 1.82
 EPT/C: 0.03
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 117

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 4/1
 Substrate: Gravel,sand mud....StreamBank Vegetation/Stability: Trees,shrubs,vines/Unstable
 Canopy: Mostly Open....Other: Suburban/Forested/Industrial park; Water temp.3.6 /pH 7.8
 /DO 15.7 /Cond.-

Station: AN0219
Great Bk, Woodland Rd { Gr Swamp Wma } , Harding Twp, Morris County
Chatham USGS Quadrangle
Date Sampled: 02/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	60
Chironomidae	6	30
Tubificidae	10	10
Cypridae	6	1
Nematoda	6	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 103
% Contribution of Dominant Family: 58.25 % (Gammaridae)
Family Biotic Index: 5.22
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 172

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Open....Other: Rural/Forested; Water temp.3.5 /pH 7.2 /DO 13.4 /Cond.753

Station: AN0220
Loantaka Bk, Bluestone Terr , Morristown Twp, Morris County
Morristown USGS Quadrangle
Date Sampled: 02/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	24
Gammaridae	4	21
Tubificidae	10	15
Planorbidae	6	7
Planariidae	4	3
Chironomidae	6	2
Tetrastemmatidae	7	2
Hydropsychidae	4	1
Lumbricidae	10	1
Cambaridae	5	1
Limnephilidae	4	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 79
% Contribution of Dominant Family: 30.38 % (Sphaeriidae)
Family Biotic Index: 6.75
Scraper/Filterer Collector Ratio: 0.32
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.53
EPT/C: 1.27
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 124

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 4/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,vines/Unstable
Canopy: Mostly Open....Other: Suburban/STP upstream; Water temp.11.1 /pH 7.9 /DO 12.1 /Cond.-
Sewage odor/Algae covering rocks;

Station: AN0221
Loantaka Bk, Green Village Rd , Green Village, Morris County
Chatham USGS Quadrangle
Date Sampled: 02/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	64
Elmidae	4	19
Planariidae	4	10
Hydropsychidae	4	9
Sphaeriidae	8	3
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 106
% Contribution of Dominant Family: 60.38 % (Gammaridae)
Family Biotic Index: 4.10
Scraper/Filterer Collector Ratio: 1.58
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 8.49
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 172
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly closed....Other: Rural/Forested; Water temp. 3.0 /pH -/DO 14.2 /Cond.1105

Station: AN0222
Black Bk, Southern Blvd , Chatham Twp, Morris County
Chatham USGS Quadrangle
Date Sampled: 02/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	98
Planariidae	4	5
BloodRed Chironomidae	8	1
Enchytraeidae	10	1
Cypridae	6	1
Coenagrionidae	9	1
Lumbricidae	10	1
Lumbriculidae	8	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 110
% Contribution of Dominant Family: 89.09 % (Tubificidae)
Family Biotic Index: 9.61
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 140
Deficiency(s) noted: Tubificidae Family Overwhelmingly Dominant
Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/<1
Substrate: Cobbles,gravel,sand...StreamBankVegetation/Stability: Grass,trees,vines/Unstable
Canopy: Mostly Open....Other: Suburban/Forested dwnstream/Golf course upstream;
Water temp.4.4 /pH 7.4 /DO 13.8 /Cond.559
Pond on golf course;

Station: AN0223
 Black Bk, New Vernon Rd , Meyersville, Morris County
 Chatham USGS Quadrangle
 Date Sampled: 02/16/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	32
Chironomidae	6	14
Naididae	7	14
BloodRed Chironomidae	8	11
Gammaridae	4	10
Nematoda	6	6
Tubificidae	10	5
Glossiphoniidae	8	3
Sphaeriidae	8	3
Planorbidae	6	1
Dendrocoelidae	4	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 32.00 % (Asellidae)
 Family Biotic Index: 7.10
 Scraper/Filterer Collector Ratio: 0.33
 Shredder/Total Ratio: 0.14
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
 % EPT: 0.00
 EPT/C: 0.00
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 146

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 45/2
 Substrate: Cobbles gravel sand....StreamBank Vegetation/Stability: Shrubs,trees/Stable
 Canopy: Mostly Open....Other: Rural/Forested/Gr Swamp Nat'l WMA ; Water temp.2.4 /pH 8.0
 /DO 13.6 /Cond.309

Station: AN0224
Passaic R, Valley Rd , Nr Millington, Morris-Somerset County
Bernardsville USGS Quadrangle
Date Sampled: 02/16/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	26
Hydropsychidae	4	23
Chironomidae	6	16
Gammaridae	4	8
Sphaeriidae	8	7
Taeniopterygidae	2	5
Caenidae	7	3
Philopotamidae	3	3
Tubificidae	10	3
Planariidae	4	2
Hydroptilidae	4	1
Nematoda	6	1
Psephenidae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Elmidae)
Family Biotic Index: 4.76
Scraper/Filterer Collector Ratio: 0.59
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 36.00
EPT/C: 2.25
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 140

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 45/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,shrubs,grass/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.2.2 /pH 7.8 /DO 14.2 /Cond.386

Station: AN0225
 Dead R Trib, Somerville Rd { Liberty Cor } , Bernards Twp, Somerset County
 Bernardsville USGS Quadrangle
 Date Sampled: 02/16/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	40
Naididae	7	15
Tubificidae	10	8
Simuliidae	6	8
Chironomidae	6	7
Elmidae	4	5
Hydropsychidae	4	2
Baetidae	4	2
Psephenidae	4	2
Tabanidae	6	2
Tipulidae	3	2
Capniidae	1	1
Planariidae	4	1
Ephemerellidae	1	1
Veliidae	9	1
Odontoceridae	0	1
Corixidae	9	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 40.00 % (Gammaridae)
 Family Biotic Index: 5.25
 Scraper/Filterer Collector Ratio: 0.90
 Shredder/Total Ratio: 0.03
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 8.00
 EPT/C: 1.14
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 162

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 5/<1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Closed....Other: Rural/Forested; Water temp.4.3 /pH 7.7 /DO 16.1 /Cond.460

Station: AN0226
 Dead R, Somerville Rd { Liberty Cor } , Bernards Twp, Somerset County
 Bernardsville USGS Quadrangle
 Date Sampled: 02/16/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	19
Simuliidae	6	15
Elmidae	4	13
Hydropsychidae	4	8
Capniidae	1	7
Ephemerellidae	1	6
Heptageniidae	4	6
Chironomidae	6	6
Tipulidae	3	5
Tubificidae	10	5
Psephenidae	4	4
Perlidae	1	1
Planariidae	4	1
Helicopsychidae	3	1
Nematoda	6	1
Nemouridae	2	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 17
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 19.00 % (Gammaridae)
 Family Biotic Index: 4.24
 Scraper/Filterer Collector Ratio: 1.35
 Shredder/Total Ratio: 0.08
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
 % EPT: 31.00
 EPT/C: 5.17
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 158

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 13/2
 Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability:
 Grass, shrubs, trees/Stable
 Canopy: Mostly Open....Other: Suburban/Forested; Water temp.2.0 /pH 7.8 /DO 15.2 /Cond.405

Station: AN0227
 Dead R, King George Rd , Nr Mt Bethel, Somerset County
 Bernardsville USGS Quadrangle
 Date Sampled: 02/16/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	32
Tubificidae	10	21
Chironomidae	6	20
Asellidae	8	7
BloodRed Chironomidae	8	4
Naididae	7	4
Physidae	7	3
Capniidae	1	2
Caenidae	7	2
Plagiostomidae	4	2
Hydropsychidae	4	1
Philopotamidae	3	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 13
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 32.00 % (Gammaridae)
 Family Biotic Index: 6.36
 Scraper/Filterer Collector Ratio: 1.50
 Shredder/Total Ratio: 0.02
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 6.00
 EPT/C: 0.25
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 118

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 37/2
 Substrate: Cobbles,mud....StreamBank Vegetation/Stability: Shrubs,trees/Unstable
 Canopy: Mostly Open....Other: Rural/Forested; Water temp.2.4 /pH 7.7 /DO 13.4 /Cond.550

Station: AN0227A
 Harrison Bk, Valley Rd , Liberty Corner, Somerset County
 Bernardsville USGS Quadrangle
 Date Sampled: 09/23/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	18
Gammaridae	4	18
Coenagrionidae	9	9
Heptageniidae	4	9
Psephenidae	4	8
Elmidae	4	8
Asellidae	8	7
Caenidae	7	4
Baetidae	4	4
Tabanidae	6	4
Chironomidae	6	3
Fredericellidae	2	3
Planorbidae	6	2
Hydropsychidae	4	1
Philopotamidae	3	1
Daphnidae	4	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 18.00 % (Tubificidae & Gammaridae)
 Family Biotic Index: 6.04
 Scraper/Filterer Collector Ratio: 4.50
 Shredder/Total Ratio: 0.07
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 19.00
 EPT/C: 6.33
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 149

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 10/<1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Unstable
 Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.16.1 /pH 7.4 /DO 5.4
 /Cond.386

Station: AN0228
 Passaic R, S Main Ave , Sterling, Morris/Somerset County
 Chatham USGS Quadrangle
 Date Sampled: 07/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	30
Gammaridae	4	28
Heptageniidae	4	13
Elmidae	4	10
Asellidae	8	7
Chironomidae	6	5
BloodRed Chironomidae	8	5
Sphaeriidae	8	3
Planorbidae	6	2
Coenagrionidae	9	1
Hydropsychidae	4	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 105
 % Contribution of Dominant Family: 28.57 % (Tubificidae)
 Family Biotic Index: 6.47
 Scraper/Filterer Collector Ratio: 1.67
 Shredder/Total Ratio: 0.11
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 13.33
 EPT/C: 1.33
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 134

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 27/2
 Substrate: Cobbles,gravel,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Mostly Open....Other: Forested; Water temp.22.3 /pH 8.3 /DO 6.4 /Cond.395

Station: AN0229
 Passaic R, Stanley Ave , Chatham, Morris/Union County
 Chatham USGS Quadrangle
 Date Sampled: 07/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	48
Chironomidae	6	17
Elmidae	4	10
Paludicellidae	7	9
Tubificidae	10	5
Sphaeriidae	8	4
Tipulidae	3	3
Empididae	6	2
BloodRed Chironomidae	8	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 10
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 48.00 % (Hydropsychidae)
 Family Biotic Index: 5.14
 Scraper/Filterer Collector Ratio: 0.16
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 48.00
 EPT/C: 2.67
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 133

