State of New Jersey
Christine Todd Whitman, Governor

AMBIENT BIOMONITORING NETWORK

Watershed Management Areas 7, 8, 9, and 10

Raritan Region

1999 Benthic Macroinvertebrate Data

New Jersey Department of Environmental Protection
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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 (BFBM), 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 BFBM received numerous requests from the Office of Regulatory Policy to reinitiate 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], and in 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 currently samples over 800 stream sites statewide, with an average of 165 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]. This report, on the Raritan River basin, presents the results of the second round of AMNET monitoring in the region. The initial macroinvertebrate study for the Raritan Region was completed in 1993-94.

Rationale for Biological Monitoring

Biological monitoring, as referenced in this report, pertains to the collection and analysis of stream benthic 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 annelids (worms, leeches), 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-one WMAs have recently been delineated within New Jersey's five major 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 WMA's 7, 8, 9, and 10 (see Maps 1 – 6). 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 basin's complete 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 is 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 valuable water quality information specific to its respective methodology.

Site Selection

For the first round of AMNET, a total of 146 stations had been established in the Raritan basin including the North and South Branches of the Raritan River, Millstone and South Rivers, and smaller sub-basins [5]. This area (shown in Figure 1) encompassed all sub-basins that drain to the Raritan River. On the smallest tributaries, sampling sites were located as close to headwaters as practical. To ensure enough instream 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 a point just above the confluence with the Raritan River.

For the second round of AMNET (FY99), the original study area (Figure 1) was enlarged to conform with the boundary between newly established Water Regions. Those sub-basins that drain to Raritan Bay via the Arthur Kill, i.e., the Elizabeth, Rahway, and Woodbridge rivers (now WMA 7), which were formerly part of the greater Passaic (northeast) basin [6], have been included in the present study area (Figure 2). In the present Raritan Water Region (WMA's 7, 8, 9, & 10), five new sites were added, and two sites (AN0202 and AN0204) relocated for better access, since the first sampling in 1993-94. Also, in WMA 7, twelve sites were added and one site (AN0203) was dropped due to inaccessibility. This brought the total number of sampling sites in the Raritan Region to 164, although two of these (AN386, & 400) were not sampled due to bridge construction.

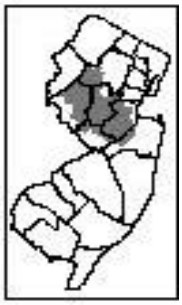


Figure 1

Map of 1993 – ’94 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. Likewise, some AMNET sites were also located in proximity to point source discharges, agricultural operations, or significant natural features such as wetlands, parks or wildlife management areas.

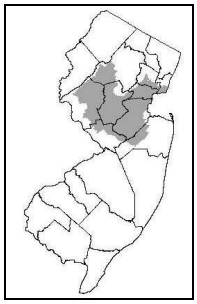


Figure 2

Map of 1998 – ’99 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 – 6, Appendix A).

FIELD & LABORATORY METHODS

Benthic macroinvertebrate sampling and analyses were performed in accordance with the NJDEP Field Procedures Manual [8], Rapid Bioassessment (RBP) Protocol II guidelines of the USEPA [2], Standard Operating Procedures (SOP) of the BFBM Aquatic Biomonitoring Laboratory [9], and guidelines of the Middle-Atlantic Coastal Streams Workgroup [10].

Field Collection

Because New Jersey encompasses both high and low gradient terrain, our field methods employ multi-habitat sampling to compensate for concomitant variations in stream habitats. The low gradient of the New Jersey southern regions precludes streams from having dominant riffle areas (the preferred sampling habitat). Multi-habitat 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 method minimizes habitat or substrate variation between stations, and includes 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 a standard #30 mesh device, 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 from each multi-habitat sample 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.

Benthic Community Analysis

The data analysis approach utilized in the RBP protocol is, in a large part, why it is expedient and a cost-effective biomonitoring indicator. The RBP utilizes a multi-metric approach, wherein a suite of “biometrics" that measure different components of community structure, including population and functional parameters, each with a different range of sensitivity to pollution stresses to calculate an overall impairment score [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 employed in the AMNET program are modified from RBP II methods, having been statistically validated for New Jersey based upon data from 200 stream sites throughout the state [11]. 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 1994 — 1999 Results

In evaluating the 1998–1999 Raritan data against that for 1993–1994, a significant improvement or decline was considered to have occurred when the score (NJIS) 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 1993-1994 and 1998-1999 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 1-6.

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 [12]. 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 relative trends in these final scores, and the respective NJIS scores, 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 [13]. 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 traced, from the southwest juncture in the Delaware drainage, by the lower Assunpink Creek in alignment with Lawrence Brook to the northeast in the Raritan drainage. Over two-thirds of the area of the Raritan basin lies north of the Fall Line in the Piedmont and Reading Prong Ecoregions [13]. The remaining area lies south of the Fall Line in the Coastal Plain, including much of the upper Millstone River and Lawrence Brook sub-basins. The Millstone River is unique in that its southern tributaries flow northwestward across the Fall Line to the mainstem in the Piedmont ecoregion.

Sediment Toxicity Testing

To supplement the results of the benthic macroinvertebrate sampling, the BFBM from 1996 to 1998 performed acute sediment toxicity tests on several AMNET sites that exhibited “severely impaired” biological conditions in the earlier Raritan survey [5]. 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. The test sites, and corresponding reference sites were as follows:

WMA	Test Site	Reference Site	Test Date	Map #
10	AN0394 Duck Pond Brook	AN0403 Cruser Brook	6/97	6
10	AN0396 Heathcote Brook	AN0403 Cruser Brook	6/97	6
9	AN0421 Green Brook	AN0403 Cruser Brook	6/97	4
9	AN0439 Manalapan Brook	AN0379 Millstone River	12/98	5
9	AN0447 McGellairds Brook	AN0379 Millstone River	12/98	5
7	AN0201 S. Br. Rahway R.	AN0420 Middle Brook	3/96	1

RESULTS AND DISCUSSION

Bioassessment ratings developed for each of the monitoring stations in the study area 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 6. 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, are given in Appendix D.

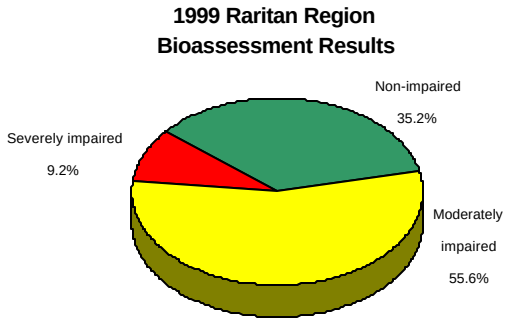


Figure 3

Overall, out of 162 monitoring stations sampled during this study period, 57 or **35.2%** were rated as ***NON-IMPAIRED***, 90 or **55.6%** were rated as ***MODERATELY IMPAIRED***, and 15 or **9.2%** were rated as ***SEVERELY IMPAIRED*** (see Figure 3).

For comparison, Figure 4 depicts the results of 153 monitoring sites within the same Watershed Management Areas that were sampled during the 1994 study period [5].

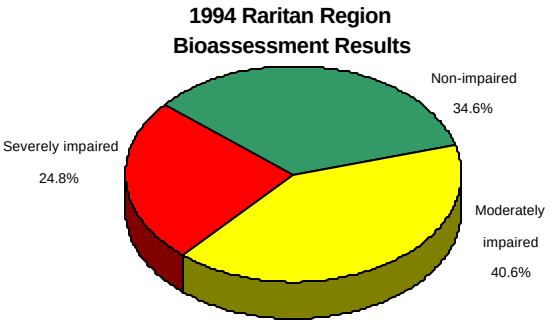
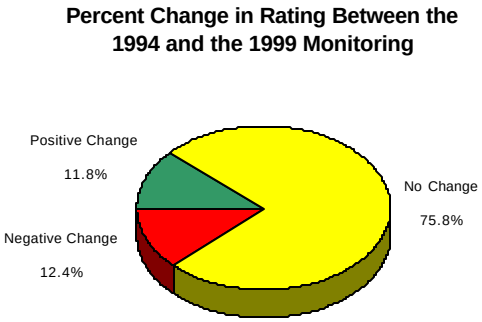


Figure 4

Figure 5 displays the percentage of change in rating that has occurred for the 153 sites that were sampled during both the 1994 and 1999 monitorings. The green indicates a positive change, yellow indicates no change, and red indicates a change for the worse (see Table 2). Notably, although there was little change in the number of non-impaired sites (about 35% both times), substantially fewer severely impaired sites were found in 1999 than in 1994 (9.2% and 24.8% respectively), but the number of moderately impaired sites was increased from 40.8% to 55.6%(Figures 3 & 4).



ure 5

In the current data set for the Raritan Water Region, the majority of NJIS scores (55.6%) are in the "moderately impaired" range; slightly over one-third (35.2%) of the sites fall into the "non-impaired" category, while fifteen sites (9.2%) are "severely impaired" (from Table 2 and Appendix D). These results are similar to those recently obtained for the Passaic Water Region [14], which is adjacent and to the north of the Raritan Region. The Raritan Water Region superimposes primarily on the lower Piedmont physiographic subregion (or "ecoregion"), with portions in the Reading Prong and upper Piedmont, all of which lie north of the "Fall Line" [13]. A portion of the Raritan Region also is situated south of the fall Line in the Inner Coastal Plain Ecoregion. The Raritan Water Region thus features both high and low-gradient terrain. Significantly, in the current data set, 28 of 51, or 55%, non-impaired sites in the Raritan Region are situated in the northwest portion, in the Reading Prong and western Piedmont Ecoregions; this includes most of the North and South Branch sub-basins (WMA 8). Area-wise, this comprises roughly only one-quarter of the Raritan Water Region, but features more forested upland than the other portions of the Region. Of the moderately impaired sites, 94% are situated in the southern and eastern portions of the Raritan Water Region, consisting of almost 64% (57 of 90 sites) in the Piedmont Ecoregion(s) (the largest area) and slightly over 30% in the Inner Coastal Plain Ecoregion. This area includes the Arthur Kill, Lower Raritan and Millstone sub-basins (WMA's 7, 9, 10), and a small portion of the South Branch sub-basin (WMA #8). Of fifteen severely impaired sites, seven (46.7%) are in the Inner Coastal Plain, but seven also are in the Piedmont. The Reading Prong Ecoregion sustained only one severely impaired site.

Macroinvertebrate Abnormalities

A listing of all AMNET sites in the Raritan Water Region exhibiting abnormalities, including both the 1993/94 and 1998/99 sampling periods, is presented in Table 3. Also listed in Table 3 are numbers of "significant" (>5% of individuals) and "chronic" (>5% in both sampling periods) abnormalities in the Chironomid larvae only. Those sites having "significant" or "chronic" abnormalities during the current sampling period are shown in Maps 1 - 6. Additional maps showing locations of all AMNET sites yielding abnormalities in 1998/99, along with detailed pictorial examples of actual deformities, are presented in Appendix B.

In the current data, 23 (14.2%) of the 162 AMNET sites sampled in the Raritan Water Region exhibited "significant" numbers of abnormalities, while two sites (1.2%) yielded "chronic" abnormalities. Proportionally, the number of sites yielding significant abnormalities was greatest (about 19% of AMNET sites sampled) in the eastern and southern portion of the Region (Lower Raritan, Arthur Kill, and Millstone sub-basins - WMA's 7, 9 and 10). The lowest proportion (4.5%) of AMNET sites yielding significant abnormalities was in the upland northwestern portion (North and South Branches - WMA 8). Of the 23 sites with significant abnormalities, two sites (AN0384 and AN0405) had significant levels in both 1993/94 and 1998/99. These two sites with chronic abnormalities are both in the Millstone River sub-basin (WMA 10). In addition to those with significant numbers of abnormalities, several sites in the Raritan Water Region exhibited abnormalities, but at less than significant or chronic levels (see Table 3, Appendix B).

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 (7 to 10) and, combined for the entire Raritan Water Region, in a (north) west to east sequence, in the following composite order: 8, 10, 9, 7 (Appendix C).

The general trend within the Raritan Water Region for habitat scores is fairly constant in the near optimal / sub-optimal range. For NJIS scores, there is a pronounced downward trend from non-impaired in the western portion of the Region to moderately impaired in the eastern portion (see figure, "Comparative Scores of Habitat vs. NJIS Combined", Appendix C). The decline in NJIS scores relative to habitat scores signifies that impairment is primarily due to water quality or other physiochemical factors rather than degraded habitat. Highest modal habitat and NJIS scores are in WMA 8 (North and South Branch sub-basins), with habitat consistently at near optimal levels and NJIS scores largely in the non-impaired range. Respective levels in WMA's 9 and 10 (Lower Raritan and Millstone sub-basins) are somewhat lower than in WMA 8, with values consistently in the sub-optimal and moderately impaired ranges. From there, a pronounced drop in modal values for both parameters is seen in WMA 7 (Arthur Kill sub-basin) with habitat scores ranging from sub-optimal to marginal, and NJIS scores from severely to moderately impaired (see Appendix C).

Sediment Toxicity Test Results

Acute toxicity, as measured by mortality, was not demonstrated in any of the tests performed, as none of the survival responses observed were significantly different from those observed in the controls. Growth responses (average dry weights) also were not significantly different from those of the control, thus indicating no chronic effects in this regard over the 10-day test period. Since the test site results largely showed no significant difference from the control results, the severe impairment levels previously found were most likely due to causes such as habitat alteration, or various physiochemical factors other than the presence of toxic materials. However, this does not preclude the presence of toxic substances at low, but chronically toxic, levels undetectable by the present methodology. Toxicants may have been introduced into the stream episodically, rather than continuously, and simply not present at the time of sample collection. Therefore, it is advisable, based on these study results, that supplemental sampling be performed for target analytes such as nitrogen and phosphorus, pesticides, or other suspected toxic compounds. The test sites and corresponding reference sites are listed below (NMAT=No Measurable Acute Toxicity):

			Results	
WMA	**Test Site**	**Reference Site**	**Survival**	**Growth**
10	AN0394 Duck Pond Brook	AN0403 Cruser Brook	NMAT	NMAT
10	AN0396 Heathcote Brook	AN0403 Cruser Brook	NMAT	NMAT
9	AN0421 Green Brook	AN0403 Cruser Brook	NMAT	NMAT
9	AN0439 Manalapan Brook	AN0379 Millstone River	NMAT	NMAT
9	AN0447 McGellairds Brook	AN0379 Millstone River	NMAT	NMAT
7	AN0201 S. Br. Rahway R.	AN0420 Middle Brook	NMAT	NMAT

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 (point source)
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 [15].