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 55/1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Open....Other: Forested; Water temp.23.2 /pH 8.8 /DO 7.3 /Cond.688

Station: AN0230
 Passaic R , Summit Ave , Chatham, Morris/Essex County
 Chatham USGS Quadrangle
 Date Sampled: 07/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	43
Hydropsychidae	4	30
Spongillidae	5	19
Elmidae	4	4
Hydroptilidae	4	2
Tipulidae	3	1
Tubificidae	10	1

Statistical Analysis

Number of Taxa: 7
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 43.00 % (Sphaeriidae)
 Family Biotic Index: 5.96
 Scraper/Filterer Collector Ratio: 0.04
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 32.00
 EPT/C: 0.00
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 130

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 23/1
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Closed....Other: Urban/Industrial; Water temp.24.3 /pH 8.6 /DO 11.9
 /Cond.628

Station: AN0231
Passaic R, Eagle Rock Ave , E Hanover Twp, Morris/Essex County
Caldwell USGS Quadrangle
Date Sampled: 07/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	44
Chironomidae	6	18
Asellidae	8	12
BloodRed Chironomidae	8	12
Gammaridae	4	11
Lumbriculidae	8	3
Corixidae	9	2
Elmidae	4	1
Plagiostomidae	4	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 104
% Contribution of Dominant Family: 42.31 % (Tubificidae)
Family Biotic Index: 8.02
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.12
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 84

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 100/>4
Substrate: Mud....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Suburban/Forested; Water temp.25.5 /pH 9.0 /DO 7.0 /Cond.681

Station: AN0231A
Passaic R, Passaic Ave , Florham Park, Morris/Essex County
Caldwell USGS Quadrangle
Date Sampled: 07/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	63
Gammaridae	4	19
Tubificidae	10	7
Chironomidae	6	6
Corbiculidae	8	1
Plagiostomidae	4	1
Gerridae	8	1
Heptageniidae	4	1
Hydropsychidae	4	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 63.00 % (BloodRed Chironomidae)
Family Biotic Index: 7.14
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.00
EPT/C: 0.03
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 100
Deficiency(s) noted: BloodRed Chironomidae Family Overwhelmingly Dominant
Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Slightly turbid....Flow: Slow....Width/Depth (ft): 60/2
Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Forested/Industrial; Water temp.23.9 /pH 9.0 /DO 8.4/Cond.580

Station: AN0231C
Slough Bk, Parsonage Hill Rd , Millburn Twp, Essex County
Caldwell USGS Quadrangle
Date Sampled: 09/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	41
Tubificidae	10	35
Chironomidae	6	11
Gammaridae	4	8
Planorbidae	6	3
Cambaridae	5	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 7
Total Number of Individuals: 100
% Contribution of Dominant Family: 41.00 % (BloodRed Chironomidae)
Family Biotic Index: 8.06
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 141

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 6/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,weeds,vines/Unstable
Canopy: Closed....Other: Forested; Water temp.20.8 /pH 7.5 /DO 4.8 /Cond.733

Station: AN0231D
Canoe Bk, Parsonage Hill Rd , Millburn Twp, Essex County
Roselle USGS Quadrangle
Date Sampled: 09/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Spongillidae	5	60
Paludicellidae	7	13
Hydropsychidae	4	11
Tubificidae	10	9
Gammaridae	4	5
Planariidae	4	3
Chironomidae	6	3
Baetidae	4	2
Tipulidae	3	1
Erpobdellidae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 108
% Contribution of Dominant Family: 55.56 % (Spongillidae)
Family Biotic Index: 5.50
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 12.04
EPT/C: 4.01
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 157

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25/2
Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability:
Trees, shrubs, grasses/Unstable
Canopy: Closed....Other: Suburban/Forested; Water temp.22.6 /pH 7.6 /DO 6.5 /Cond.318

Station: AN0231E
Canoe Bk, McClellan St , Livingston, Essex County
Caldwell USGS Quadrangle
Date Sampled: 09/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tetrastemmatidae	7	4
Chironomidae	6	3
Hydropsychidae	4	2
Ceratopogonidae	6	1
Erpobdellidae	8	1
Tubificidae	10	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 12
% Contribution of Dominant Family: 33.33 % (Tetrastemmatidae)
Family Biotic Index: 6.50
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 16.67
EPT/C: 5.56
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 125

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,vines,weeds/Unstable
Canopy: Closed....Other: Suburban; Water temp.21.9 /pH 7.6 /DO 8.0 /Cond.414

Station: AN0232
 Whippany R, Mt Pleasant Rd , Mendham Twp, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 07/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	31
Philopotamidae	3	16
Leuctridae	0	13
Hydropsychidae	4	10
Baetidae	4	9
Elmidae	4	7
Tipulidae	3	6
Glossosomatidae	0	4
Gammaridae	4	3
Psephenidae	4	3
Simuliidae	6	3
Corydalidae	0	2
Perlidae	1	1
Empididae	6	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 109
 % Contribution of Dominant Family: 28.44 % (Chironomidae)
 Family Biotic Index: 3.72
 Scraper/Filterer Collector Ratio: 0.24
 Shredder/Total Ratio: 0.12
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 48.62
 EPT/C: 1.57
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 187

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.17.1 /pH 8.0 /DO 7.9
 /Cond.357

Station: AN0233
 Whippany R, Whitehead Rd , Morris Twp, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 08/04/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	33
Gammaridae	4	33
Hydropsychidae	4	8
Baetidae	4	4
Lumbriculidae	8	4
Simuliidae	6	4
BloodRed Chironomidae	8	3
Tipulidae	3	2
Corixidae	9	2
Naididae	7	2
Elmidae	4	2
Psychomyiidae	2	1
Veliidae	9	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 33.00 % (Chironomidae & Gammaridae)
 Family Biotic Index: 5.21
 Scraper/Filterer Collector Ratio: 0.76
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 13.00
 EPT/C: 0.36
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 131

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 10/<1
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Open....Other: Suburban/Forested/Agricultural cropland; Water temp.18.3 /pH
 7.5 /DO 8.1 /Cond.255

Station: AN0234
Whippany R, Ridgedale Ave , Morristown, Morris County
Morristown USGS Quadrangle
Date Sampled: 11/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	35
Gammaridae	4	20
Planariidae	4	14
Naididae	7	13
Chironomidae	6	10
Hydroptilidae	4	4
Nematoda	6	4
Tetrastemmatidae	7	3
Plagiostomidae	4	2
Tipulidae	3	1
Planorbidae	6	1
Leptoceridae	4	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 109
% Contribution of Dominant Family: 32.11 % (Hydropsychidae)
Family Biotic Index: 4.71
Scraper/Filterer Collector Ratio: 0.17
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 36.70
EPT/C: 3.67
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 121

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27/1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Shrubs,grass,trees/Unstable
Canopy: Mostly Open....Other: Urban; Water temp.7.4 /pH 7.7 /DO 11.3 /Cond.511

Station: AN0234A
 Watnong Bk, Lake Rd , Morristown, Morris County
 Morristown USGS Quadrangle
 Date Sampled: 09/23/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	53
Baetidae	4	14
Planariidae	4	8
Elmidae	4	6
Tetrastemmatidae	7	5
Simuliidae	6	3
Gammaridae	4	2
Glossosomatidae	0	2
Lumbricidae	10	2
Chironomidae	6	1
Calopterygidae	5	1
Lumbriculidae	8	1
Leptoceridae	4	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 53.00 % (Hydropsychidae)
 Family Biotic Index: 4.34
 Scraper/Filterer Collector Ratio: 0.14
 Shredder/Total Ratio: 0.01
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 70.00
 EPT/C: 70.00
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 181

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.16.0 /pH 7.6 /DO 8.5
 /Cond.487

Station: AN0235
Whippany R, Jefferson Rd , E Hanover Twp, Morris County
Morristown USGS Quadrangle
Date Sampled: 11/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	69
Planorbidae	6	8
Chironomidae	6	6
Fredericellidae	2	6
Plagiostomidae	4	5
Tubificidae	10	3
BloodRed Chironomidae	8	1
Nematoda	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 69.00 % (Gammaridae)
Family Biotic Index: 4.40
Scraper/Filterer Collector Ratio: 1.50
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
EPT/C: 0.14
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 128
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 37/1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Urban/Industrial/STP upstream;
Water temp.9.5 /pH 7.6 /DO 11.3 /Cond.637

Station: AN0236
Troy Bk, Lake Dr , Mountain Lakes, Morris County
Morristown USGS Quadrangle
Date Sampled: 07/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	28
Sphaeriidae	8	25
Chironomidae	6	20
Asellidae	8	7
Lumbriculidae	8	7
Hydropsychidae	4	4
Lumbricidae	10	2
Planorbidae	6	2
Planariidae	4	1
Naididae	7	1
Dendrocoelidae	4	1
Tetrastemmatidae	7	1
Leptoceridae	4	1
Tubificidae	10	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 101
% Contribution of Dominant Family: 27.72 % (Gammaridae)
Family Biotic Index: 6.22
Scraper/Filterer Collector Ratio: 0.07
Shredder/Total Ratio: 0.07
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.95
EPT/C: 0.25
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 160

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5/<1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Rural/Forested/Lake upstream; Water temp.23.6 /pH 7.2 /DO 6.5 /Cond.272

Station: AN0237
 Troy Bk, Beaverwyck Rd , Troy Hills, Morris County
 Morristown USGS Quadrangle
 Date Sampled: 07/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	32
Gammaridae	4	20
Baetidae	4	16
Simuliidae	6	8
Elmidae	4	5
Chironomidae	6	4
Psephenidae	4	4
Planariidae	4	2
Hydroptilidae	4	2
BloodRed Chironomidae	8	2
Tipulidae	3	1
Asellidae	8	1
Enchytraeidae	10	1
Cambaridae	5	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 32.00 % (Hydropsychidae)
 Family Biotic Index: 4.42
 Scraper/Filterer Collector Ratio: 0.30
 Shredder/Total Ratio: 0.01
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 51.00
 EPT/C: 8.50
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 188