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

Evaluation by WMA

Watershed Management Area #7 includes the Elizabeth, Rahway, and Woodbridge River systems and, has a total of 12 AMNET sites sampled (see Map 1). Figure 6 shows that the majority of sites in WMA #7 (eight or 66.7%) were rated as moderately impaired. Three sites (25%) were found to be severely impaired, while only one site (8.3%) was rated as non-impaired. (see Table 2, Map 1). Figure 7 depicts the results of the 1994 survey [5] for comparison. A significant decline is seen at three sites (AN0194, AN0195, and AN0200), and an improvement at two sites (AN0196 and AN0201). Possible reasons for impairment are extrapolated from the current data set. Discrepancies are exhibited between habitat and NJIS scores in WMA #7, especially in the northwestern portion; several sites with optimal and sub-optimal habitat have respective bioassessment ratings of moderately and severely impaired (Appendix C). A pronounced downward trend to marginal levels for habitat scores is then seen with a corresponding upward trend in NJIS scores to moderately impaired levels. While this trend may be partially attributable to there being relatively few AMNET sites (as compared to the other WMA's), it nevertheless reflects a strong influence of degraded water quality or other physiochemical factors on stream biotic integrity; this is further lowered by marginal habitat in some portions of WMA #7 (see Appendix C, Map 1). Three sites (25 % of sites sampled), although without chronic abnormalities, currently exhibited significant levels of abnormalities in chironomid larvae (see Table 3, Map 1).

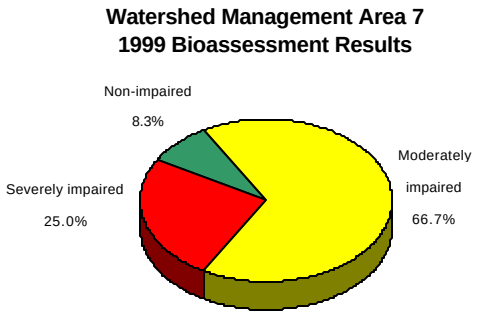


Figure 6

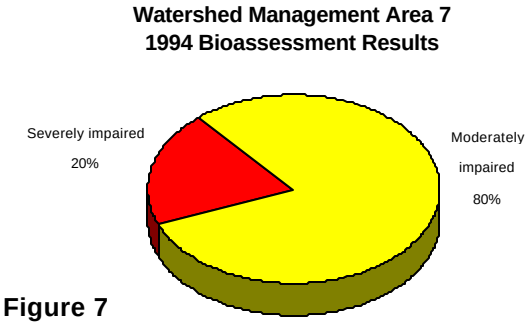


Figure 7

Watershed Management Area #8 includes both the North and South branches of the Raritan River and their tributaries, with a total of 67 AMNET sites sampled currently (see Maps 2, and 3). Figure 8 shows that the majority (49 or 73.1%) of sites in WMA #8 were rated non-impaired; 17 or 25.4% were rated as moderately impaired, and only one site (1.5%) was rated as severely impaired (see Table 2, Maps 2 and 3). Figure 9 depicts the results of the earlier (1994) survey for comparison. In WMA #8, the habitat trend remains fairly constant at near optimum levels throughout; NJIS scores, in the non-impaired range throughout, increase somewhat from northwest to southeast, from the South Branch to North Branch sub-basins (Appendix C). Thus, while there may be some localized degradation from agricultural or residential sources, stream biotic integrity in WMA #8 is generally quite favorable. Only three sites (4.5% of sites sampled), exhibited significant numbers of chironomid abnormalities in the current data (see Table 3, Maps 2 and 3).

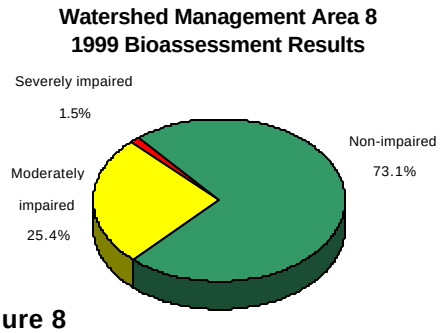


Figure 8

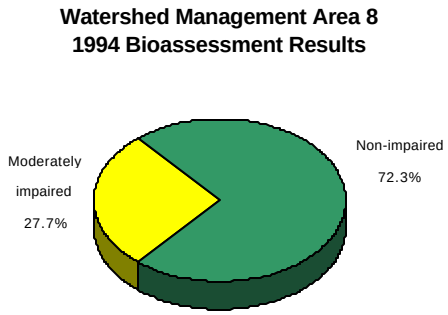


Figure 9

Watershed Management Area #9 encompasses the lower portion of the Raritan River, South River, Lawrence Brook and their tributaries with a total of 46 AMNET sites sampled during the current study period (see Maps 4 and 5). As shown in Figure 10, five (10.9%) of these sites received a non-impaired rating; 35 sites (76.1%) were rated as moderately impaired, while the remaining 6 sites (13.0%) were rated as severely impaired (Table 2, Maps 4 and 5) Figure 11 depicts the results of the earlier (1994) survey for comparison. A significant improvement was seen at seven sites and a significant decline at three sites. In WMA #9, an upward trend in habitat scores coincides with a downward trend in NJIS scores (Appendix C), reflecting the increasing influence of water quality or other physiochemical factors progressively downstream. This however, can be partially attributed to the fact that AMNET sites in this area are spatially distributed over several smaller sub-basins (including Middle Brook, Green Brook, Lawrence Brook and South River) as well as the Raritan River mainstem (Maps 4 and 5). Nine sites (17% of sites sampled) exhibited significant levels of chironomid abnormalities in the current sampling (see Table 3, Maps 4 and 5).

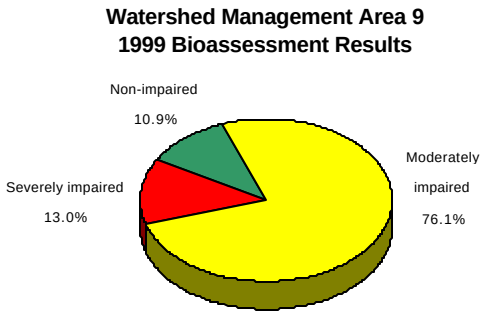


Figure 10

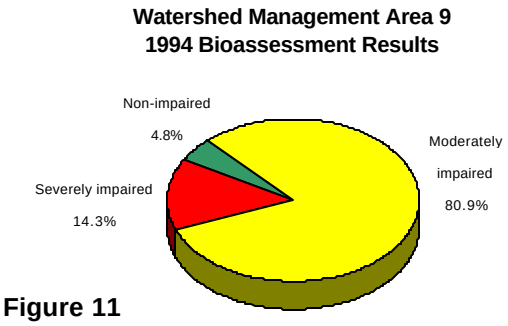


Figure 11

Watershed Management Area #10 includes the Millstone River and its tributaries, with a total of 37 AMNET sites sampled (see Map 6). Figure 12 shows that two or 5.4% of the sites were rated non-impaired, 30 or 81.1% were rated as moderately impaired, and five sites (13.5%) were rated as severely impaired. Figure 13 depicts the results of the earlier (1994) survey for comparison. A significant improvement was seen at three sites, and a significant decline at six sites (see Table 2, Map 6). In WMA #10, habitat and NJIS scores are at sub-optimal and moderately impaired levels, respectively, throughout. A slight upward trend in both parameters is seen from upstream to downstream (north to south in this case) (Appendix C); this indicates that stream quality is primarily a function of habitat quality in this area. In the current study, six sites (16% of sites sampled) exhibited significant levels of abnormalities in chironomid larvae (see Table 3, Map 6). Two of these (AN0384 and AN0405) also had significant levels in 1993/94. In the current sampling, these were the only two sites in the Raritan Water Region yielding "chronic" abnormalities.

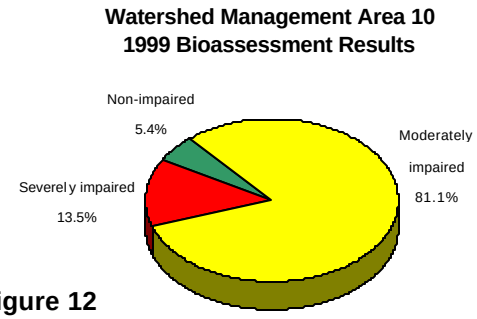


Figure 12

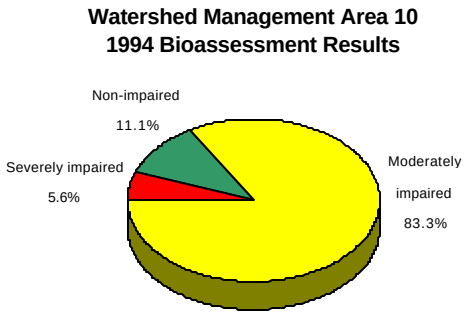


Figure 13

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TABLE 1

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

Scoring Criteria for Rapid Bioassessments[1]

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

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

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

Attributes

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

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

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

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

Table 2

Comparative Scores / Ratings (see notes)

Watershed Management Areas 7, 8, 9, and 10

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	
	93 / 94	98 / 99					93 / 94	98 / 99					93 / 94	98 / 99			
192	12	15	/+	182		336	15	27	+	161		377	21	21	/	113	
193	9	9	/	110		337	12	18	/+	135		378	15	9	/-	117	
194	15	3	—	116		338	27	30	/+	146		379	24	18	/-	143	
195	15	6	—	112		339	18	30	+	135		380	15	18	/+	174	
196	6	12	+	97		340	30	21	—	102		381	18	6	—	93	
197	15	15	/	128		341	21	27	+	124		382	15	21	/+	154	
198	12	18	/+	133		342	24	30	/+	114		382B	15	15	/	120	
199	15	15	/	114		343	30	21	—	96		382D	-	12	-	135	
200	9	6	—	133		344	30	30	/	160		383	15	12	/-	133	
201	3	12	+	107		344A	-	27	-	154		384	21	24	+	161	
202X	12	-	-	-		345	27	30	/+	171		385	18	6	—	148	
202	-	12	-	75		346	30	30	/	159		386	12	-	-	-	
203	-	-	-	-		347	30	30	/	157		387	15	6	—	106	
204X	0	-	-	-		348	30	30	/	192		388	12	15	/+	150	
204	-	24	-	92		349	30	30	/	167		389	12	21	/+	145	
310	9	15	/+	155		350	30	30	/	160		390	24	15	—	157	
311	21	21	/	117		351	30	30	/	140		391	12	12	/	135	
312	24	30	/+	148		352	15	6	—	147		392	12	21	/+	152	
313	30	30	/	183		353	30	21	—	119		393	15	12	/-	173	
314	30	30	/	166		354	27	30	/+	162		394	6	18	+	138	
315	30	24	/-	148		355	12	24	+	122		395	18	15	/-	114	
316	27	27	/	157		356	9	9	/	141		396	3	24	+	152	
317	27	30	/+	169		357	9	27	+	129		397	12	9	/-	146	
318	27	30	/+	166		358	27	27	/	185		398	15	21	/+	126	
319	27	24	/-	144		359	30	30	/	181		399	12	18	/+	161	
320	30	27	/-	164		360	27	30	/+	183		400	21	-	-	-	
321	30	24	/-	164		361	30	30	/	174		401	12	15	/+	160	
322	27	27	/	121		362	30	30	/	181		402	18	18	/	148	
323	27	30	/+	170		363	27	30	/+	178		403	27	21	/-	133	
324	12	9	/-	112		364	30	30	/	100		404	24	21	/-	150	
325	27	30	/+	178		365	27	30	/+	133		405	15	3	—	89	
325B	-	30	-	154		366	27	30	/+	137		406	15	15	/	104	
326	30	18	—	143		367	30	30	/	165		407	15	21	/+	146	
327	27	30	/+	168		368	18	21	/+	128		408	15	15	/	152	
328	27	30	/+	161		369	27	27	/	111		409	21	18	/-	126	
329	18	27	+	127		370	30	30	/	170		410	15	15	/	136	
330	15	12	/-	138		371	21	18	/-	131		411	21	21	/	141	
331	27	21	—	148		372	27	24	/-	96		412	9	12	/+	136	
332	24	21	—	149		373	24	30	/+	140		413	18	6	—	116	
333	18	12	/-	133		374	27	30	/+	154		414	15	15	/	160	
334	15	18	/+	120		375	9	21	/+	147		415	18	15	/-	125	
335	21	12	/-	118		376	15	9	/-	125		416	21	18	/-	132	

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)

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

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

Sites 202X and 204X, sampled in 93/94, were relocated to 202 and 204 in 98/99

Table 2 (continued)

Comparative Scores / Ratings (see notes)

Watershed Management Areas 7, 8, 9, and 10

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	
	93 / 94	98 / 99					93 / 94	98 / 99					93 / 94	98 / 99			
417	15	12	/-	151													
418	6	18	+	132													
419	21	27	/+	146													
420	24	30	/+	158													
421	6	15	+	111													
422	9	15	/+	114													
423	18	9	/-	97													
424	9	12	/+	118													
424B	-	6	-	98													
425	12	15	/+	129													
425A	-	18	-	102													
426	18	15	/-	120													
427	12	18	/+	141													
428	18	24	+	161													
429	12	6	—	131													
430	12	6	—	124													
431	12	12	/	140													
432	21	15	/-	135													
433	15	21	/+	157													
434	21	15	/-	129													
435	12	12	/	113													
436	12	15	/+	151													
437	27	27	/	167													
438	15	27	+	140													
439	3	18	+	149													
440	12	21	/+	152													
441	6	9	+	143													
442	15	21	/+	154													
443	18	15	/-	146													
444	15	15	/	153													
445	9	12	/+	134													
446	18	15	/-	137													
447	6	6	/	153													
448	15	15	/	137													
449	9	6	—	117													
450	9	21	/+	158													
451	9	12	/+	136													
452	6	15	+	84													
453	9	15	/+	182													
454	-	6	-	141													
455	-	15	-	173													

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)

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

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

Table 3

Abnormalities (see notes)

Watershed Management Areas 7, 8, 9, and 10

Station	1993 / 94	1998 / 99	Station	1993 / 94	1998 / 99	Station	1993 / 94	1998 / 99
193		1/15+1*	379		1/28			
194		+2	382	1/25	+2			
196	4/7*		382B		+1			
197		1/3*	384	23/110*	2/21*			
202	2/37*	1/26	392		1/8*			
204		3/26*	393		1/44			
311	1/6*	+1						
312	1/6*		395		4/16*			
315		+1	401		2/52			
316	4/38*		403		2/44			
322		2/44	405	1/8*	3/31*			
324	1/16*		409		1/2*			
			410	10/27*				
325B		1/35	411		1/1*			
326	+2		414	3/26*				
330		5/82*	417		2/29*			
332	1/22	+1	418		1/14*			
334		+3	419		1/19			
337		+1	420		3/15*			
341	2/31*		424		2/3*			
343	3/15*	1/33	424B		+1			
348		1/10*	425A	1/20	+1			
350		1/26	426		+1			
351	2/18*		428		1/21			
352	1/1*		431		1/24			
353		1/38	438		4/12*			
356		+1	441	1/6*				
358		+1	445		3/25*			
359	+4		448		3/23*+1			
368	2/23*		449	2/43	3/48*			
372		2/29*	450	1/36	2/25*			
374	1/10*		451		+1			
375		1/22	452		1/17*			
376		3/15*						
377	3/47*							

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 1993 / 1994 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

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

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

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

MAPS

1999 Raritan AMNET Study
WMA's 7, 8, 9, & 10

AMNET site locations and their respective biological ratings, for each major sub-basin, are shown in maps 1-6. Also identified are sites that exhibited significant and chronic macroinvertebrate abnormalities.

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

Site	Stream	Latitude Longitude	Watershed Management Area
AN0192	Rahway River	40 46'11.022"N 74 16'59.605"W	7
AN0193	Rahway River	40 42'28.817"N 74 18'06.441"W	7
AN0194	Rahway River	40 40'24.010"N 74 18'46.508"W	7
AN0195	Rahway River	40 37'05.443"N 74 16'42.076"W	7
AN0196	Robinsons Br	40 36'55.135"N 74 20'20.659"W	7
AN0197	UNT to Robinsons Br	40 37'31.702"N 74 20'49.072"W	7
AN0198	UNT to Robinsons Br	40 37'29.941"N 74 19'41.278"W	7
AN0199	Robinsons Br	40 36'38.305"N 74 17'11.475"W	7
AN0200	South Br Rahway River	40 33'13.769"N 74 20'17.255"W	7
AN0201	South Br Rahway River	40 34'56.816"N 74 18'00.962"W	7
AN0202	West Br Elizabeth River	40 41'33.989"N 74 14'32.817"W	7
AN0203	Elizabeth River	40 43'55.029"N 74 14'24.607"W	7
AN0204	Elizabeth River	40 40'39.173"N 74 13'32.202"W	7
AN0310	S Br Raritan River	40 51'37.094"N 74 45'35.854"W	8
AN0311	Drakes Bk	40 51'21.932"N 74 40'41.956"W	8
AN0312	Drakes Bk	40 48'43.555"N 74 43'45.689"W	8
AN0313	Stony Bk	40 48'18.444"N 74 45'03.008"W	8
AN0314	Electric Bk	40 47'23.423"N 74 46'34.952"W	8
AN0315	S Br Raritan River	40 47'06.051"N 74 46 48.068"W	8
AN0316	S Br Raritan River	40 43 07.160"N 74 50 30.437"W	8
AN0317	S Br Raritan River	40 41 48.921"N 74 52'18.904"W	8
AN0318	Spruce Run	40 43'29.440"N 74 54'33.994"W	8
AN0319	Spruce Run	40 41'13.965"N 74 56'02.431"W	8
AN0320	Willoughby Bk	40 40'17.910"N 74 54'54.388"W	8
AN0321	Mulhockaway Ck	40 38'50.889"N 74 58'07.677"W	8
AN0322	S Br Raritan River	40 38'06.966"N 74 54'41.665"W	8
AN0323	Beaver Bk	40 40'03.182"N 74 51'55.159"W	8
AN0324	Beaver Bk	40 38'10.799"N 74 54'34.759"W	8
AN0325	Cakepoulin Ck	40 36'28.147"N 74 54'56.769"W	8
AN0325B	Cakepoulin Ck	40 34'58.880"N 74 57'30.385"W	8

Site	Stream	Latitude Longitude	Watershed Management Area
AN0326	S Br Raritan River	40 34'20.716"N 74 52'04.310"W	8
AN0327	Prescott Bk	40 34'24.249"N 74 51'48.234"W	8
AN0328	Assiscong Ck	40 32'23.181"N 74 50 49.303"W	8
AN0329	S Br Raritan River	40 31'01.180"N 74 48'06.911"W	8
AN0330	First Neshanic River	40 29'22.982"N 74 51'44.174"W	8
AN0331	Second Neshanic River	40 28'59.461"N 74 51'49.423"W	8
AN0332	Third Neshanic River	40 28'29.339"N 74 51'46.023"W	8
AN0333	Neshanic River	40 28'24.360"N 74 49'39.483"W	8
AN0334	Back Bk	40 25'46.280"N 74 50'50.907"W	8
AN0335	Back Bk	40 27'33.733"N 74 48'22.644"W	8
AN0336	Furmans Bk	40 27'50.648"N 74 47'09.998"W	8
AN0337	Neshanic River	40 29'36.452"N 74 45'11.866"W	8
AN0338	S Br Raritan River	40 30'33.765"N 74 43'37.036"W	8
AN0339	Pleasant Run	40 33'42.941"N 74 47'37.118"W	8
AN0340	Pleasant Run	40 31'12.166"N 74 44'08.481"W	8
AN0341	S Br Raritan River	40 32'48.659"N 74 41'47.348"W	8
AN0342	Holland Bk	40 34'44.840"N 74 46'33.607"W	8
AN0343	Holland Bk	40 33'11.473"N 74 42'01.971"W	8
AN0344	UNT to India Bk	40 49'41.598"N 74 36'00.921"W	8
AN0344A	India Bk	40 49'42.514"N 74 35'20.931"W	8
AN0345	India Bk	40 47'10.332"N 74 37'13.896"W	8
AN0346	N Br Raritan River	40 46'16.431"N 74 37'32.833"W	8
AN0347	Dawsons Bk	40 48'15.845"N 74 37'41.071"W	8
AN0348	Burnett Bk	40 46'57.039"N 74 38'42.290"W	8
AN0349	Peapack Bk	40 45'16.418"N 74 40'50.428"W	8
AN0350	Peapack Bk	40 41'29.592"N 74 38'52.271"W	8
AN0351	N Br Raritan River	40 40'58.337"N 74 38'18.657"W	8
AN0352	Mine Bk	40 42'44.667"N 74 34'45.474"W	8
AN0353	Mine Bk	40 40'56.332"N 74 37'48.227"W	8
AN0354	Middle Bk	40 41'37.919"N 74 40'42.730"W	8

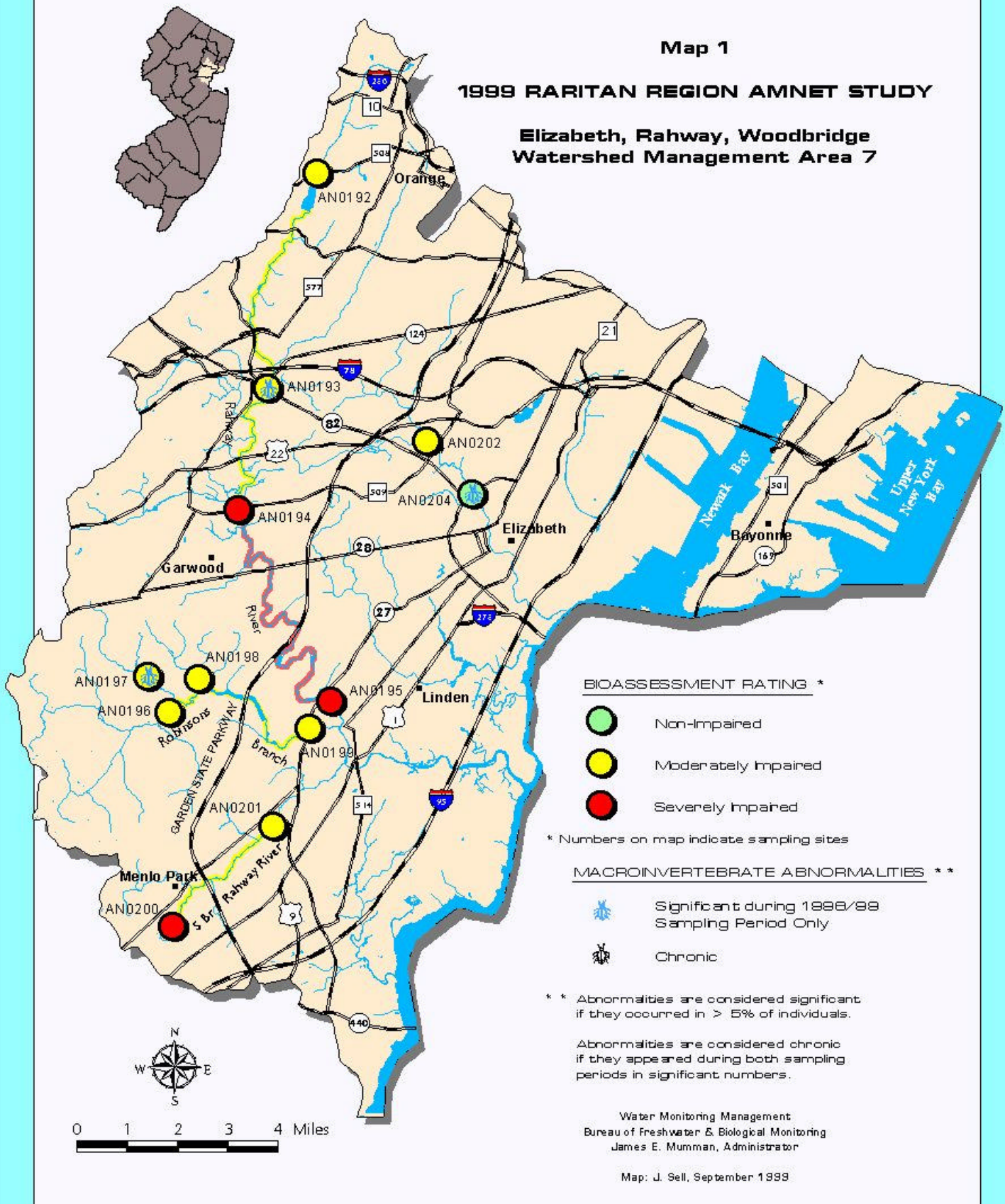
Appendix A — Station Numbers and Locations for the 1999 Raritan Region AMNET Study

Site	Stream	Latitude Longitude	Watershed Management Area
AN0355	Middle Bk	40 38'50.859"N 74 40'51.794"W	8
AN0356	Lamington River	40 50'06.932"N 74 38'40.546"W	8
AN0357	Tanners Bk	40 47'17.943"N 74 43'32.431"W	8
AN0358	Lamington River	40 46'43.453"N 74 43'18.019"W	8
AN0359	Trout Bk	40 45'16.396"N 74 43'55.187"W	8
AN0360	Lamington River	40 42'56.246"N 74 43'17.630"W	8
AN0361	UNT to Lamington River	40 42'24.643"N 74 42'59.361"W	8
AN0362	Cold Bk	40 40'30.024"N 74 44'16.069"W	8
AN0363	Lamington River	40 39'38.381"N 74 43'44.250"W	8
AN0364	N Br Rockaway Ck	40 43'31.244"N 74 47'10.077"W	8
AN0365	N Br Rockaway Ck	40 41'23.540"N 74 48'39.928"W	8
AN0366	N Br Rockaway Ck	40 39'42.387"N 74 45'57.240"W	8
AN0367	S Br Rockaway Ck	40 38'22.213"N 74 48'58.420"W	8
AN0368	S Br Rockaway Ck	40 37'24.551"N 74 45'59.963"W	8
AN0369	Rockaway Ck	40 37'23.975"N 74 43'15.131"W	8
AN0370	Lamington River	40 38'04.804"N 74 41'12.197"W	8
AN0371	Chambers(B) Bk	40 37'26.183"N 74 39'46.916"W	8
AN0372	Chambers(A) Bk	40 36'18.705"N 74 44'43.402"W	8
AN0373	Chambers(A) Bk	40 35'32.488"N 74 40'58.840"W	8
AN0374	N Br Raritan River	40 34'11.002"N 74 40'41.493"W	8
AN0375	Dukes Bk	40 33'14.314"N 74 36'48.227"W	9
AN0376	Peters Bk	40 34'01.277"N 74 36'18.868"W	9
AN0377	Raritan River	40 32'39.200"N 74 34'05.421"W	9
AN0378	Millstone River	40 14'28.495"N 74 24'04.832"W	10
AN0379	Millstone River	40 15'43.051"N 74 25'12.305"W	10
AN0380	Rocky Bk	40 13'38.371"N 74 26'22.149"W	10
AN0381	Rocky Bk	40 16'13.026"N 74 31'21.855"W	10
AN0382	Millstone River	40 19'19.653"N 74 36'28.695"W	10
AN0382B	Millstone River	40 17'27.435"N 74 32'58.014"W	10
AN0382D	Millstone River	40 16'28.620"N 74 28'20.525"W	10

Site	Stream	Latitude Longitude	Watershed Management Area
AN0383	Big Bear Bk	40 16'41.201"N 74 34'36.982"W	10
AN0384	Bear Bk	40 19'05.323"N 74 36'44.554"W	10
AN0385	Cranbury Bk	40 18'18.858"N 74 28'23.669"W	10
AN0386	Cranbury Bk	40 19'35.979"N 74 36'09.714"W	10
AN0387	Devils Bk	40 21'42.428"N 74 32'42.028"W	10
AN0388	Shallow Bk	40 20'48.608"N 74 33'25.879"W	10
AN0389	Devils Bk	40 20'35.129"N 74 35'21.073"W	10
AN0390	Camp Harmony Br of Stony Bk	40 24'12.202"N 74 48'06.008"W	10
AN0391	Stony Bk	40 22'26.598"N 74 47'37.479"W	10
AN0392	Stony Bk	40 19'52.630"N 74 46'01.800"W	10
AN0393	Stony Bk	40 19'59.682"N 74 40'55.949"W	10
AN0394	Duck Pond Run	40 18'23.496"N 74 40'04.668"W	10
AN0395	Heathcote Bk	40 22'57.502"N 74 34'04.740"W	10
AN0396	Heathcote Bk	40 22'11.952"N 74 36'56.978"W	10
AN0397	Millstone River	40 22'25.677"N 74 37'12.787"W	10
AN0398	Bedens Bk	40 23'03.999"N 74 44'25.474"W	10
AN0399	Rock Bk	40 26'23.130"N 74 44'21.646"W	10
AN0400	Rock Bk	40 24'46.881"N 74 41'02.493"W	10
AN0401	Bedens Bk	40 24'52.520"N 74 39 01.533"W	10
AN0402	Pike Run	40 28'26.673"N 74 39'25.494"W	10
AN0403	Cruser Bk	40 27'15.949"N 74 39'36.505"W	10
AN0404	Back Bk	40 25'57.702"N 74 39'34.796"W	10
AN0405	Pike Run	40 25'12.408"N 74 38'25.663"W	10
AN0406	Simonson Bk	40 26'18.513"N 74 36'46.689"W	10
AN0407	Ten Mile Run	40 27'23.093"N 74 35'08.581"W	10
AN0408	Six Mile Run	40 27'18.952"N 74 30'52.166"W	10
AN0409	Six Mile Run	40 28'22.389"N 74 34'16.033"W	10
AN0410	Millstone River	40 28'30.495"N 74 34'34.587"W	10
AN0411	Royce Bk	40 29'47.714"N 74 38'50.800"W	10
AN0412	Royce Bk Br	40 30'40.115"N 74 37'57.560"W	10