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/<1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.20.7 /pH 9.0 /DO 8.7
 /Cond.495

Station: AN0238
Whippany R, Edwards Rd , E Hanover Twp, Morris County
Caldwell USGS Quadrangle
Date Sampled: 07/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	40
Tubificidae	10	15
Chironomidae	6	12
BloodRed Chironomidae	8	11
Hydropsychidae	4	9
Asellidae	8	3
Empididae	6	3
Elmidae	4	3
Corbiculidae	8	2
Naididae	7	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 40.00 % (Gammaridae)
Family Biotic Index: 5.89
Scraper/Filterer Collector Ratio: 0.25
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 9.00
EPT/C: 0.39
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 110

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 30/1
Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Mostly Open....Other: Urban/Forested; Water temp.25.2 /pH 8.9 /DO 8.5 /Cond.531

Station: AN0238B
Malapardis Bk, Mt Pleasant Ave , Whippany, Morris County
Morristown USGS Quadrangle
Date Sampled: 09/23/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	29
Baetidae	4	20
Elmidae	4	16
Gammaridae	4	10
Simuliidae	6	9
Philopotamidae	3	4
Planariidae	4	4
Heptageniidae	4	3
Tipulidae	3	2
Tetrastemmatidae	7	2
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Hydropsychidae)
Family Biotic Index: 4.18
Scraper/Filterer Collector Ratio: 0.48
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 56.00
EPT/C: 0.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 173

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/<1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.17.7 /pH 7.7 /DO 8.0
/Cond.629

Station: AN0239
 Russia Bk, Milton-Dover Rd , Jefferson Twp, Morris County
 Franklin USGS Quadrangle
 Date Sampled: 07/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	29
Philopotamidae	3	13
Gammaridae	4	13
Elmidae	4	11
Chironomidae	6	9
Calopterygidae	5	7
Oligoneuriidae	2	4
Perlidae	1	4
Ephemerellidae	1	4
Baetidae	4	3
Tubificidae	10	2
Rhyacophilidae	0	2
Tipulidae	3	1
Empididae	6	1
Leuctridae	0	1
Brachycentridae	1	1
Leptoceridae	4	1
Simuliidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 26.85 % (Hydropsychidae)
 Family Biotic Index: 3.81
 Scraper/Filterer Collector Ratio: 0.21
 Shredder/Total Ratio: 0.02
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
 % EPT: 58.33
 EPT/C: 6.48
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 166

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 16/1
 Substrate: Cobbles....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Mostly Closed....Other: Rural; Water temp.21.0 /pH 8.3 /DO 8.1 /Cond.273

Station: AN0240
Rockaway River, Blue Rd., Jefferson Twp., Morris
Dover USGS Quadrangle
Date Sampled: 08/26/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	31
Elmidae	4	19
Chironomidae	6	13
Philopotamidae	3	9
Sphaeriidae	8	6
Heptageniidae	4	6
Planariidae	4	5
Coenagrionidae	9	3
Baetidae	4	2
Corydalidae	0	2
Gammaridae	4	2
Oligoneuriidae	2	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 31.00 % (Hydropsychidae)
Family Biotic Index: 4.46
Scraper/Filterer Collector Ratio: 0.53
Shredder/Total Ratio: 0.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 50.00
EPT/C: 3.85
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 170

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 15/1
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, Shrubs, Weeds/Good
Canopy: Mostly Open....Other: Rural, Forested; Longwood Lake upstr.
Fish, Crayfish; Water temp. 22.8C / pH 7.7SU / DO 8.1mg/L / Cond. 388umhos

Station: AN0241
Rockaway R, Berkshire Valley Rd , Jefferson Twp, Morris County
Dover USGS Quadrangle
Date Sampled: 07/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	59
Asellidae	8	25
Calopterygidae	5	2
Baetidae	4	2
Chironomidae	6	2
Paludicellidae	7	2
Aeshnidae	3	1
Viviparidae	6	1
Philopotamidae	3	1
Corixidae	9	1
Elmidae	4	1
Pyralidae	5	1
Simuliidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 59.00 % (Gammaridae)
Family Biotic Index: 5.20
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.26
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 4.00
EPT/C: 2.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 125

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 27/2
Substrate: Cobbles, gravel, sand, mud....StreamBank Vegetation/Stability:
Trees, grass, shrubs/Stable
Canopy: Mostly Open....Other: Rural/Forested; Water temp.23.1 /pH 8.3 /DO 7.8 /Cond.263

Station: AN0242
Green Pond Bk, Mt Pleasant Tpk , Wharton, Morris County
Dover USGS Quadrangle
Date Sampled: 07/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	78
Chironomidae	6	9
Elmidae	4	6
Baetidae	4	3
BloodRed Chironomidae	8	2
Tipulidae	3	1
Aeshnidae	3	1
Glossosomatidae	0	1
Tubificidae	10	1
Oniscidae	7	1
Physidae	7	1
Simuliidae	6	1
Hydropsychidae	4	1
Gerridae	8	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 108
% Contribution of Dominant Family: 72.22 % (Gammaridae)
Family Biotic Index: 4.35
Scraper/Filterer Collector Ratio: 4.00
Shredder/Total Ratio: 0.14
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 5.56
EPT/C: 0.51
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 121
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 11/1
Substrate: Cobbles,gravel,silt....StreamBank Vegetation/Stability: Trees,shrubs,grass /Stable; Canopy: Mostly Open....Other: Forested/Commercial; Water temp.23.0 /pH 7.8 /DO 9.7 /Cond.353
Trash in stream;

Station: AN0243
 Rockaway R , Blackwells Rd { Rt 513 } , Randolph Twp, Morris County
 Dover USGS Quadrangle
 Date Sampled: 07/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	21
Hydropsychidae	4	19
Gammaridae	4	11
Glossosomatidae	0	11
Lumbriculidae	8	8
Chironomidae	6	6
Psychomyiidae	2	6
Pleuroceridae	6	5
Heptageniidae	4	5
Oligoneuriidae	2	3
Tipulidae	3	2
Nematoda	6	2
Cambaridae	5	2
Tetrastemmatidae	7	2
Asellidae	8	1
Planorbidae	6	1
Gomphidae	1	1
Psephenidae	4	1
Sperchonidae	2	1

Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 19.44 % (Elmidae)
 Family Biotic Index: 4.03
 Scraper/Filterer Collector Ratio: 1.57
 Shredder/Total Ratio: 0.01
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 40.74
 EPT/C: 6.79
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 141

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 25/2
 Substrate: Cobbles,sand,mud....StreamBank Vegetation/Stability: Trees,shrubs,vines/Unstable
 Canopy: Open....Other: Urban/Industrial; Water temp.22.3 /pH 7.8 /DO 8.7 /Cond.351
 Oil in bottom mud ;

Station: AN0244
 Mill Bk, Palmer Rd , Randolph Twp, Morris County
 Dover USGS Quadrangle
 Date Sampled: 07/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	49
Chironomidae	6	23
Hydropsychidae	4	7
Lumbriculidae	8	7
Empididae	6	4
Tipulidae	3	2
Gomphidae	1	2
Physidae	7	2
Simuliidae	6	1
Leuctridae	0	1
Nematoda	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 49.00 % (Gammaridae)
 Family Biotic Index: 4.80
 Scraper/Filterer Collector Ratio: 0.38
 Shredder/Total Ratio: 0.24
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 8.00
 EPT/C: 0.35
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 139

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,vines
 weeds/Unstable
 Canopy: Mostly Closed....Other: Suburban; Water temp.19.4 /pH 7.6 /DO 9.4 /Cond.310

Station: AN0245
Beaver Bk, Lyonville-Meridan Rd , Meridan, Morris County
Boonton USGS Quadrangle
Date Sampled: 07/21/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	36
Peltoperlidae	1	19
Chironomidae	6	8
Simuliidae	6	7
Philopotamidae	3	6
Tipulidae	3	5
Ephemerellidae	1	4
Baetidae	4	3
Elmidae	4	3
Psephenidae	4	2
Rhyacophilidae	0	2
Lumbriculidae	8	1
Leptoceridae	4	1
Corydalidae	0	1
Perlidae	1	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 36.00 % (Hydropsychidae)
Family Biotic Index: 3.42
Scraper/Filterer Collector Ratio: 0.10
Shredder/Total Ratio: 0.27
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 72.00
EPT/C: 9.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 163

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Closed....Other: Rural/Forested; Water temp.21.5 /pH 8.0 /DO 7.9 /Cond.48
Road name correction;

Station: AN0246
Beaver Bk, Morris Ave , Denville, Morris County
Boonton USGS Quadrangle
Date Sampled: 07/21/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	25
Viviparidae	6	22
Chironomidae	6	15
BloodRed Chironomidae	8	13
Tubificidae	10	8
Planorbidae	6	4
Glossiphoniidae	8	2
Asellidae	8	2
Elmidae	4	2
Plagiostomidae	4	2
Physidae	7	2
Sialidae	4	2
Planariidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 25.00 % (Gammaridae)
Family Biotic Index: 6.04
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 107

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 20/5
Substrate: Sand,mud,silt....StreamBank Vegetation/Stability: Trees,shrubs,vines/Unstable
Canopy: Mostly Closed....Other: Urban/Industrial/Forested; Water temp. 22.6 /pH 7.5 /DO 4.7 /Cond.204

Station: AN0247
 Den Bk, Mt Pleasant Tpk , Denville, Morris County
 Mendham USGS Quadrangle
 Date Sampled: 07/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	23
Hydropsychidae	4	21
Baetidae	4	18
Tipulidae	3	8
Lumbriculidae	8	7
BloodRed Chironomidae	8	3
Psychomyiidae	2	3
Perlidae	1	2
Gammaridae	4	2
Polycentropodidae	6	2
Veliidae	9	2
Simuliidae	6	2
Heptageniidae	4	2
Empididae	6	1
Tetrastemmatidae	7	1
Ephemerellidae	1	1
Elmidae	4	1
Philopotamidae	3	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 23.00 % (Chironomidae)
 Family Biotic Index: 4.85
 Scraper/Filterer Collector Ratio: 0.23
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
 % EPT: 50.00
 EPT/C: 1.92
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 169

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.21.8 /pH 8.4 /DO 7.1
 /Cond.197

Station: AN0248
Rockaway R , Pocono Rd , Denville, Morris County
Boonton USGS Quadrangle
Date Sampled: 07/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	33
Hydropsychidae	4	24
Baetidae	4	14
Simuliidae	6	7
Gammaridae	4	4
Glossosomatidae	0	4
Heptageniidae	4	3
Chironomidae	6	3
Planariidae	4	2
Pleuroceridae	6	2
Lumbriculidae	8	1
Leptoceridae	4	1
Psephenidae	4	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 33.00 % (Elmidae)
Family Biotic Index: 4.16
Scraper/Filterer Collector Ratio: 1.78
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 46.00
EPT/C: 15.33
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 117

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 35/2
Substrate: Cobbles,sand....StreamBank Vegetation/Stability: Trees,weeds,grass/Unstable
Canopy: Mostly Open....Other: Suburban/Channelized; Water temp.23.0 /pH 7.7 /DO 8.6
/Cond.350

Station: AN0249
 Stony Bk, Valley Rd , Boonton Twp, Morris County
 Boonton USGS Quadrangle
 Date Sampled: 07/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	91
Chironomidae	6	4
Baetidae	4	3
Lumbriculidae	8	2
Hydropsychidae	4	1
Planorbidae	6	1
Elmidae	4	1
Tabanidae	6	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 9
 Total Number of Individuals: 105
 % Contribution of Dominant Family: 86.67 % (Gammaridae)
 Family Biotic Index: 4.23
 Scraper/Filterer Collector Ratio: 1.00
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 3.81
 EPT/C: 0.76
 NJIS Rating: 9
 Biological Condition: Moderately Impaired
 Habitat Analysis: 109
 Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant
 Paucity of Clean Water Organisms

Observations

Streamwater: Slightly turbid....Flow: Slow....Width/Depth (ft): 13/1
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Shrubs/trees/Unstable
 Canopy: Mostly Open....Other: Rural/Forested; Water temp.22.9 /pH 7.3 /DO 5.2 /Cond.147

Station: AN0250
Rockaway R, Morris Ave , Boonton, Morris County
Boonton USGS Quadrangle
Date Sampled: 07/21/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	50
Baetidae	4	41
Gammaridae	4	8
Chironomidae	6	7
Lumbriculidae	8	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 108
% Contribution of Dominant Family: 46.30 % (Hydropsychidae)
Family Biotic Index: 4.17
Scraper/Filterer Collector Ratio: 0.84
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 84.26
EPT/C: 12.04
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 152

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 25/2
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Urban/Industrial; Water temp.24.1 /pH 8.1 /DO 7.8
/Cond.317

Station: AN0251
Rockaway R, River Rd , Boonton, Morris County
Boonton USGS Quadrangle
Date Sampled: 07/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	75
Chironomidae	6	22
Baetidae	4	2
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 4
Total Number of Individuals: 100
% Contribution of Dominant Family: 75.00 % (Hydropsychidae)
Family Biotic Index: 4.47
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 77.00
EPT/C: 3.50
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 149
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant - Low Diversity
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 35/2
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Open....Other: Rural/Forested; Water temp.19.4 /pH 7.4 /DO 7.9 /Cond.477
Sewage odor; STP and reservoir upstream;

Station: AN0252
 Crooked Bk, Hemlock Rd , Montville Twp, Morris County
 Pompton Plains USGS Quadrangle
 Date Sampled: 08/04/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	17
Ephemerellidae	1	13
Leuctridae	0	12
BloodRed Chironomidae	8	9
Gomphidae	1	7
Psephenidae	4	7
Hydropsychidae	4	6
Veliidae	9	6
Perlidae	1	4
Planorbidae	6	4
Limnephilidae	4	4
Heptageniidae	4	3
Lumbriculidae	8	2
Psychomyiidae	2	2
Elmidae	4	2
Sphaeriidae	8	2
Tipulidae	3	2
Aeshnidae	3	1
Astacidae	7	1
Gerridae	8	1
Lumbricidae	10	1
Leptoceridae	4	1
Baetidae	4	1
Pteronarcidae	0	1
Sialidae	4	1

Statistical Analysis

Number of Taxa: 25
 Total Number of Individuals: 110
 % Contribution of Dominant Family: 15.45 % (Chironomidae)
 Family Biotic Index: 4.06
 Scraper/Filterer Collector Ratio: 2.25
 Shredder/Total Ratio: 0.16
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
 % EPT: 42.73
 EPT/C: 1.64
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 181

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 2/<1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Closed....Other: Rural/Forested; Water temp.19.3 /pH 7.7 /DO 6.1 /Cond.142

Station: AN0253
 Crooked Bk, Vista Rd , Montville Twp, Morris County
 Boonton USGS Quadrangle
 Date Sampled: 07/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	68
Heptageniidae	4	14
Planariidae	4	7
Sphaeriidae	8	3
Psephenidae	4	2
Baetidae	4	2
Gomphidae	1	2
Tetrastemmatidae	7	2
Tipulidae	3	1
Asellidae	8	1
Gammaridae	4	1
Empididae	6	1
Lumbricidae	10	1
Lumbriculidae	8	1
Physidae	7	1
Psychomyiidae	2	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 62.96 % (Hydropsychidae)
 Family Biotic Index: 4.26
 Scraper/Filterer Collector Ratio: 0.24
 Shredder/Total Ratio: 0.01
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 78.70
 EPT/C: 0.00
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 172
 Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 11/1
 Substrate: Cobbles,gravel...StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Closed....Other: Rural/Forested/Lake upstream; Water temp.25.7 /pH 7.6
 DO 6.8 /Cond.125

Station: AN0254
 Crooked Bk, River Rd , Montville Twp, Morris County
 Pompton Plains USGS Quadrangle
 Date Sampled: 07/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	27
Hydropsychidae	4	22
Elmidae	4	19
Glossosomatidae	0	11
Chironomidae	6	9
Baetidae	4	4
Tipulidae	3	3
Empididae	6	2
Calopterygidae	5	1
Psephenidae	4	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 27.00 % (Gammaridae)
 Family Biotic Index: 3.78
 Scraper/Filterer Collector Ratio: 1.35
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 37.00
 EPT/C: 4.11
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 156

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 17/1
 Substrate: Cobbles,sand....StreamBank Vegetation/Stability: Trees/Unstable
 Canopy: Mostly Closed....Other: Rural/Forested; Water temp.20.5 /pH 8.2 /DO 8.0 /Cond.371

Station: AN0255
 Wanaque R, E Shore Dr , Awosting, Passaic County
 Greenwood Lake USGS Quadrangle
 Date Sampled: 08/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Heptageniidae	4	28
Hydropsychidae	4	16
Baetidae	4	13
Oligoneuriidae	2	10
Corydalidae	0	5
Chironomidae	6	5
Perlidae	1	4
Philopotamidae	3	3
Sphaeriidae	8	3
Gammaridae	4	2
Physidae	7	2
Talitridae	8	1
Coenagrionidae	9	1
Planorbidae	6	1
Brachycentridae	1	1
Nematoda	6	1
Pyrilidae	5	1
Veliidae	9	1
Rhyacophilidae	0	1
Ephemerellidae	1	1

Statistical Analysis

Number of Taxa: 20
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 28.00 % (Heptageniidae)
 Family Biotic Index: 3.82
 Scraper/Filterer Collector Ratio: 1.22
 Shredder/Total Ratio: 0.01
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
 % EPT: 77.00
 EPT/C: 15.40
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 182

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/1
 Substrate: Cobbles,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Closed....Other: Forested; Water temp.24.4 /pH 7.7 /DO 7.3 /Cond.186

Station: AN0255C
Belchers Ck, Union Valley Rd , West Milford, Passaic County
Greenwood Lake USGS Quadrangle
Date Sampled: 09/25/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Paludicellidae	7	38
Chironomidae	6	13
Naididae	7	9
Spongillidae	5	8
Gammaridae	4	5
Elmidae	4	5
Hydropsychidae	4	4
Planariidae	4	4
Simuliidae	6	4
BloodRed Chironomidae	8	2
Plagiostomidae	4	2
Leptoceridae	4	2
Arrenuridae	5	1
Planorbidae	6	1
Nematoda	6	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 38.00 % (Paludicellidae)
Family Biotic Index: 5.99
Scraper/Filterer Collector Ratio: 0.13
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 6.00
EPT/C: 0.40
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 191

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/<1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Suburban/Forested; Water temp.19.1 /pH 7.7 /DO 5.9 /Cond.212

Station: AN0255D
 Green Bk, Union Valley Rd , West Milford, Passaic County
 Greenwood Lake USGS Quadrangle
 Date Sampled: 09/25/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	14
Gammaridae	4	11
Hydropsychidae	4	11
Limnephilidae	4	11
Peltoperlidae	1	9
Chironomidae	6	8
Tubificidae	10	6
Lumbriculidae	8	5
Tipulidae	3	3
Chloroperlidae	1	3
Calopterygidae	5	2
Psychomyiidae	2	2
Ceratopogonidae	6	2
BloodRed Chironomidae	8	2
Tetrastemmatidae	7	2
Tabanidae	6	2
Perlidae	1	1
Athericidae	2	1
Asellidae	8	1
Philopotamidae	3	1
Gomphidae	1	1
Molannidae	6	1
Leptoceridae	4	1
Elmidae	4	1
Veliidae	9	1
Rhyacophilidae	0	1

 Statistical Analysis

Number of Taxa: 26
 Total Number of Individuals: 103
 % Contribution of Dominant Family: 13.59 % (Ephemerellidae)
 Family Biotic Index: 4.09
 Scraper/Filterer Collector Ratio: 0.75
 Shredder/Total Ratio: 0.19
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
 % EPT: 53.40
 EPT/C: 5.34
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 177

 Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/<1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Closed....Other: Rural/Forested; Water temp.13.3 /pH 8.3 /DO 8.3 /Cond.122