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

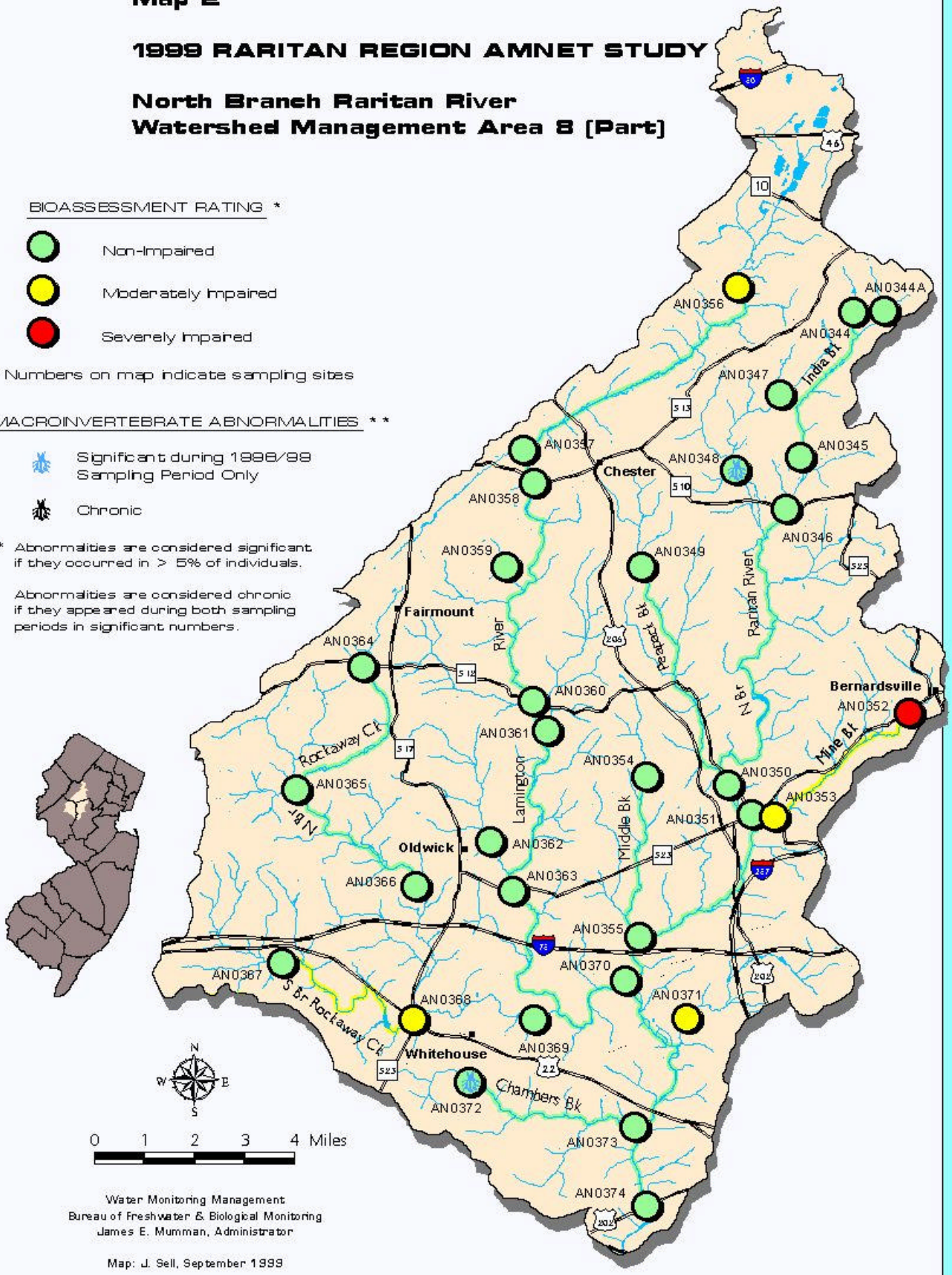
Site	Stream	Latitude Longitude	Watershed Management Area
AN0413	Royce Bk	40 32'13.363"N 74 35'22.668"W	10
AN0414	Millstone River	40 32'30.924"N 74 34'07.554"W	10
AN0415	Cuckels Bk	40 34'07.355"N 74 34'10.841"W	9
AN0416	W Br Middle Bk	40 36'43.383"N 74 35'25.710"W	9
AN0417	W Br Middle Bk	40 35'21.701"N 74 33'48.395"W	9
AN0418	E Br Middle Bk	40 36'47.621"N 74 29'47.454"W	9
AN0419	E Br Middle Bk	40 35'29.891"N 74 33'18.072"W	9
AN0420	Middle Bk	40 34'05.056"N 74 33'12.661"W	9
AN0421	Green Bk	40 38'27.731"N 74 24'49.425"W	9
AN0422	Stony Bk	40 36'50.903"N 74 26'45.891"W	9
AN0423	Green Bk	40 36'19.635"N 74 26'59.268"W	9
AN0424	Bound Bk	40 34'50.497"N 74 29'57.414"W	9
AN0424B	Bound Bk	40 33'42.614"N 74 23'51.312"W	9
AN0425	Ambrose Bk	40 34'03.434"N 74 31'12.003"W	9
AN0425A	Ambrose Bk	40 32'50.115"N 74 27'51.059"W	9
AN0426	Green Bk	40 33'42.746"N 74 31'28.350"W	9
AN0427	UNT to Raritan River	40 32'43.133"N 74 31'08.009"W	9
AN0428	Raritan River	40 32'27.225"N 74 30'45.415"W	9
AN0429	Mile Run	40 30'20.042"N 74 28'02.071"W	9
AN0430	Lawrence Bk	40 22'51.506"N 74 32'37.700"W	9
AN0431	Lawrence Bk	40 24'58.850"N 74 29'36.930"W	9
AN0432	Oakeys Bk	40 25'06.100"N 74 29'52.230"W	9
AN0433	Ireland Bk	40 25'13.409"N 74 29'05.490"W	9
AN0434	Lawrence Bk	40 26'55.734"N 74 26'46.339"W	9
AN0435	Sawmill Bk	40 27'30.816"N 74 25'31.092"W	9
AN0436	Mill Bk	40 30'19.531"N 74 22'41.572"W	9
AN0437	Manalapan Bk	40 12'03.912"N 74 22'37.976"W	9
AN0438	Manalapan Bk	40 15'11.336"N 74 20'58.593"W	9
AN0439	Manalapan Bk	40 17'46.133"N 74 23'52.302"W	9
AN0440	Manalapan Bk	40 22'29.077"N 74 24'55.526"W	9
AN0441	Weamaconk Ck	40 16'16.554"N 74 17'39.011"W	9
AN0442	Wemrock Bk	40 15'38.376"N 74 18'48.562"W	9
AN0443	Weamaconk Ck	40 17'50.467"N 74 21'41.881"W	9
AN0444	McGellairds Bk	40 16'46.999"N 74 17'40.200"W	9
AN0445	Tepehemus Bk	40 17'45.840"N 74 19'11.045"W	9
AN0446	Milford Bk	40 18'04.840"N 74 19'10.375"W	9
AN0447	McGellairds Bk	40 18'06.501"N 74 21'24.895"W	9
AN0448	Matchaponix Bk	40 18'51.593"N 74 21'42.425"W	9
AN0449	Pine Bk	40 18'55.566"N 74 21'00.198"W	9
AN0450	Barclay Bk	40 20'54.059"N 74 21'25.188"W	9
AN0451	Matchaponix Bk	40 21'35.558"N 74 22'03.691"W	9
AN0452	Iresick Bk	40 23'35.113"N 74 21'33.397"W	9
AN0453	Deep Run	40 23'05.771"N 74 18'28.741"W	9
AN0454	Deep Run	40 24'35.749"N 74 20'45.052"W	9
AN0455	Tennent Bk	40 25'40.902"N 74 20'39.356"W	9


Map 1
1999 RARITAN REGION AMNET STUDY
Elizabeth, Rahway, Woodbridge
Watershed Management Area 7
AN0192
AN0193
AN0194
AN0195
AN0196
AN0197
AN0198
AN0199
AN0200
AN0201
AN0202
AN0204
Orange
Elizabeth
Garwood
Linden
Menlo Park
Bayonne
Rahway
Robinsons
Branch
S Br Rahway River
GARDEN STATE PARKWAY
Newark Bay
Upper New York Bay
BIOASSESSMENT RATING *
Non-Impaired
Moderately Impaired
Severely Impaired
* Numbers on map indicate sampling sites
MACROINVERTEBRATE ABNORMALITIES * *
Significant during 1998/99 Sampling Period Only
Chronic
* * Abnormalities are considered significant if they occurred in > 5% of individuals.
Abnormalities are considered chronic if they appeared during both sampling periods in significant numbers.
N
W
E
S
0 1 2 3 4 Miles
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator
Map: J. Sell, September 1999

Map 2

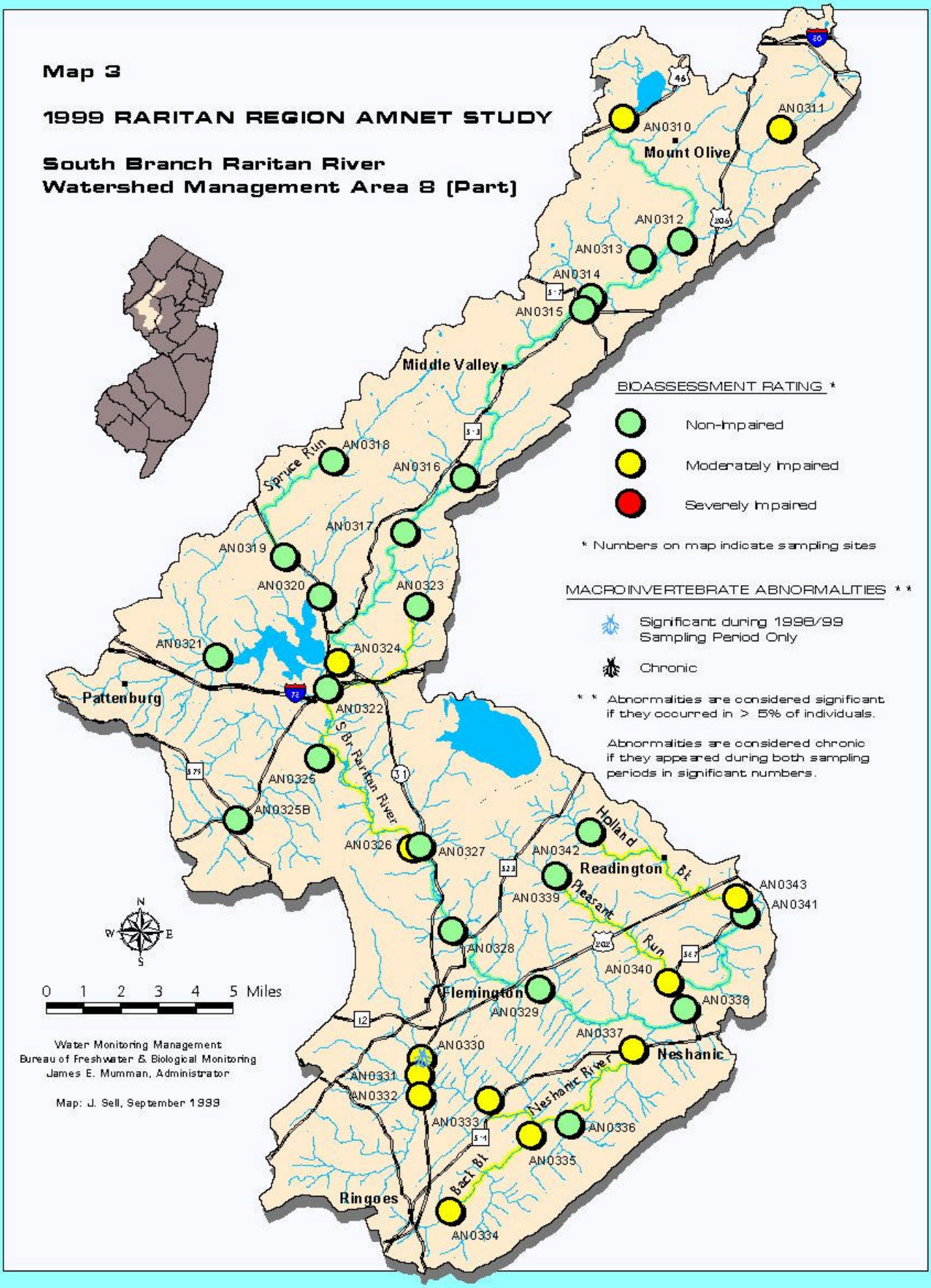
1999 RARITAN REGION AMNET STUDY

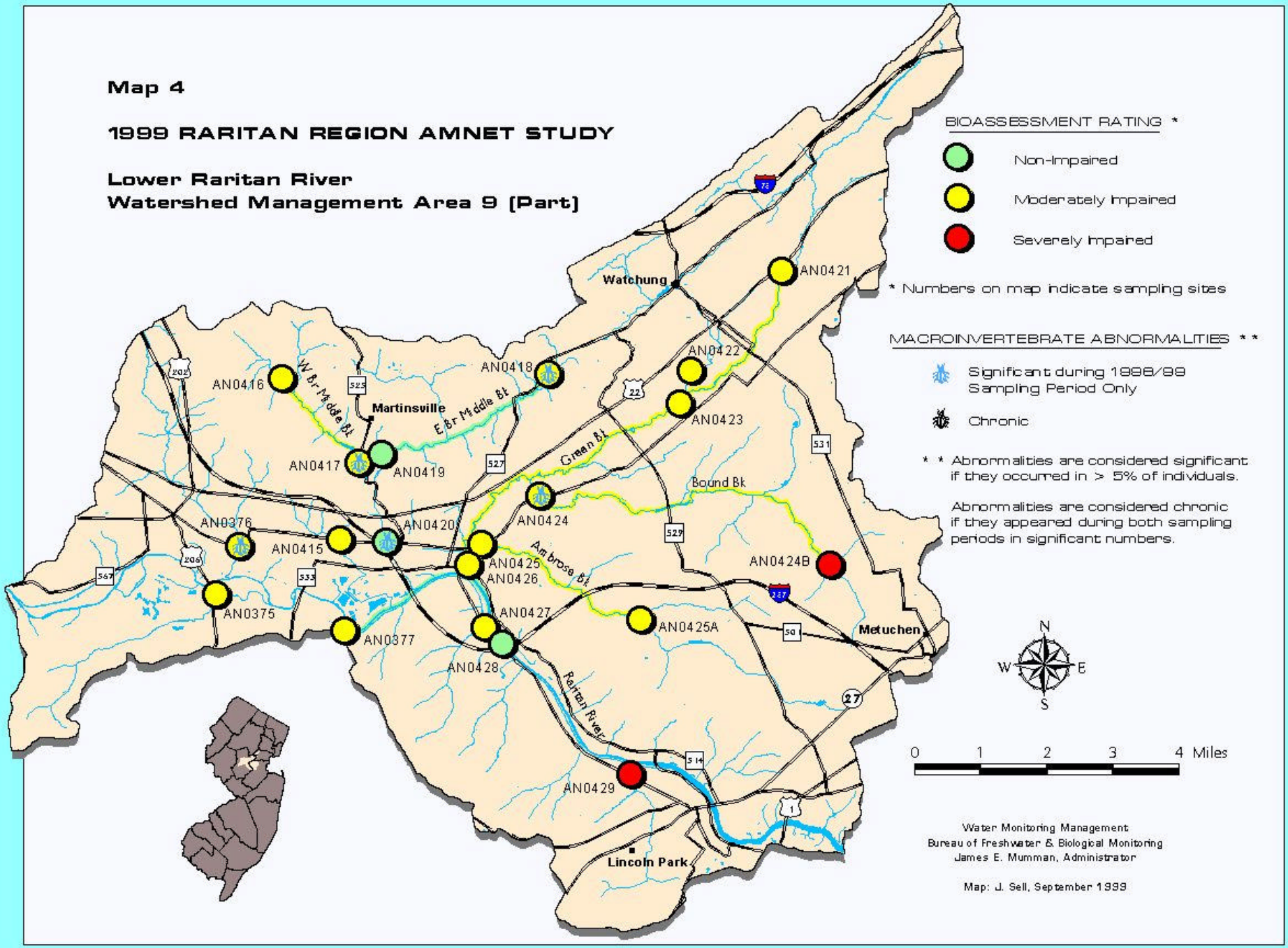
North Branch Raritan River
Watershed Management Area 8 (Part)