Station: AN0256
Wanaque R, Highland Ave { Blw Stp } , Wanaque, Passaic County
Wanaque USGS Quadrangle
Date Sampled: 08/05/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	43
Chironomidae	6	21
BloodRed Chironomidae	8	8
Corixidae	9	7
Asellidae	8	5
Planorbidae	6	5
Tubificidae	10	4
Nematoda	6	2
Plagiostomidae	4	1
Physidae	7	1
Sphaeriidae	8	1
Psychomyiidae	2	1
Hydropsychidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 43.00 % (Gammaridae)
Family Biotic Index: 5.72
Scraper/Filterer Collector Ratio: 1.17
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.00
EPT/C: 0.07
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 132

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 15/2
Substrate: Sand,silt....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Open....Other: Forested; Water temp.20.8 /pH 8.1 /DO 7.4 /Cond.194

Station: AN0256A
 Meadow Bk, Highland Ave , Wanaque, Passaic County
 Wanaque USGS Quadrangle
 Date Sampled: 09/28/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	60
Hydropsychidae	4	11
Baetidae	4	9
Chironomidae	6	4
Planariidae	4	4
Gammaridae	4	4
Tipulidae	3	2
Glossosomatidae	0	2
Tetrastemmatidae	7	2
Nematoda	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 60.00 % (Simuliidae)
 Family Biotic Index: 5.26
 Scraper/Filterer Collector Ratio: 0.09
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 22.00
 EPT/C: 5.50
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 116

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 10/1
 Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability:
 Trees, weeds, vines/Unstable
 Canopy: Mostly Closed....Other: Suburban/Recycling facility adjacent; Water temp.20.0 /pH
 7.2 /DO 6.5 /Cond.383

Station: AN0257
Wanaque R , Wanaque Ave , Pompton Lakes, Passaic County
Wanaque USGS Quadrangle
Date Sampled: 08/05/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	44
Baetidae	4	15
Heptageniidae	4	12
Gammaridae	4	6
Chironomidae	6	5
Oligoneuriidae	2	3
Elmidae	4	3
Empididae	6	2
Hydroptilidae	4	2
Nematoda	6	2
Tipulidae	3	1
Corydalidae	0	1
Tetrastemmatidae	7	1
Psephenidae	4	1
Sialidae	4	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 44.00 % (Hydropsychidae)
Family Biotic Index: 4.12
Scraper/Filterer Collector Ratio: 0.38
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 76.00
EPT/C: 15.20
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 129

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 30/3
Substrate: Cobbles,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs,weeds/Stable
Canopy: Mostly Open....Other: Urban/Lake upstream; Water temp.20.5 /pH 8.0 /DO 8.0 /Cond.221
Caution Do Not Eat Fish;

Station: AN0258
 Pequannock R, Rt 515 , N Of Stockholm, Sussex County
 Franklin USGS Quadrangle
 Date Sampled: 08/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	44
Talitridae	8	19
Corixidae	9	8
Elmidae	4	5
Asellidae	8	4
Coenagrionidae	9	3
Aeshnidae	3	2
Haliplidae	5	2
BloodRed Chironomidae	8	2
Naididae	7	2
Baetidae	4	1
Corydalidae	0	1
Planorbidae	6	1
Hydroptilidae	4	1
Psychomyiidae	2	1
Cambaridae	5	1
Tetrastemmatidae	7	1
Limnephilidae	4	1
Daphnidae	4	1

Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 44.00 % (Chironomidae)
 Family Biotic Index: 6.49
 Scraper/Filterer Collector Ratio: 5.00
 Shredder/Total Ratio: 0.03
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 4.00
 EPT/C: 0.09
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 142

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 8/4
 Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability:
 Grass, trees, shrubs/Stable
 Canopy: Open....Other: Forested; Water temp.19.3 /pH 7.2 /DO 4.8 /Cond.378

Station: AN0259
 Pequannock R, Rt 23 { Abv Res } , Stockholm, Morris/Passaic County
 Newfoundland USGS Quadrangle
 Date Sampled: 08/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	46
BloodRed Chironomidae	8	20
Baetidae	4	7
Elmidae	4	4
Hydroptilidae	4	4
Heptageniidae	4	3
Hydropsychidae	4	2
Planorbidae	6	2
Ephemerellidae	1	2
Calopterygidae	5	1
Aeshnidae	3	1
Caenidae	7	1
Hygrobatidae	2	1
Oligoneuriidae	2	1
Leptoceridae	4	1
Perlidae	1	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1
Naididae	7	1
Lymnaeidae	6	1
Peltoperlidae	1	1

Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 102
 % Contribution of Dominant Family: 45.10 % (Chironomidae)
 Family Biotic Index: 5.72
 Scraper/Filterer Collector Ratio: 9.00
 Shredder/Total Ratio: 0.46
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
 % EPT: 22.55
 EPT/C: 0.34
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 180

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/<1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Open....Other: Rural/Forested; Water temp.24.1 /pH 7.8 /DO 9.2 /Cond.302

Station: AN0260
 Mossmans Bk, Clinton Rd { Abv Res } , W Milford Twp, Passaic County
 Newfoundland USGS Quadrangle
 Date Sampled: 08/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	26
Baetidae	4	19
Elmidae	4	11
Ephemerellidae	1	7
Brachycentridae	1	7
Hydropsychidae	4	4
Leuctridae	0	4
Sphaeriidae	8	3
Tubificidae	10	2
BloodRed Chironomidae	8	2
Gerridae	8	2
Gomphidae	1	2
Lumbriculidae	8	2
Heptageniidae	4	2
Asellidae	8	1
Hydroptilidae	4	1
Veliidae	9	1
Psephenidae	4	1
Odontoceridae	0	1
Limnephilidae	4	1
Peltoperlidae	1	1

Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 26.00 % (Chironomidae)
 Family Biotic Index: 4.38
 Scraper/Filterer Collector Ratio: 2.29
 Shredder/Total Ratio: 0.14
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
 % EPT: 47.00
 EPT/C: 1.68
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 171

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 15/<1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Closed....Other: Forested; Water temp.19.5 /pH 7.7 /DO 8.1 /Cond.70

Station: AN0261
 Clinton Bk, La Rue Rd , W Milford Twp, Passaic County
 Newfoundland USGS Quadrangle
 Date Sampled: 08/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Baetidae	4	19
Chironomidae	6	16
Corixidae	9	12
Elmidae	4	9
Calopterygidae	5	6
Talitridae	8	5
Tubificidae	10	4
Hydropsychidae	4	3
Heptageniidae	4	3
Naididae	7	3
Hydrophilidae	5	2
Coenagrionidae	9	2
Leptoceridae	4	2
Notonectidae	9	2
Sphaeriidae	8	2
Asellidae	8	1
Aeshnidae	3	1
Caenidae	7	1
Culicidae	8	1
Curculionidae	7	1
Hydroptilidae	4	1
Brachycentridae	1	1
Veliidae	9	1
Cambaridae	5	1
Tetrastemmatidae	7	1
Daphnidae	4	1

Statistical Analysis

Number of Taxa: 26
 Total Number of Individuals: 101
 % Contribution of Dominant Family: 18.81 % (Baetidae)
 Family Biotic Index: 5.98
 Scraper/Filterer Collector Ratio: 0.59
 Shredder/Total Ratio: 0.03
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
 % EPT: 29.70
 EPT/C: 1.86
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 171

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30/2
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Open....Other: Rural/Forested/Partially channelized; Water temp.15.2 /pH
 8.2 /DO 9.2 /Cond.45

Station: AN0262
 Kanouse Bk, Kanouse Rd , Newfoundland, Passaic County
 Newfoundland USGS Quadrangle
 Date Sampled: 08/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	34
Hydropsychidae	4	10
Baetidae	4	9
BloodRed Chironomidae	8	9
Hydroptilidae	4	6
Talitridae	8	4
Tetrastemmatidae	7	4
Planorbidae	6	3
Gyrinidae	3	3
Coenagrionidae	9	3
Tubificidae	10	2
Caenidae	7	2
Philopotamidae	3	2
Naucoridae	5	2
Polycentropodidae	6	2
Arrenuridae	5	1
Asellidae	8	1
Aeshnidae	3	1
Gammaridae	4	1
Calopterygidae	5	1
Sphaeriidae	8	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 22
 Total Number of Individuals: 102
 % Contribution of Dominant Family: 33.33 % (Chironomidae)
 Family Biotic Index: 5.77
 Scraper/Filterer Collector Ratio: 1.08
 Shredder/Total Ratio: 0.01
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
 % EPT: 31.37
 EPT/C: 0.73
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 141

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 20/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Weeds/Stable
 Canopy: Open....Other: Rural/Forested; Water temp.20.8 /pH 8.0 /DO 7.6 /Cond.118

Station: AN0263
Macopin River, Echo Lake Rd. (Outlet Of Echo Lake), West Milford Twp, Passaic County
Newfoundland USGS Quadrangle
Date Sampled: NOT SAMPLED

No Water

Station: AN0264
Pequannock R, Rt 23 , W Milford Twp, Morris/Passaic County
Newfoundland USGS Quadrangle
Date Sampled: 08/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	40
Baetidae	4	14
Gammaridae	4	10
Oligoneuriidae	2	7
Chironomidae	6	7
Planorbidae	6	5
Physidae	7	4
Hydrobiidae	8	3
Corydalidae	0	2
Planariidae	4	2
Empididae	6	1
Lumbriculidae	8	1
Brachycentridae	1	1
Elmidae	4	1
Tetrastemmatidae	7	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 40.00 % (Hydropsychidae)
Family Biotic Index: 4.34
Scraper/Filterer Collector Ratio: 0.24
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 62.00
EPT/C: 8.86
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 168

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 25/2
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Rural/Forested; Water temp.21.3 /pH 7.9 /DO 8.2 /Cond.217

Station: AN0265
Pequannock R, Rt 511 , Riverdale, Morris/Passaic County
Wanaque USGS Quadrangle
Date Sampled: 08/05/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Baetidae	4	37
Hydropsychidae	4	22
Chironomidae	6	16
Oligoneuriidae	2	13
Heptageniidae	4	3
Lumbriculidae	8	2
Gammaridae	4	1
Hydroptilidae	4	1
Lumbricidae	10	1
Elmidae	4	1
Physidae	7	1
Sphaeriidae	8	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 37.00 % (Baetidae)
Family Biotic Index: 4.29
Scraper/Filterer Collector Ratio: 0.16
Shredder/Total Ratio: 0.16
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 76.00
EPT/C: 4.75
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 185