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

Map: J. Sell, September 1999


Map 3
1999 RARITAN REGION AMNET STUDY
South Branch Raritan River
Watershed Management Area 8 (Part)
AN0310
Mount Olive
AN0311
AN0312
AN0313
AN0314
AN0315
Middle Valley
AN0316
AN0317
AN0318
Spruce Run
AN0319
AN0320
AN0321
AN0322
AN0323
AN0324
Pattenburg
S Br Raritan River
AN0325
AN0325B
AN0326
AN0327
AN0328
Flemington
AN0329
AN0330
AN0331
AN0332
AN0333
AN0334
Ringoes
AN0335
AN0336
AN0337
Neshanic
Neshanic River
AN0338
AN0339
AN0340
AN0341
AN0342
AN0343
Readington
Holland Bk
Pleasant Run
Back Bk
BIOASSESSMENT RATING *
Non-Impaired
Moderately Impaired
Severely Impaired
* Numbers on map indicate sampling sites
MACROINVERTEBRATE ABNORMALITIES * *
Significant during 1998/99 Sampling Period Only
Chronic
* * Abnormalities are considered significant if they occurred in > 5% of individuals.
Abnormalities are considered chronic if they appeared during both sampling periods in significant numbers.
N
W
E
S
0 1 2 3 4 5 Miles
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator
Map: J. Sell, September 1999


Map 4
1999 RARITAN REGION AMNET STUDY
Lower Raritan River
Watershed Management Area 9 (Part)
BIOASSESSMENT RATING *
Non-Impaired
Moderately Impaired
Severely Impaired
* Numbers on map indicate sampling sites
MACROINVERTEBRATE ABNORMALITIES * *
Significant during 1998/99 Sampling Period Only
Chronic
* * Abnormalities are considered significant if they occurred in > 5% of individuals.
Abnormalities are considered chronic if they appeared during both sampling periods in significant numbers.
AN0416
AN0417
AN0418
AN0419
AN0420
AN0421
AN0422
AN0423
AN0424
AN0424B
AN0425
AN0425A
AN0426
AN0427
AN0428
AN0429
AN0375
AN0376
AN0377
AN0415
W Br Middle Bk
E Br Middle Bk
Green Bk
Bound Bk
Ambrose Bk
Raritan River
Martinsville
Watchung
Metuchen
Lincoln Park
N
S
E
W
0 1 2 3 4 Miles
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator
Map: J. Sell, September 1999

Map 5

1999 RARITAN REGION AMNET STUDY

South River
Watershed Management Area 9 (Part)

BIOASSESSMENT RATING *

- Non-Impaired
- Moderately Impaired
- Severely Impaired

* Numbers on map indicate sampling sites

MACROINVERTEBRATE ABNORMALITIES * *

- Significant during 1998/99 Sampling Period Only
- Chronic

* * Abnormalities are considered significant if they occurred in > 5% of individuals.

Abnormalities are considered chronic if they appeared during both sampling periods in significant numbers.

0 1 2 3 4 5 Miles

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

Map: J. Sell, September 1999

Map 6

1999 RARITAN REGION AMNET STUDY

Millstone River
Watershed Management Area 10

BIOASSESSMENT RATING *

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

* Numbers on map indicate sampling sites

MACROINVERTEBRATE ABNORMALITIES * *

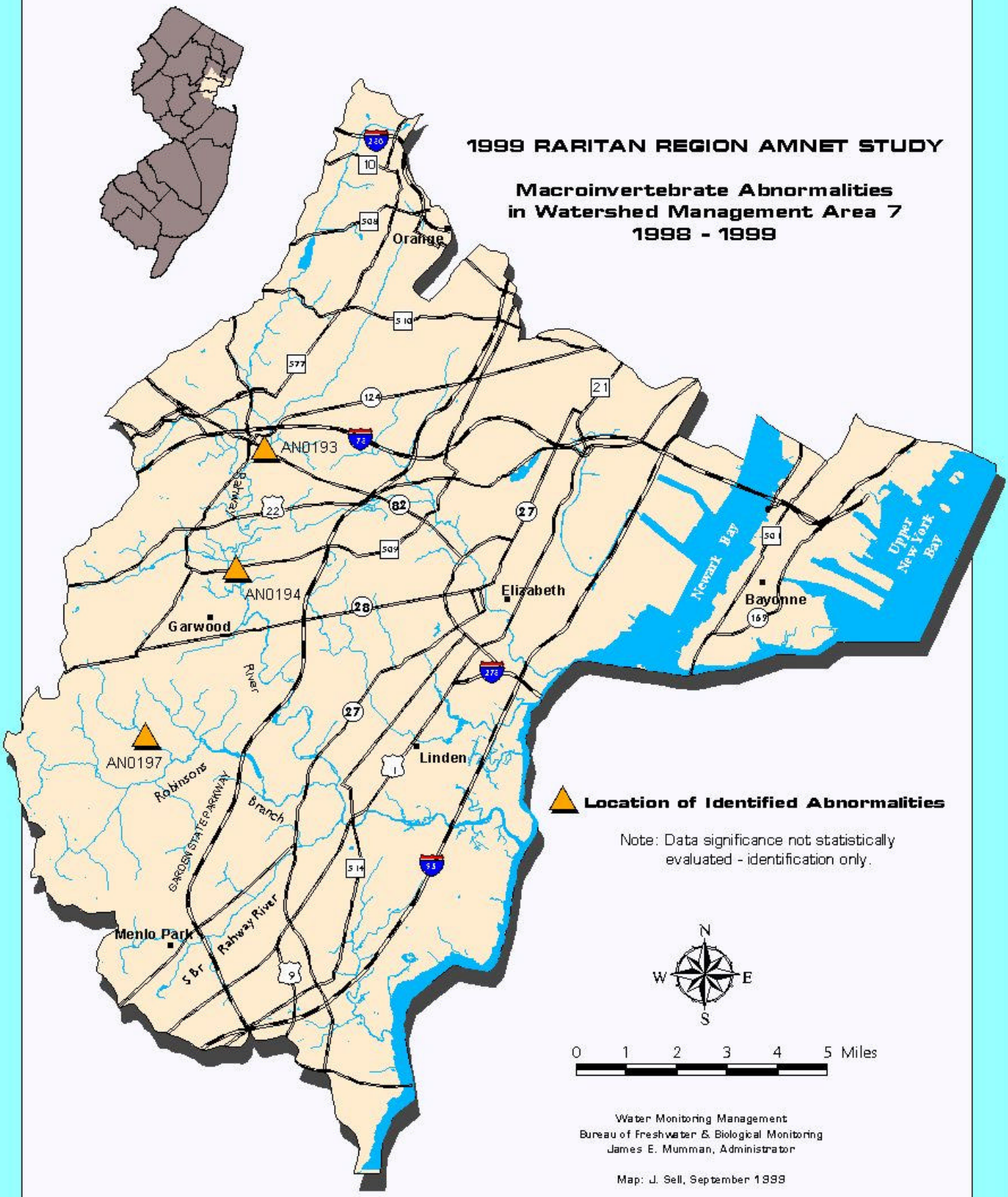
- Significant during 1998/99 Sampling Period Only
- Chronic

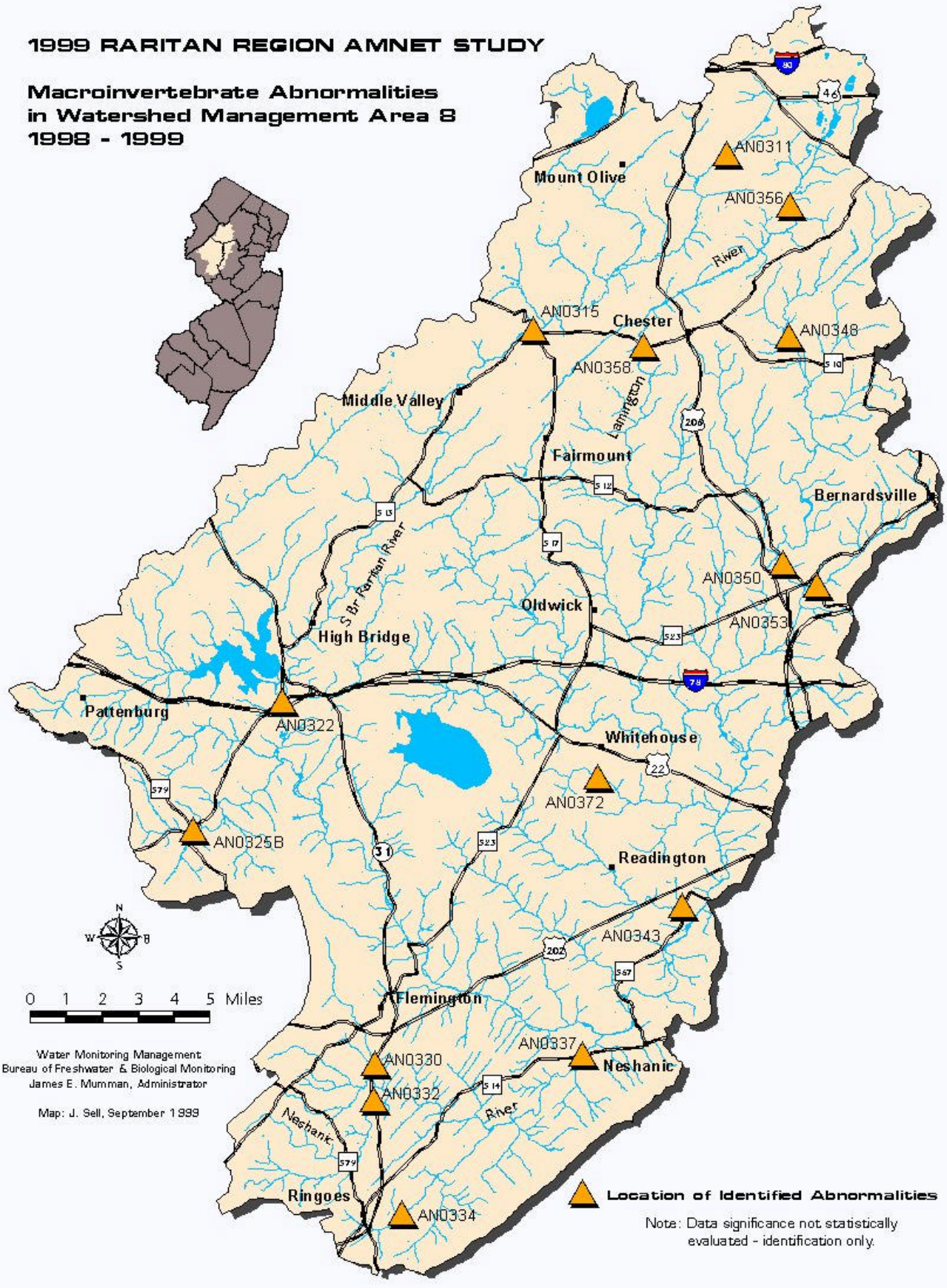
* * Abnormalities are considered significant if they occurred in > 5% of individuals.

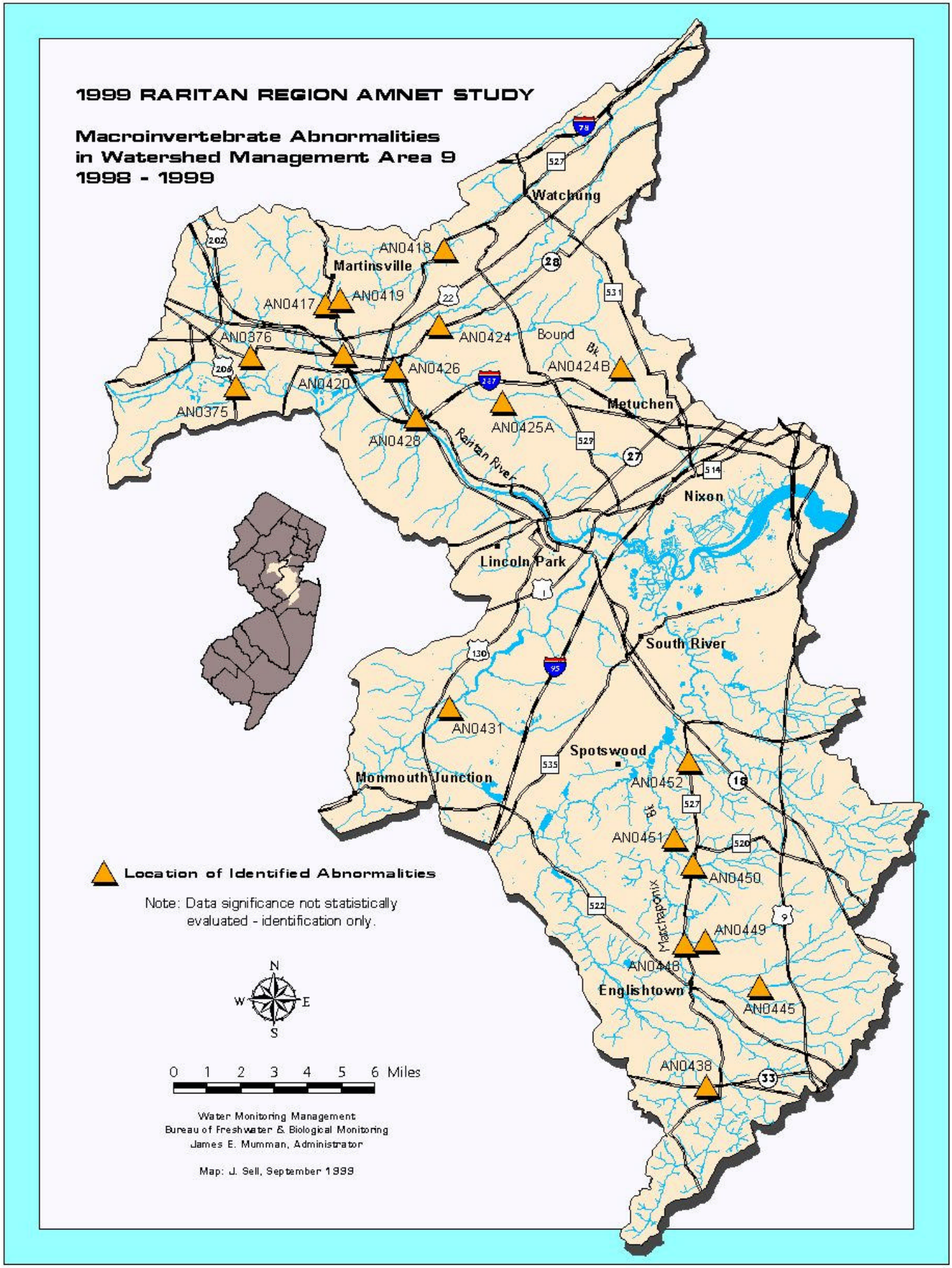
Abnormalities are considered chronic if they appeared during both sampling periods in significant numbers.