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.21.2 /pH 8.1 /DO 8.9
/Cond.356

Station: AN0266
 Ramapo R, W Ramapo Ave , Mahwah Twp, Bergen County
 Ramsey USGS Quadrangle
 Date Sampled: 08/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	35
Chironomidae	6	28
Elmidae	4	11
Planariidae	4	7
Baetidae	4	5
Caenidae	7	3
Tipulidae	3	2
Gammaridae	4	2
Empididae	6	2
Nematoda	6	2
Planorbidae	6	1
Heptageniidae	4	1
Oligoneuriidae	2	1

Statistical Analysis

Number of Taxa: 13
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 35.00 % (Hydropsychidae)
 Family Biotic Index: 4.71
 Scraper/Filterer Collector Ratio: 0.36
 Shredder/Total Ratio: 0.28
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 45.00
 EPT/C: 1.61
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 134

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 35/2
 Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability:
 Trees,shrubs,vines,weeds/Unstable
 Canopy: Mostly Open....Other: Suburban/Forested; Water temp.21.2 /pH 7.4 /DO 6.6 /Cond.572

Station: AN0267
Ramapo R, Lenape Lane , Oakland, Bergen County
Ramsey USGS Quadrangle
Date Sampled: 08/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Paludicellidae	7	31
Hydropsychidae	4	20
Chironomidae	6	14
Planariidae	4	6
Baetidae	4	6
Elmidae	4	6
Oligoneuriidae	2	4
Heptagenidae	4	3
Hydroptilidae	4	2
Tetrastemmatidae	7	2
Caenidae	7	1
Empididae	6	1
Tubificidae	10	1
Lumbriculidae	8	1
Nematoda	6	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 31.00 % (Paludicellidae)
Family Biotic Index: 5.36
Scraper/Filterer Collector Ratio: 0.15
Shredder/Total Ratio: 0.18
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 37.00
EPT/C: 2.64
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 145

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 35/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,shrubs,vines/Unstable
Canopy: Open....Other: Suburban; Water temp.24.4 /pH 7.7 /DO 9.8 /Cond.467

Station: AN0268
 Pompton R , Newark-Pompton Tpk , Pequannock Twp, Morris/Passaic County
 Pompton Plains USGS Quadrangle
 Date Sampled: 08/04/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	25
Gammaridae	4	18
Hydropsychidae	4	13
Simuliidae	6	12
Baetidae	4	10
Planariidae	4	3
Caenidae	7	2
Corbiculidae	8	2
Hydroptilidae	4	2
BloodRed Chironomidae	8	2
Tricorythidae	4	2
Urnatellidae	5	2
Elmidae	4	1
Tubificidae	10	1
Cambaridae	5	1
Veliidae	9	1
Leptoceridae	4	1
Psychomyiidae	2	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 25.00 % (Chironomidae)
 Family Biotic Index: 5.08
 Scraper/Filterer Collector Ratio: 0.21
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
 % EPT: 32.00
 EPT/C: 1.19
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 149

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 80/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Open....Other: Suburban/Forested; Water temp.24.0 /pH 8.2 /DO 9.1 /Cond.355

Station: AN0269
 Dam Bk, Ryerson Rd , Lincoln Park, Morris County
 Pompton Plains USGS Quadrangle
 Date Sampled: 08/04/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	41
Chironomidae	6	13
Asellidae	8	11
Hydropsychidae	4	11
Hydrobiidae	8	7
Elmidae	4	4
BloodRed Chironomidae	8	3
Tubificidae	10	2
Sphaeriidae	8	2
Calopterygidae	5	1
Planariidae	4	1
Empididae	6	1
Plagiostomidae	4	1
Physidae	7	1
Corixidae	9	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 41.00 % (Gammaridae)
 Family Biotic Index: 5.41
 Scraper/Filterer Collector Ratio: 0.46
 Shredder/Total Ratio: 0.11
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 11.00
 EPT/C: 0.69
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 132

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 30/<1
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.20.9 /pH 7.4 /DO 5.8
 /Cond.435
 Stream name correction;

Station: AN0270
 Packanack Bk, Osbourne Rd , Mountain View, Passaic County
 Pompton Plains USGS Quadrangle
 Date Sampled: 08/05/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Spongillidae	5	30
Hydropsychidae	4	29
Gammaridae	4	17
Tubificidae	10	7
BloodRed Chironomidae	8	5
Elmidae	4	5
Chironomidae	6	3
Simuliidae	6	3
Planariidae	4	1
Empididae	6	1
Cyclopidae	4	1
Leptoceridae	4	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 13
 Total Number of Individuals: 104
 % Contribution of Dominant Family: 28.85 % (Spongillidae)
 Family Biotic Index: 5.05
 Scraper/Filterer Collector Ratio: 0.07
 Shredder/Total Ratio: 0.05
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 28.85
 EPT/C: 3.61
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 124

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Mostly Closed....Other: Suburban/Lake upstream; Water temp.27.9 /pH 9.0 /DO 8.8
 /Cond.317
 Trash;

Station: AN0271
Deepavaal Bk, Little Falls Ave , Caldwell Twp, Essex County
Pompton Plains USGS Quadrangle
Date Sampled: 08/05/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	41
BloodRed Chironomidae	8	18
Tubificidae	10	13
Naididae	7	10
Plagiostomidae	4	5
Planorbidae	6	4
Hydridae	5	4
Corixidae	9	2
Daphnidae	4	2
Planariidae	4	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 41.00 % (Chironomidae)
Family Biotic Index: 6.84
Scraper/Filterer Collector Ratio: 1.05
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 95

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 30/3
Substrate: Cobbles,gravel,silt....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Suburban; Water temp.20.4 /pH 7.3 /DO 4.7 /Cond.539
Trash;

Station: AN0272
Preakness Bk, Paterson-Hamburg Tpk , Wayne Twp, Passaic County
Paterson USGS Quadrangle
Date Sampled: 08/12/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Baetidae	4	29
Gammaridae	4	26
Lumbriculidae	8	13
Elmidae	4	12
Chironomidae	6	6
Planariidae	4	3
Hydroptilidae	4	3
Tetrastemmatidae	7	2
Psephenidae	4	2
Asellidae	8	1
Empididae	6	1
Hydropsychidae	4	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Baetidae)
Family Biotic Index: 4.78
Scraper/Filterer Collector Ratio: 3.29
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 33.00
EPT/C: 5.50
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 109

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 9/1
Substrate: Gravel,sand silt....StreamBank Vegetation/Stability: Shrubs,grass/Stable
Canopy: Mostly Open....Other: Urban; Water temp.22.2 /pH 7.0 /DO 7.7 /Cond.538

Station: AN0273
Preakness Bk, French Hill Rd , Wayne Twp, Passaic County
Paterson USGS Quadrangle
Date Sampled: 08/12/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Lumbriculidae	8	43
Chironomidae	6	24
Hydropsychidae	4	15
Elmidae	4	6
Nematoda	6	5
Gammaridae	4	4
Planorbidae	6	3
Tubificidae	10	3
Baetidae	4	2
BloodRed Chironomidae	8	2
Tipulidae	3	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 109
% Contribution of Dominant Family: 39.45 % (Lumbriculidae)
Family Biotic Index: 6.39
Scraper/Filterer Collector Ratio: 0.26
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 15.60
EPT/C: 0.60
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 129

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 11/1
Substrate: Cobbles,gravel,sand,silt....StreamBank Vegetation/Stability: Shrubs,grass/Stable
Canopy: Mostly Open....Other: Suburban/Golf course adjacent; Water temp.20.1 /pH 7.7 /DO 8.4 /Cond.506

Station: AN0274
 Passaic R, Riverview Rd , Little Falls, Passaic County
 Paterson USGS Quadrangle
 Date Sampled: 08/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	55
Baetidae	4	16
Chironomidae	6	7
Planariidae	4	6
Elmidae	4	5
BloodRed Chironomidae	8	4
Corbiculidae	8	3
Caenidae	7	1
Empididae	6	1
Pyralidae	5	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 55.00 % (Hydropsychidae)
 Family Biotic Index: 4.48
 Scraper/Filterer Collector Ratio: 0.10
 Shredder/Total Ratio: 0.12
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 73.00
 EPT/C: 6.64
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 174

Observations

Streamwater: Turbid....Flow: Fast....Width/Depth (ft): 30/3
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Open....Other: Urban; Water temp.25.1 /pH 7.1 /DO 7.7 /Cond.573
 Trash;

Station: AN0274A
 Passaic R, Willard St , Montville Twp, Morris/Essex County
 Pompton Plains USGS Quadrangle
 Date Sampled: 09/28/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	50
Chironomidae	6	20
Corbiculidae	8	10
Heptageniidae	4	5
Elmidae	4	5
BloodRed Chironomidae	8	3
Corixidae	9	3
Gammaridae	4	3
Paludicellidae	7	3
Planorbidae	6	1
Plagiostomidae	4	1
Tubificidae	10	1
Cambaridae	5	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 107
 % Contribution of Dominant Family: 46.73 % (Hydropsychidae)
 Family Biotic Index: 5.19
 Scraper/Filterer Collector Ratio: 0.13
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 51.40
 EPT/C: 2.23
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 115

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 25/2
 Substrate: Cobbles,gravel,sand,mud....StreamBank Vegetation/Stability: Trees,weeds/Unstable
 Canopy: Mostly Open....Other: Suburban/Forested; Water temp.22.5 /pH 7.8 /DO 7.8 /Cond.770

Station: AN0275
Peckman R, McBride Ave , W Paterson, Passaic County
Paterson USGS Quadrangle
Date Sampled: 08/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	48
Baetidae	4	34
Hydropsychidae	4	6
BloodRed Chironomidae	8	5
Asellidae	8	2
Empididae	6	2
Simuliidae	6	2
Naididae	7	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 48.00 % (Chironomidae)
Family Biotic Index: 5.35
Scraper/Filterer Collector Ratio: 0.86
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 40.00
EPT/C: 0.75
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 143

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 30/1
Substrate: Cobbles,sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Urban; Water temp.22.1 /pH 7.3 /DO 7.7 /Cond.576
Trash;

Station: AN0275A
 Peckman R, Bradford Ave , Cedar Grove, Essex County
 Orange USGS Quadrangle
 Date Sampled: 09/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	26
Hydropsychidae	4	16
Coenagrionidae	9	16
Tubificidae	10	16
Chironomidae	6	10
Glossiphoniidae	8	4
BloodRed Chironomidae	8	4
Planorbidae	6	3
Baetidae	4	3
Physidae	7	3
Naididae	7	2
Planariidae	4	2
Simuliidae	6	2
Gammaridae	4	1
Erpobdellidae	8	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 109
 % Contribution of Dominant Family: 23.85 % (Asellidae)
 Family Biotic Index: 7.31
 Scraper/Filterer Collector Ratio: 0.71
 Shredder/Total Ratio: 0.24
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 17.43
 EPT/C: 1.25
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 138

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27/1
 Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Closed....Other: Urban/County Hwy Dept , ball field , & inactive STP
 adjacent; Water temp.22.4 /pH 7.2 /DO 7.7 /Cond.681

Station: AN0276
Molly Ann Bk, Totowa Ave , Prospect Park, Passaic County
Paterson USGS Quadrangle
Date Sampled: 08/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	60
Chironomidae	6	19
Physidae	7	6
Daphnidae	4	6
BloodRed Chironomidae	8	4
Corixidae	9	2
Isotomidae	10	1
Chydoridae	4	1
Planorbidae	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 60.00 % (Naididae)
Family Biotic Index: 6.70
Scraper/Filterer Collector Ratio: 1.00
Shredder/Total Ratio: 0.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 105

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 30/2
Substrate: Cobbles,mud....StreamBank Vegetation/Stability: Weeds/Unstable
Canopy: Open....Other: Urban; Water temp.22.8 /pH 7.3 /DO 4.6 /Cond.573

Station: AN0277
 Goffle Bk, Wagaraw Rd , Prospect Park, Passaic County
 Paterson USGS Quadrangle
 Date Sampled: 08/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	47
Chironomidae	6	29
BloodRed Chironomidae	8	5
Hydropsychidae	4	4
Tetrastemmatidae	7	4
Empididae	6	3
Gammaridae	4	1
Planariidae	4	1
Lumbriculidae	8	1
Simuliidae	6	1
Naididae	7	1
Sperchonidae	2	1
Lymnaeidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 14
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 47.00 % (Asellidae)
 Family Biotic Index: 6.93
 Scraper/Filterer Collector Ratio: 1.06
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 4.00
 EPT/C: 0.12
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 116

Observations

Streamwater: Slightly Turbid...Flow: Moderate...Width/Depth (ft): 10/<1
 Substrate: Cobbles,sand...StreamBank Vegetation/Stability: Weeds/Unstable
 Canopy: Mostly Open...Other: Urban/Channelized & tunneled upstream; Water temp.19.9 /pH
 7.3 /DO 4.1 /Cond.456
 Trash;

Station: AN0277A
 Goffle Bk, Wyckoff Ave , Midland Park, Bergen County
 Paterson USGS Quadrangle
 Date Sampled: 09/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Planariidae	4	38
Tubificidae	10	24
Planorbidae	6	2
BloodRed Chironomidae	8	1
Glossiphoniidae	8	1
Lebertiidae	4	1
Nematoda	6	1
Sphaeriidae	8	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 9
 Total Number of Individuals: 70
 % Contribution of Dominant Family: 54.29 % (Planariidae)
 Family Biotic Index: 6.36
 Scraper/Filterer Collector Ratio: 2.00
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
 % EPT: 0.00
 EPT/C: 0.00
 NJIS Rating: 9
 Biological Condition: Moderately Impaired
 Habitat Analysis: 85

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 6/<1
 Substrate: Cobbles,gravel,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Mostly Open....Other: Urban/Mall parking lot adjacent; Water temp.20.3 /pH 6.9 /DO 2.9 /Cond.681

Station: AN0278
Diamond Bk, Hemlock St & Harristown Rd , Fairlawn, Bergen County
Paterson USGS Quadrangle
Date Sampled: 08/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	50
Lumbriculidae	8	18
Simuliidae	6	9
Asellidae	8	6
Planariidae	4	5
Hydropsychidae	4	4
BloodRed Chironomidae	8	3
Planorbidae	6	1
Tubificidae	10	1
Lumbricidae	10	1
Naididae	7	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 50.00 % (Chironomidae)
Family Biotic Index: 6.46
Scraper/Filterer Collector Ratio: 0.08
Shredder/Total Ratio: 0.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 4.00
EPT/C: 0.08
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 144

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/<1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Urban/Partially channelized; Water temp.22.3 /pH 7.4 /DO 7.2 /Cond.487

Station: AN0279
 Saddle R, Old Stone Church Rd , Upper Saddle River, Bergen County
 Park Ridge USGS Quadrangle
 Date Sampled: 08/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	26
Hydropsychidae	4	17
Chironomidae	6	12
Psephenidae	4	11
Tipulidae	3	8
Lumbriculidae	8	8
Gammaridae	4	6
Nematoda	6	6
Corydalidae	0	3
Hydroptilidae	4	2
Baetidae	4	2
Planariidae	4	1
Glossosomatidae	0	1
Empididae	6	1
Veliidae	9	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 105
 % Contribution of Dominant Family: 24.76 % (Elmidae)
 Family Biotic Index: 4.49
 Scraper/Filterer Collector Ratio: 2.35
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 20.95
 EPT/C: 1.75
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 147

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 6/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
 Trees,shrubs,weeds/Unstable
 Canopy: Mostly Closed....Other: Suburban; Water temp.19.4 /pH 7.8 /DO 8.0 /Cond.536

Station: AN0280
 W Br Saddle R , Old Stone Church Rd , Upper Saddle River, Bergen County
 Park Ridge USGS Quadrangle
 Date Sampled: 08/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	34
Lumbriculidae	8	19
Chironomidae	6	15
Hydropsychidae	4	12
Glossosomatidae	0	4
Lumbricidae	10	4
Heptageniidae	4	4
Philopotamidae	3	3
Psephenidae	4	3
Veliidae	9	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 11
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 34.00 % (Elmidae)
 Family Biotic Index: 5.19
 Scraper/Filterer Collector Ratio: 3.00
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 23.00
 EPT/C: 1.53
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 106

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 6/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,weeds/Unstable
 Canopy: Closed....Other: Suburban; Water temp.20.9 /pH 7.7 /DO 8.5 /Cond.578

Station: AN0281
 Saddle R, E Allendale Ave , Saddle River, Bergen County
 Park Ridge USGS Quadrangle
 Date Sampled: 08/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	23
Hydropsychidae	4	22
Lumbriculidae	8	13
Elmidae	4	11
Fredericellidae	2	5
Philopotamidae	3	4
BloodRed Chironomidae	8	4
Planariidae	4	3
Tipulidae	3	2
Empididae	6	2
Nematoda	6	2
Tetrastemmatidae	7	2
Tubificidae	10	1
Asellidae	8	1
Baetidae	4	1
Psephenidae	4	1
Ephemerellidae	1	1
Simuliidae	6	1
Tricorythidae	4	1

Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 23.00 % (Chironomidae)
 Family Biotic Index: 5.21
 Scraper/Filterer Collector Ratio: 0.64
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 29.00
 EPT/C: 1.07
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 76

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 12/2
 Substrate: Cobbles,gravel,mud....StreamBank Vegetation/Stability: Trees,weeds/Unstable
 Canopy: Mostly Closed....Other: Suburban; Water temp.22.2 /pH 7.4 /DO 9.5 /Cond.505
 Oil sheen near banks,oil odor from gas station HASMA site adjacent;

Station: AN0282
 Saddle R, E Ridgewood Ave , Ridgewood, Bergen County
 Ridgewood USGS Quadrangle
 Date Sampled: 08/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	31
Elmidae	4	16
Gammaridae	4	15
Lumbriculidae	8	10
Chironomidae	6	9
Tipulidae	3	5
Planariidae	4	4
Empididae	6	2
Tetrastemmatidae	7	2
Asellidae	8	1
Baetidae	4	1
Corydalidae	0	1
BloodRed Chironomidae	8	1
Psephenidae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 31.00 % (Hydropsychidae)
 Family Biotic Index: 4.67
 Scraper/Filterer Collector Ratio: 0.61
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 33.00
 EPT/C: 3.30
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 152

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Open....Other: Suburban; Water temp.21.3 /pH 7.8 /DO 11.0 /Cond.498

Station: AN0283
Hohokus Bk, Old Mill Rd , Franklin Lakes, Bergen County
Ramsey USGS Quadrangle
Date Sampled: 08/12/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	31
Baetidae	4	22
Hydropsychidae	4	18
Gammaridae	4	9
Asellidae	8	8
Empididae	6	4
Planariidae	4	3
Elmidae	4	3
Simuliidae	6	2
Philopotamidae	3	1
Lumbriculidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 102
% Contribution of Dominant Family: 30.39 % (Chironomidae)
Family Biotic Index: 5.07
Scraper/Filterer Collector Ratio: 0.14
Shredder/Total Ratio: 0.30
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 40.20
EPT/C: 1.30
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 169

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 4/1
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Suburban/Forested/Lake upstream; Water temp.23.0 /pH 7.3
/DO 6.9 /Cond.768

Station: AN0284
Valentine Bk, Forest Ave , Allendale, Bergen County
Ramsey USGS Quadrangle
Date Sampled: 08/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	35
Chironomidae	6	30
Planariidae	4	10
Asellidae	8	8
Hydropsychidae	4	6
Empididae	6	4
Tubificidae	10	3
Lumbriculidae	8	1
Veliidae	9	1
Nematoda	6	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 35.00 % (Elmidae)
Family Biotic Index: 5.33
Scraper/Filterer Collector Ratio: 6.00
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 6.00
EPT/C: 0.19
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 93

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 8/1
Substrate: Cobbles,gravel,sand,silt....StreamBank Vegetation/Stability:
Trees,grass/Unstable
Canopy: Mostly Closed....Other: Suburban; Water temp.20.4 /pH 7.3 /DO 7.1 /Cond.738