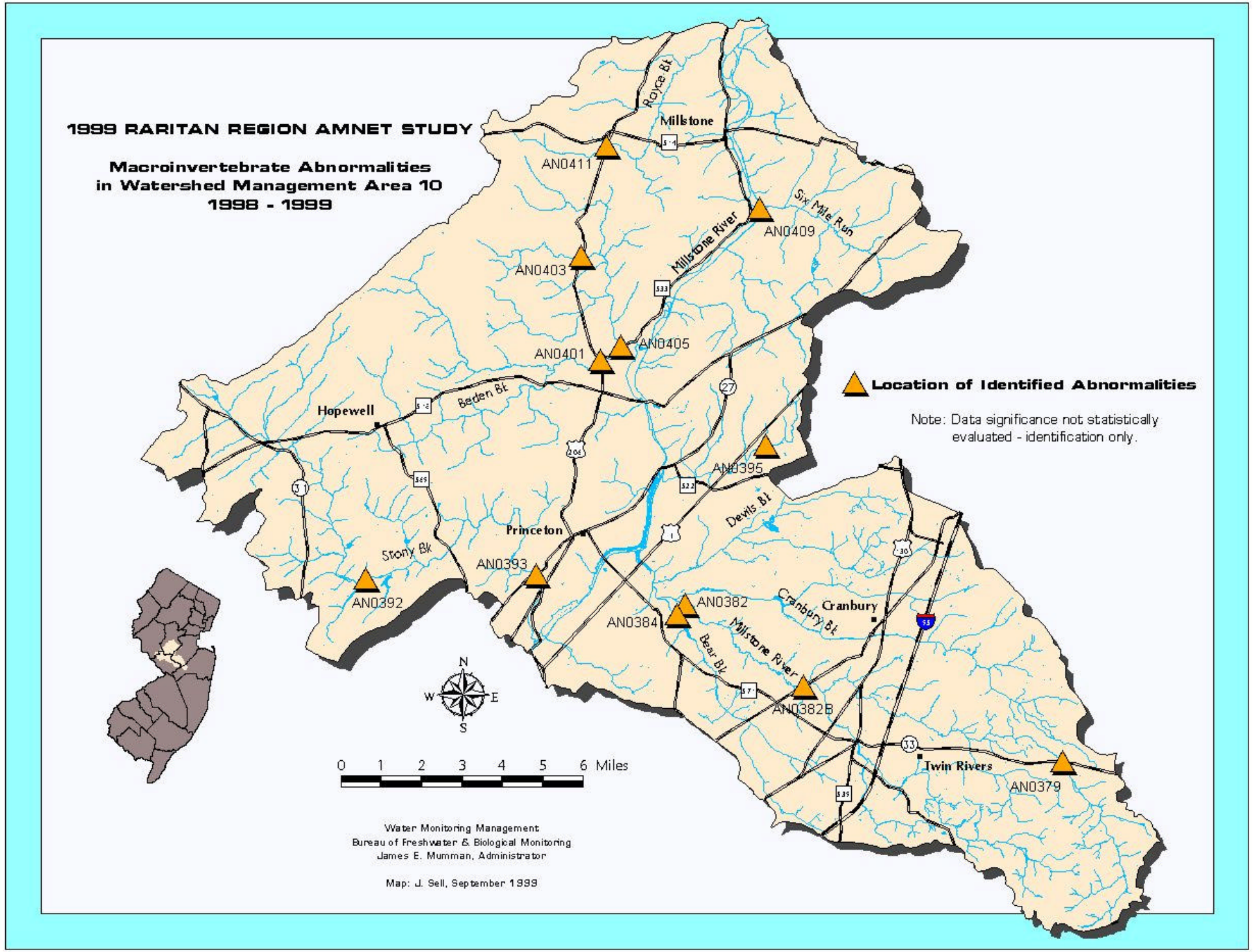
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator

Map: J. Sell, September 1999


1999 RARITAN REGION AMNET STUDY
Macroinvertebrate Abnormalities
in Watershed Management Area 7
1998 - 1999
AN0193
AN0194
AN0197
Orange
Garwood
Elizabeth
Linden
Menlo Park
Bayonne
Newark Bay
Upper New York Bay
Robinsons Branch
Rahway River
S Br Rahway River
Garwood River
GARDEN STATE PARKWAY
Location of Identified Abnormalities
Note: Data significance not statistically evaluated - identification only.
N
W
E
S
0 1 2 3 4 5 Miles
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator
Map: J. Sell, September 1999


1999 RARITAN REGION AMNET STUDY
Macroinvertebrate Abnormalities
in Watershed Management Area 8
1998 - 1999
AN0311
Mount Olive
AN0356
AN0315
Chester
AN0348
AN0358
Middle Valley
Lamington River
Fairmount
Bernardsville
S Br Raritan River
AN0350
Oldwick
AN0353
High Bridge
Pattenburg
AN0322
Whitehouse
AN0372
AN0325B
Readington
AN0343
Flemington
AN0337
Neshanic
AN0330
AN0332
Neshanic River
Ringoes
AN0334
N
W
E
S
0 1 2 3 4 5 Miles
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator
Map: J. Sell, September 1999
Location of Identified Abnormalities
Note: Data significance not statistically evaluated - identification only.

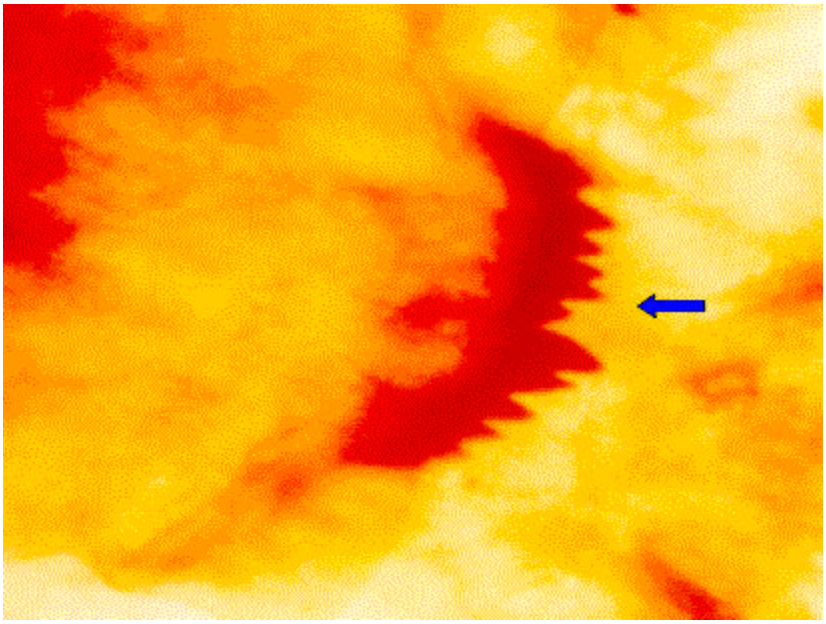

1999 RARITAN REGION AMNET STUDY
Macroinvertebrate Abnormalities
in Watershed Management Area 9
1998 - 1999
Watchung
Martinsville
Bound Bk
Metuchen
Nixon
Lincoln Park
South River
Spotswood
Monmouth Junction
Englishtown
Raritan River
Manalapan Br
AN0418
AN0417
AN0419
AN0376
AN0375
AN0420
AN0426
AN0424
AN0424B
AN0425A
AN0428
AN0431
AN0452
AN0451
AN0450
AN0449
AN0448
AN0445
AN0438
Location of Identified Abnormalities
Note: Data significance not statistically evaluated - identification only.
N
W
E
S
0 1 2 3 4 5 6 Miles
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator
Map: J. Sell, September 1999


1999 RARITAN REGION AMNET STUDY
Macroinvertebrate Abnormalities
in Watershed Management Area 10
1998 - 1999
Location of Identified Abnormalities
Note: Data significance not statistically evaluated - identification only.
AN0411
AN0409
AN0403
AN0405
AN0401
AN0395
AN0393
AN0392
AN0382
AN0384
AN0382B
AN0379
Millstone
Hopewell
Princeton
Cranbury
Twin Rivers
Royce Bk
Six Mile Run
Millstone River
Beden Bk
Stony Bk
Devils Bk
Cranbury Bk
Bear Bk
N
W
E
S
0 1 2 3 4 5 6 Miles
Water Monitoring Management
Bureau of Freshwater & Biological Monitoring
James E. Mumman, Administrator
Map: J. Sell, September 1999

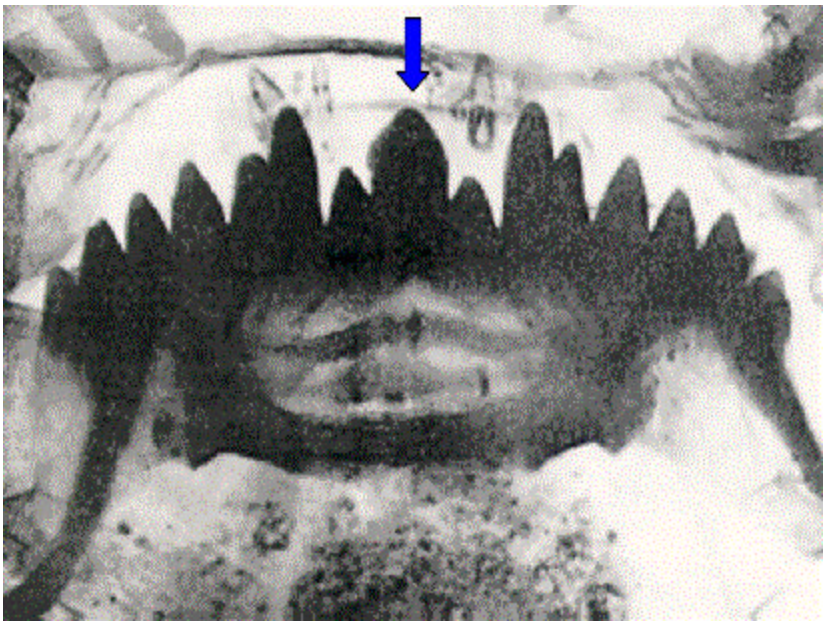
APPENDIX B

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

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



ABNORMAL*

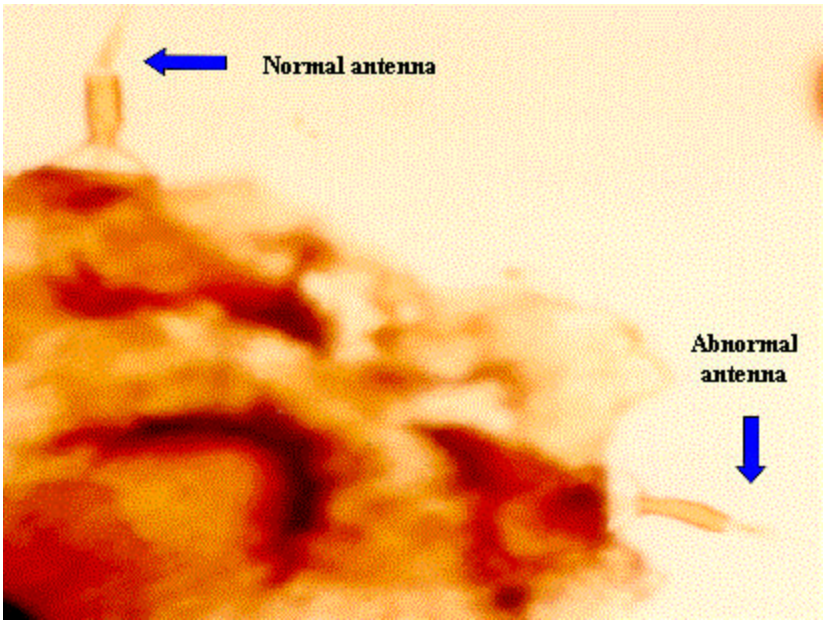


NORMAL**

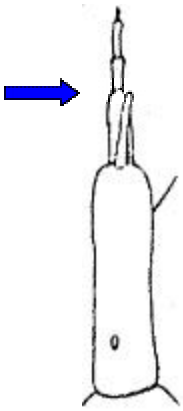
* Photograph taken by J. Kurtz, NJDEP.

** 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*

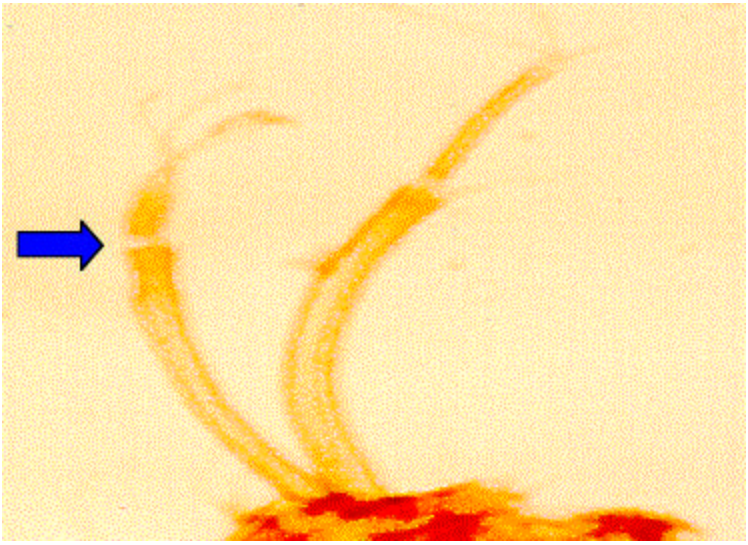


NORMAL antenna**

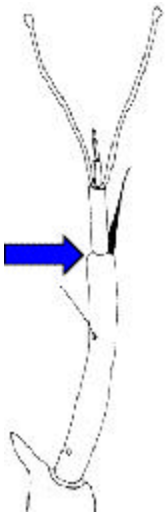
* Photograph taken by J. Kurtz, NJDEP.

** 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*

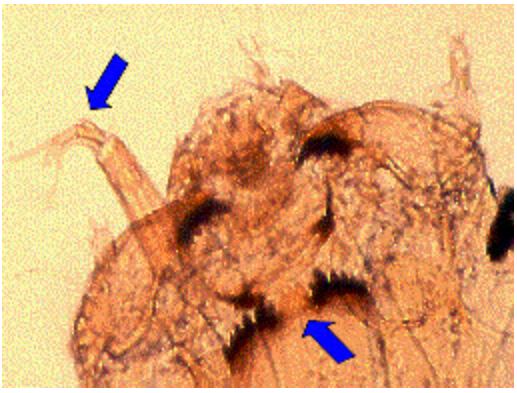


NORMAL**

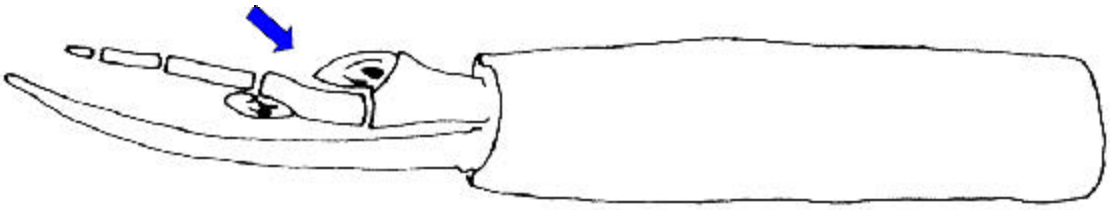
* Photograph taken by J. Kurtz, NJDEP.

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

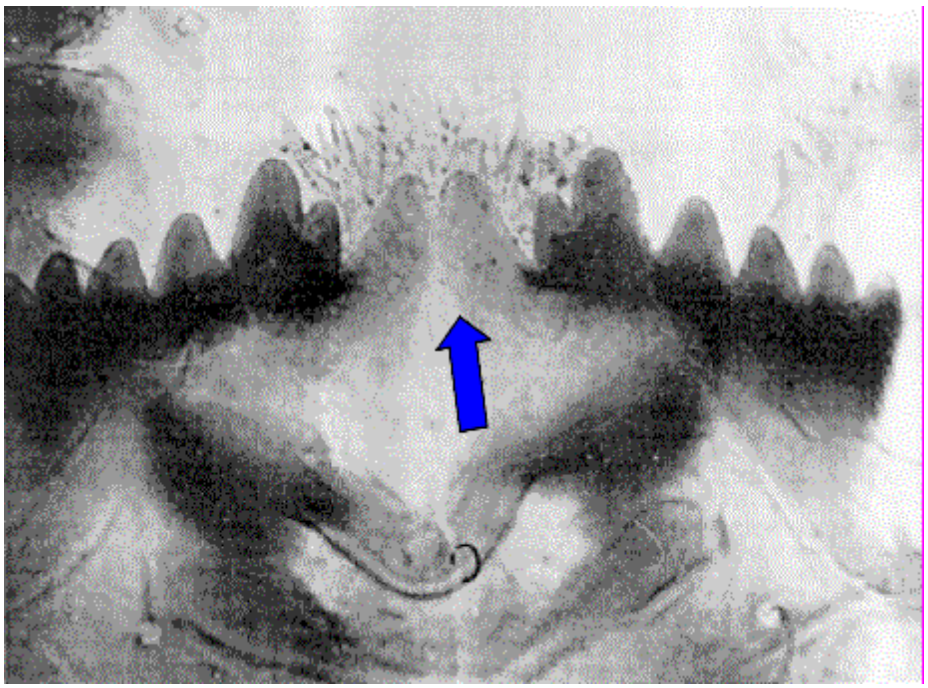
Microtendipes sp. — Note the abnormal teeth and antenna in the top picture compared to the bottom pictures, which depict normal antenna and teeth. The normal pictures on the bottom are magnified to show detail.



ABNORMAL*



NORMAL antenna**



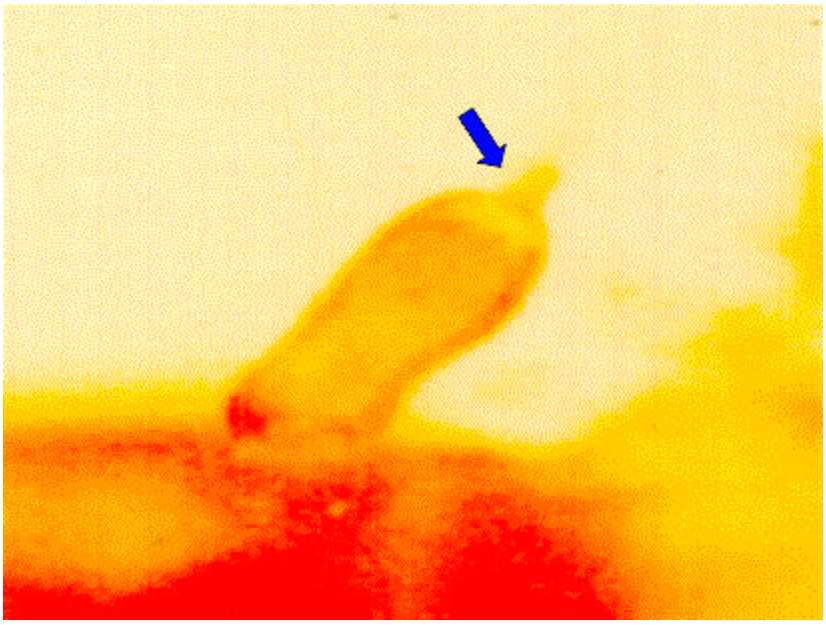
NORMAL teeth***

* Photograph taken by J. Kurtz, NJDEP.

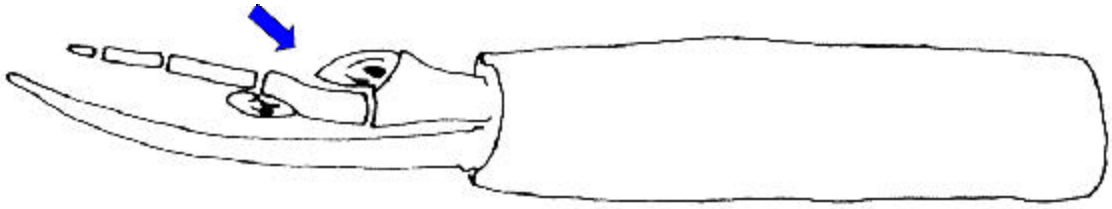
** From: *An Introduction to the Aquatic Insects of North America*, second edition, R.W. Merritt & K.W. Cummins, 1988, Kendall/Hunt Publ. Co.

*** 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 *

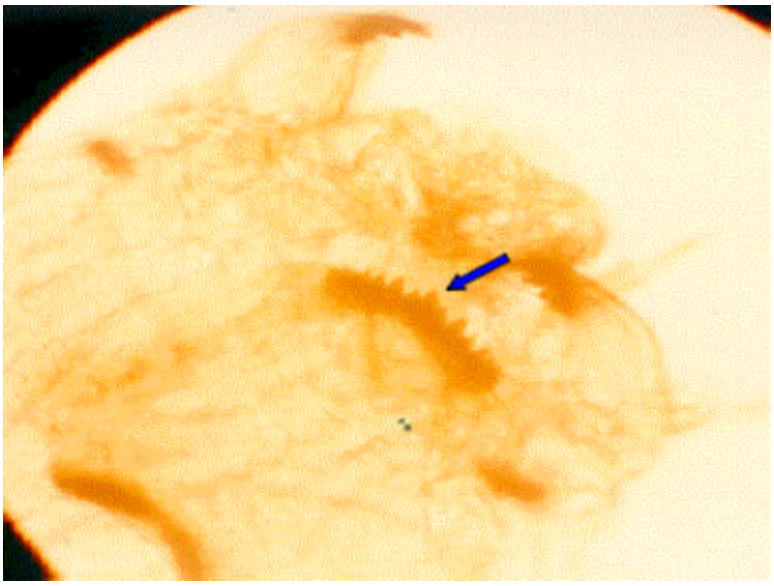


NORMAL antenna**

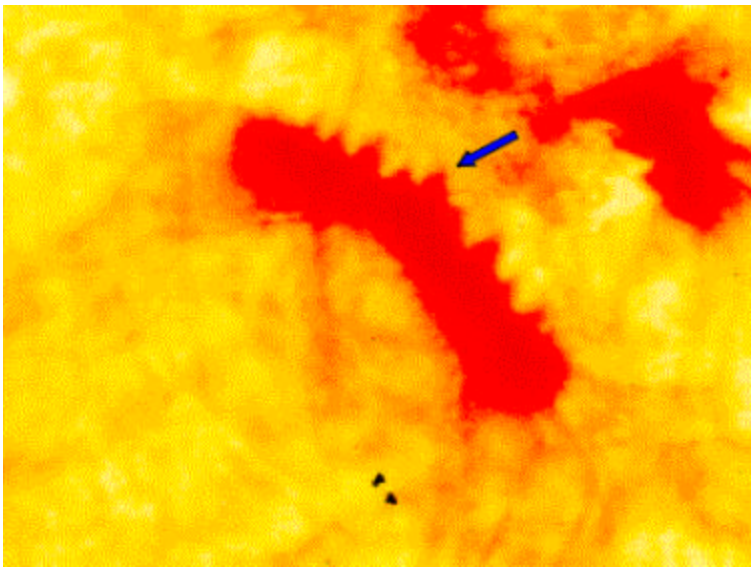
* Photograph taken by J. Kurtz, NJDEP.

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

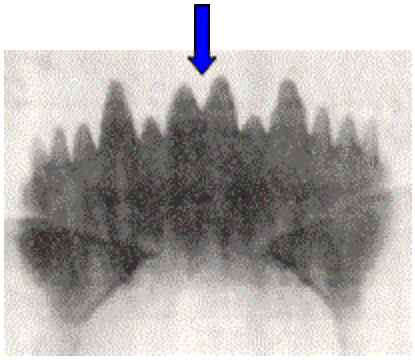
Polypedilum convictum — The first two pictures show abnormal teeth as compared to the normal teeth depicted in the picture below. The second picture is a higher magnification of the first one.



ABNORMAL*



ABNORMAL*

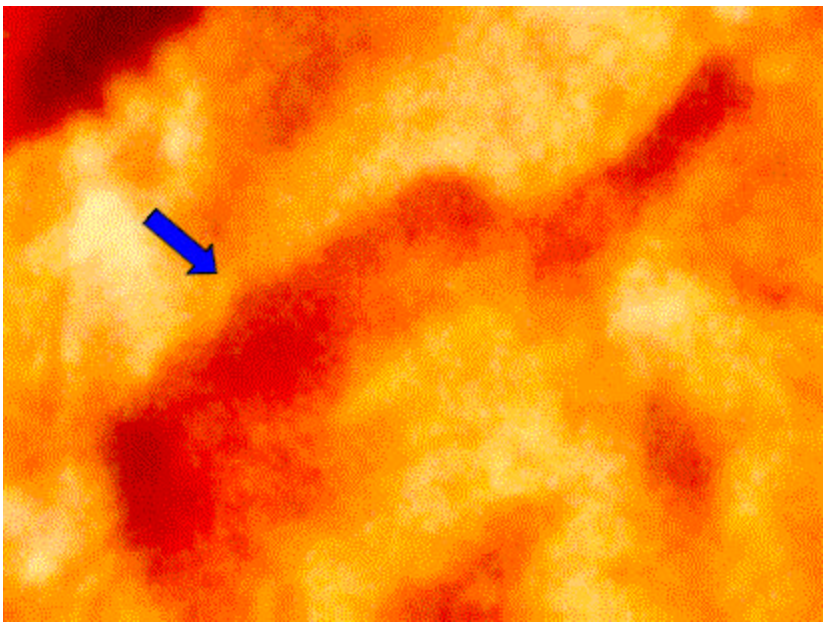


NORMAL**

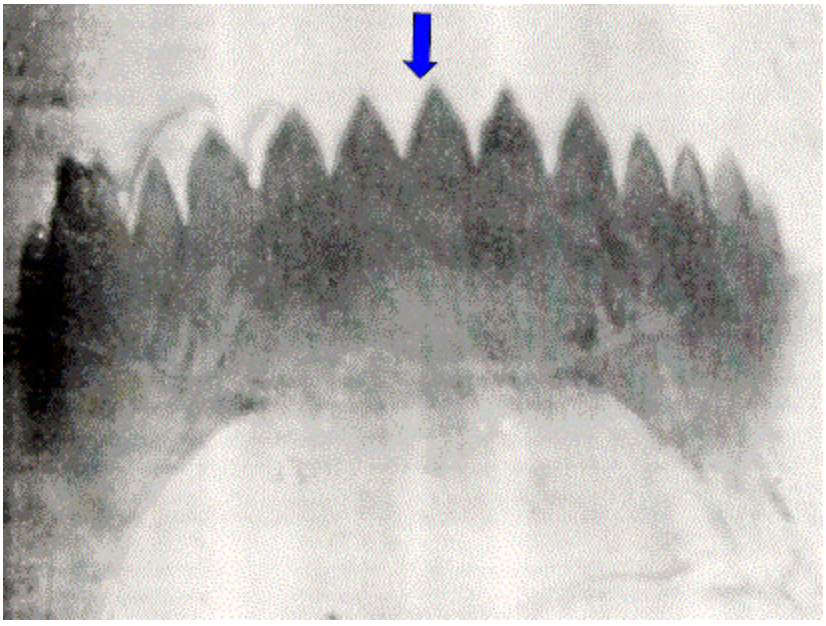
* Photograph taken by J. Kurtz, NJDEP.

** 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*



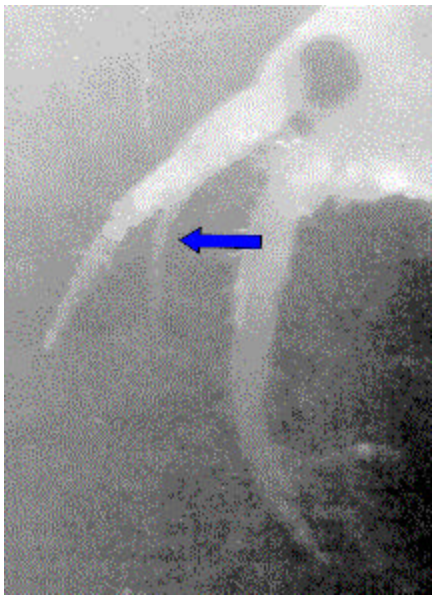
NORMAL**

* Photograph taken by J. Kurtz, NJDEP.

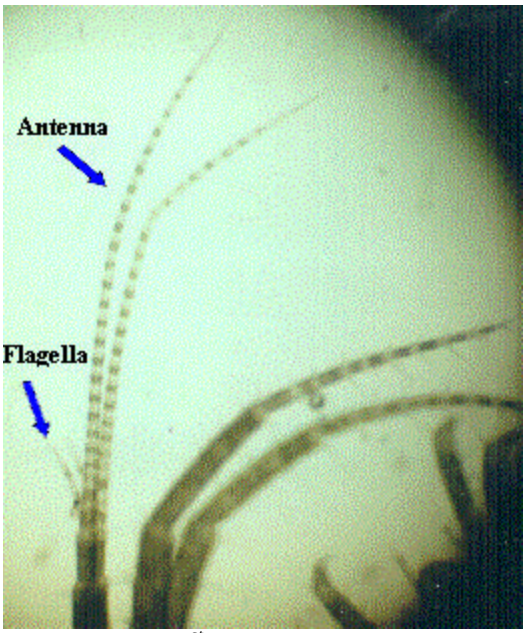
** From: *A Key to Some Larvae of Chironomidae (Diptera) From the Mackenzie & Porcupine River Watersheds,* D.R. Oliver, D. McClymont, & M.E. Roussel, 1978, Fisheries & Marine Service Technical Report # 791.

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

Photographs taken by J. Kurtz, NJDEP.