Station: AN0285
Hohokus Bk, Park Ave , Allendale, Bergen County
Ramsey USGS Quadrangle
Date Sampled: 08/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	67
Elmidae	4	7
Tipulidae	3	6
Chironomidae	6	6
Simuliidae	6	4
Philopotamidae	3	3
Psephenidae	4	2
Heptageniidae	4	2
Gammaridae	4	1
Lumbriculidae	8	1
Cambaridae	5	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 67.00 % (Hydropsychidae)
Family Biotic Index: 4.16
Scraper/Filterer Collector Ratio: 0.15
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 72.00
EPT/C: 12.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 156
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 10/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,shrubs,grass/Unstable Canopy: Mostly Closed....
Other: Suburban; Water temp.21.4 /pH 7.1 /DO 8.2 /Cond.606

Station: AN0286
Ramsey Bk, Masonic Rd , Mahwah Twp, Bergen County
Park Ridge USGS Quadrangle
Date Sampled: 08/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	21
BloodRed Chironomidae	8	15
Cambaridae	5	6
Hydropsychidae	4	2
Philopotamidae	3	1
Psephenidae	4	1
Empididae	6	1
Chironomidae	6	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 49
% Contribution of Dominant Family: 42.86 % (Tubificidae)
Family Biotic Index: 8.02
Scraper/Filterer Collector Ratio: 0.33
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 6.12
EPT/C: 0.38
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 143
Deficiency(s) noted: Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 3/<1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,weeds,vines/Stable
Canopy: Mostly Open....Other: Forested; Water temp.19.3 /pH 7.2 /DO 3.7 /Cond.447
Location adjustment one half mile dowstr due to drought;

Station: AN0287
Ramsey Bk, Park Ave , Allendale, Bergen County
Ramsey USGS Quadrangle
Date Sampled: 08/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	39
Lumbriculidae	8	11
Psephenidae	4	10
Tubificidae	10	9
Chironomidae	6	8
Hydropsychidae	4	8
BloodRed Chironomidae	8	4
Philopotamidae	3	3
Planariidae	4	3
Tetrastemmatidae	7	3
Lumbricidae	10	1
Veliidae	9	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 39.00 % (Elmidae)
Family Biotic Index: 5.47
Scraper/Filterer Collector Ratio: 4.45
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 11.00
EPT/C: 0.92
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 115
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 8/1
Substrate: Cobbles, gravel, sand....StreamBank Vegetation/Stability:
Trees, shrubs, grass/Unstable
Canopy: Closed....Other: Suburban; Water temp.20.7 /pH 7.4 /DO 6.5 /Cond.626

Station: AN0288
Hohokus Bk, Spring St , Ridgewood, Bergen County
Ridgewood USGS Quadrangle
Date Sampled: 08/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	27
Hydrobiidae	8	22
Hydropsychidae	4	15
Gammaridae	4	11
Chironomidae	6	7
Tubificidae	10	5
Elmidae	4	4
Plagiostomidae	4	3
Planorbidae	6	2
Coenagrionidae	9	1
BloodRed Chironomidae	8	1
Sphaeriidae	8	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 27.00 % (Asellidae)
Family Biotic Index: 6.63
Scraper/Filterer Collector Ratio: 1.81
Shredder/Total Ratio: 0.34
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 15.00
EPT/C: 1.88
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 133
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 37/2
Substrate: Cobbles,gravel,silt....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.22.7 /pH 7.0 /DO 7.8 /Cond.634

Station: AN0289
 Saddle R, Dunkerhook Rd , Fairlawn, Bergen County
 Hackensack USGS Quadrangle
 Date Sampled: 08/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	35
Asellidae	8	20
Hydropsychidae	4	13
BloodRed Chironomidae	8	10
Fredericellidae	2	8
Simuliidae	6	4
Plagiostomidae	4	3
Naididae	7	2
Planariidae	4	1
Hydrobiidae	8	1
Planorbidae	6	1
Gerridae	8	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 13
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 35.00 % (Chironomidae)
 Family Biotic Index: 6.01
 Scraper/Filterer Collector Ratio: 0.05
 Shredder/Total Ratio: 0.20
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 13.00
 EPT/C: 0.29
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 138
 Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 55/2
 Substrate: Cobbles,gravel,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Mostly Open....Other: Suburban/Forested; Water temp.22.6 /pH 7.1 /DO 5.2 /Cond.686

Station: AN0290
 Saddle R, Railroad Ave , Rochelle, Bergen County
 Hackensack USGS Quadrangle
 Date Sampled: 08/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	32
BloodRed Chironomidae	8	28
Naididae	7	20
Tubificidae	10	18
Planariidae	4	4
Asellidae	8	2
Hydrophilidae	5	1
Hydropsychidae	4	1
Empididae	6	1
Hydroptilidae	4	1
Daphnidae	4	1
Ceratopogonidae	6	1

Statistical Analysis

Number of Taxa: 12
 Total Number of Individuals: 110
 % Contribution of Dominant Family: 29.09 % (Chironomidae)
 Family Biotic Index: 7.25
 Scraper/Filterer Collector Ratio: 0.50
 Shredder/Total Ratio: 0.02
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 1.82
 EPT/C: 0.03
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 90
 Deficiency(s) noted: Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 100/2
 Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Open....Other: Urban/County park; Water temp.25.6 /pH 7.3 /DO 7.4 /Cond.550

Station: AN0291
 Saddle R, Marcellus Place , Garfield, Bergen County
 Weehawken USGS Quadrangle
 Date Sampled: 08/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	22
Hydroptilidae	4	21
Asellidae	8	12
Hydropsychidae	4	10
Tubificidae	10	10
Gammaridae	4	7
Baetidae	4	5
Sphaeriidae	8	3
BloodRed Chironomidae	8	3
Corbiculidae	8	2
Planorbidae	6	2
Empididae	6	2
Planariidae	4	1
Hydrobiidae	8	1
Glossiphoniidae	8	1
Plagiostomidae	4	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 103
 % Contribution of Dominant Family: 21.36 % (Chironomidae)
 Family Biotic Index: 5.94
 Scraper/Filterer Collector Ratio: 1.24
 Shredder/Total Ratio: 0.12
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 34.95
 EPT/C: 1.40
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 114

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 47/1
 Substrate: Cobbles,gravel,sand,silt....StreamBank Vegetation/Stability:
 Trees,shrubs/Unstable
 Canopy: Mostly Open....Other: Urban; Water temp.24.2 /pH 7.2 /DO 5.8 /Cond.557

Station: AN0292
Third R, Kingland Ave , Nutley, Essex County
Orange USGS Quadrangle
Date Sampled: 08/19/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	54
Planariidae	4	11
Gammaridae	4	8
Asellidae	8	6
Baetidae	4	6
Tipulidae	3	4
Fredericellidae	2	4
Chironomidae	6	2
Lumbriculidae	8	1
Naididae	7	1
Pleuroceridae	6	1
Tetrastemmatidae	7	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 54.00 % (Hydropsychidae)
Family Biotic Index: 4.32
Scraper/Filterer Collector Ratio: 0.02
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 60.00
EPT/C: 30.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 134
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/<1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Urban/Partially channelized; Water temp.20.1 /pH 7.6 /DO 8.3
/Cond.392

Station: AN0292A
Third R, W Passaic Ave , Brookdale, Essex County
Orange USGS Quadrangle
Date Sampled: 09/25/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	72
Chironomidae	6	9
Sphaeriidae	8	5
Tubificidae	10	4
Planariidae	4	2
Planorbidae	6	2
Plagiostomidae	4	2
Asellidae	8	1
BloodRed Chironomidae	8	1
Lumbricidae	10	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 72.00 % (Gammaridae)
Family Biotic Index: 4.83
Scraper/Filterer Collector Ratio: 0.60
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 146
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/<1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Urban/Forested; Water temp.15.2 /pH 7.3 /DO 8.4 /Cond.544
Trash in stream

Station: AN02920
 Passaic R, River Rd { Dundee Dam } , Garfield, Bergen/Passaic County
 Paterson USGS Quadrangle
 Date Sampled: 08/19/98

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	27
Tubificidae	10	12
Chironomidae	6	11
Spongillidae	5	9
Hydropsychidae	4	7
Empididae	6	7
Planariidae	4	5
Gammaridae	4	5
Asellidae	8	4
Paludicellidae	7	3
Elmidae	4	3
Hydroptilidae	4	2
Naididae	7	2
Planorbidae	6	1
Pyralidae	5	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 16
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 27.00 % (BloodRed Chironomidae)
 Family Biotic Index: 6.61
 Scraper/Filterer Collector Ratio: 0.12
 Shredder/Total Ratio: 0.31
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 9.00
 EPT/C: 0.24
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 140
 Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 100/2
 Substrate: Cobbles, gravel, sand, mud....StreamBank Vegetation/Stability: Weeds/Unstable
 Canopy: Open....Other: Urban/Lake upstream; Water temp.25.0 /pH 8.1 /DO 10.1 /Cond.519

Station: AN0293
 Second R, Mccarter Hwy , Newark/Belleville, Essex County
 Orange USGS Quadrangle
 Date Sampled: 08/19/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	25
Gammaridae	4	22
Baetidae	4	19
Hydropsychidae	4	10
Physidae	7	6
Naididae	7	5
BloodRed Chironomidae	8	5
Hydroptilidae	4	4
Lumbricidae	10	4
Planariidae	4	2
Lumbriculidae	8	2
Enchytraeidae	10	1
Erpobdellidae	8	1
Glossiphoniidae	8	1
Planorbidae	6	1
Sphaeriidae	8	1
Tubificidae	10	1

Statistical Analysis

Number of Taxa: 17
 Total Number of Individuals: 110
 % Contribution of Dominant Family: 22.73 % (Chironomidae)
 Family Biotic Index: 5.46
 Scraper/Filterer Collector Ratio: 1.45
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 30.00
 EPT/C: 1.00
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 110

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/1
 Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Weeds/Stable
 Canopy: Open....Other: Urban/Partially channelized; Water temp.19.0 /pH 7.8 /DO 9.2
 /Cond.635
 Trash;