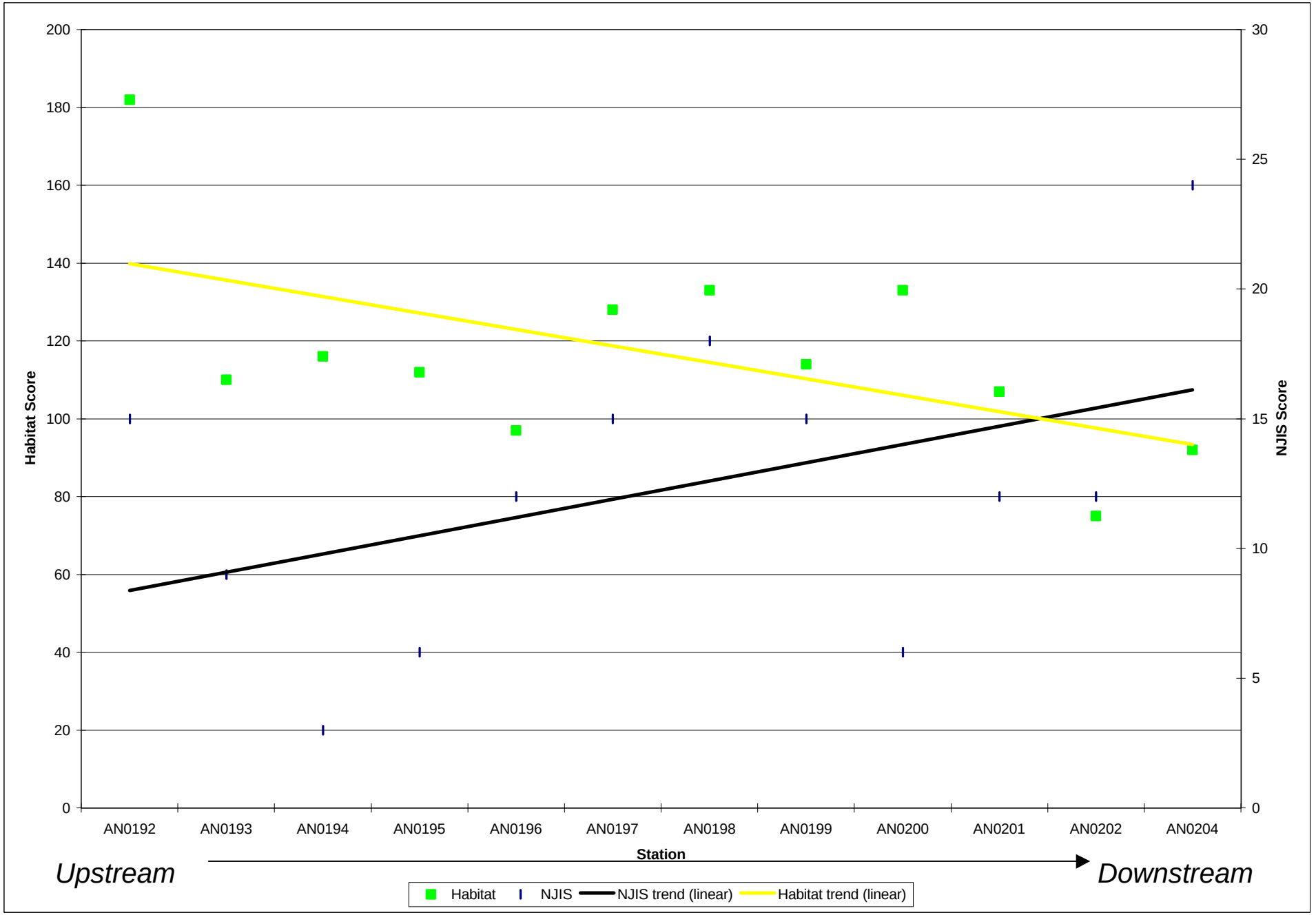
APPENDIX C

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

Comparative Scores of
HABITAT vs. NJIS

WMA 7

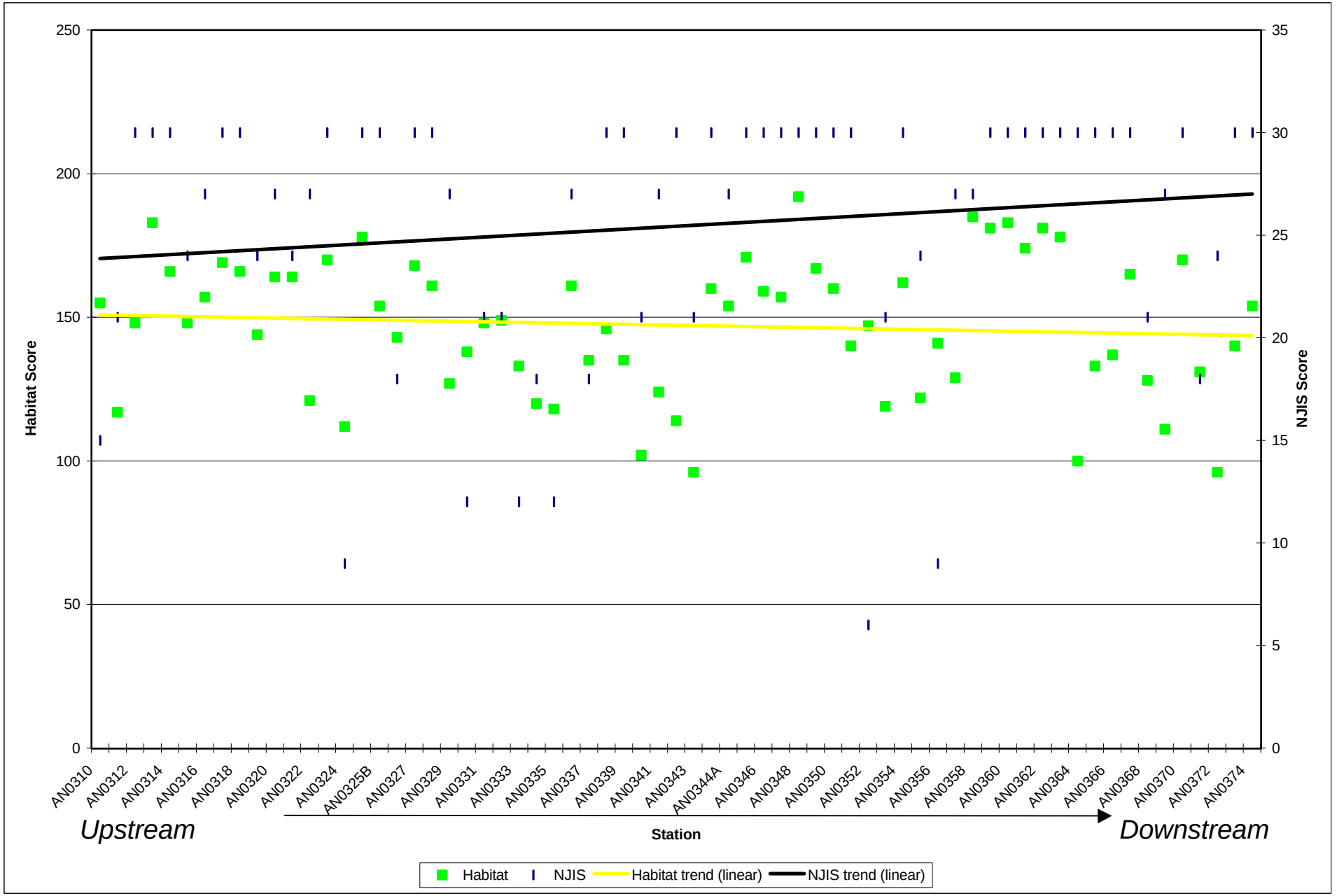
1999



Comparative Scores of
HABITAT vs. NJIS

WMA 8

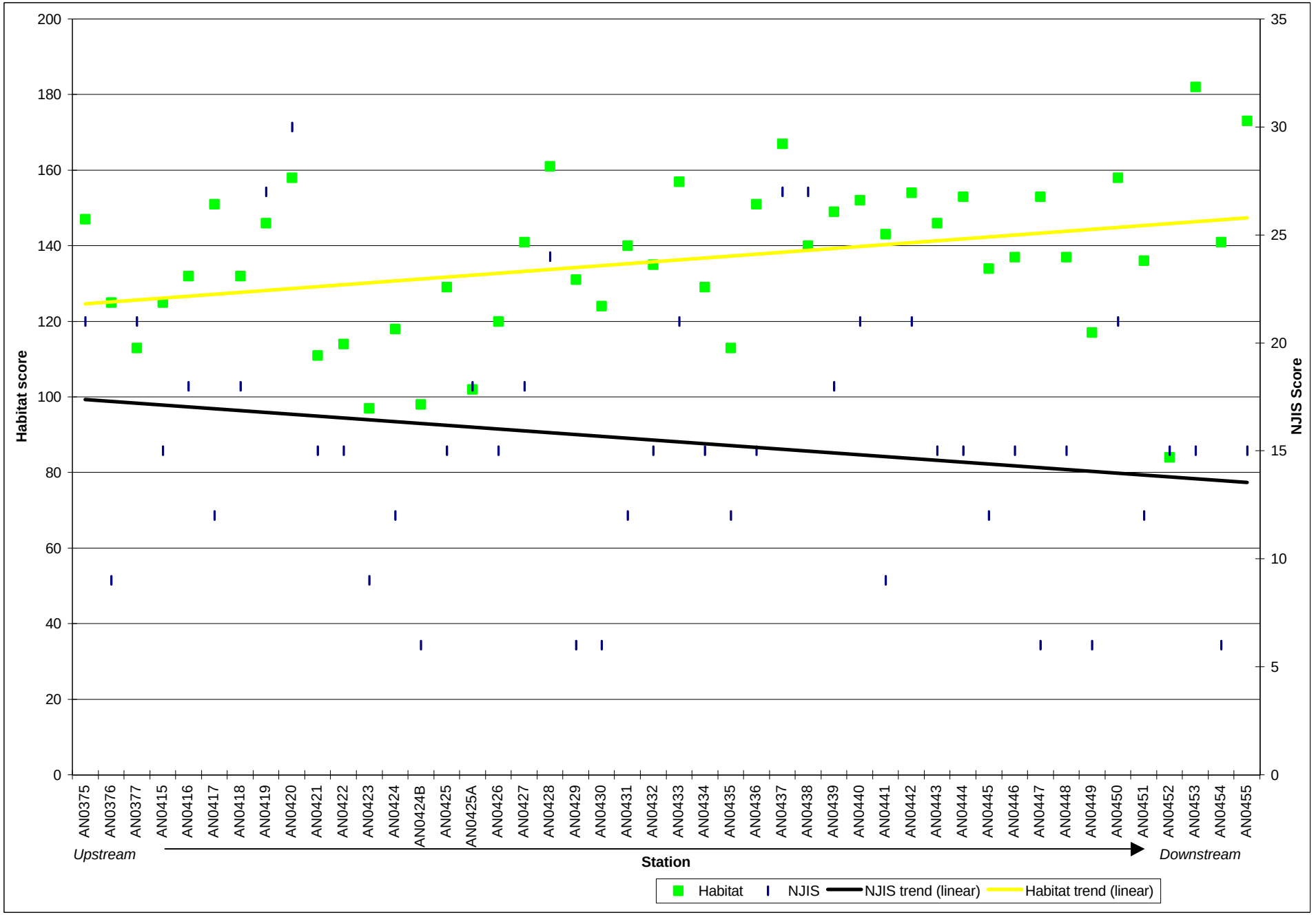
1999



Comparative scores of HABITAT vs. NJIS

WMA 9

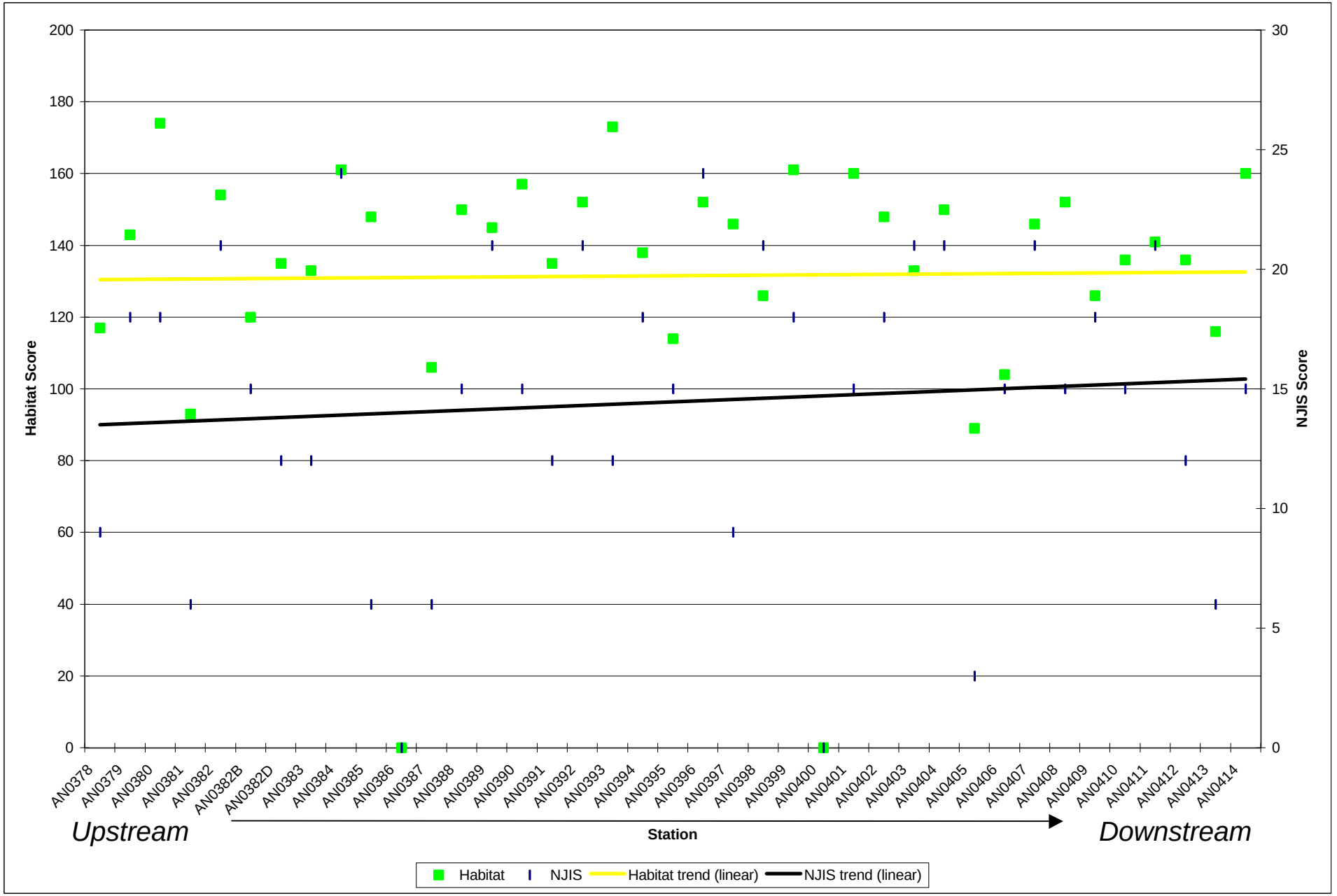
1999



Comparative Scores of HABITAT vs. NJIS

WMA 10

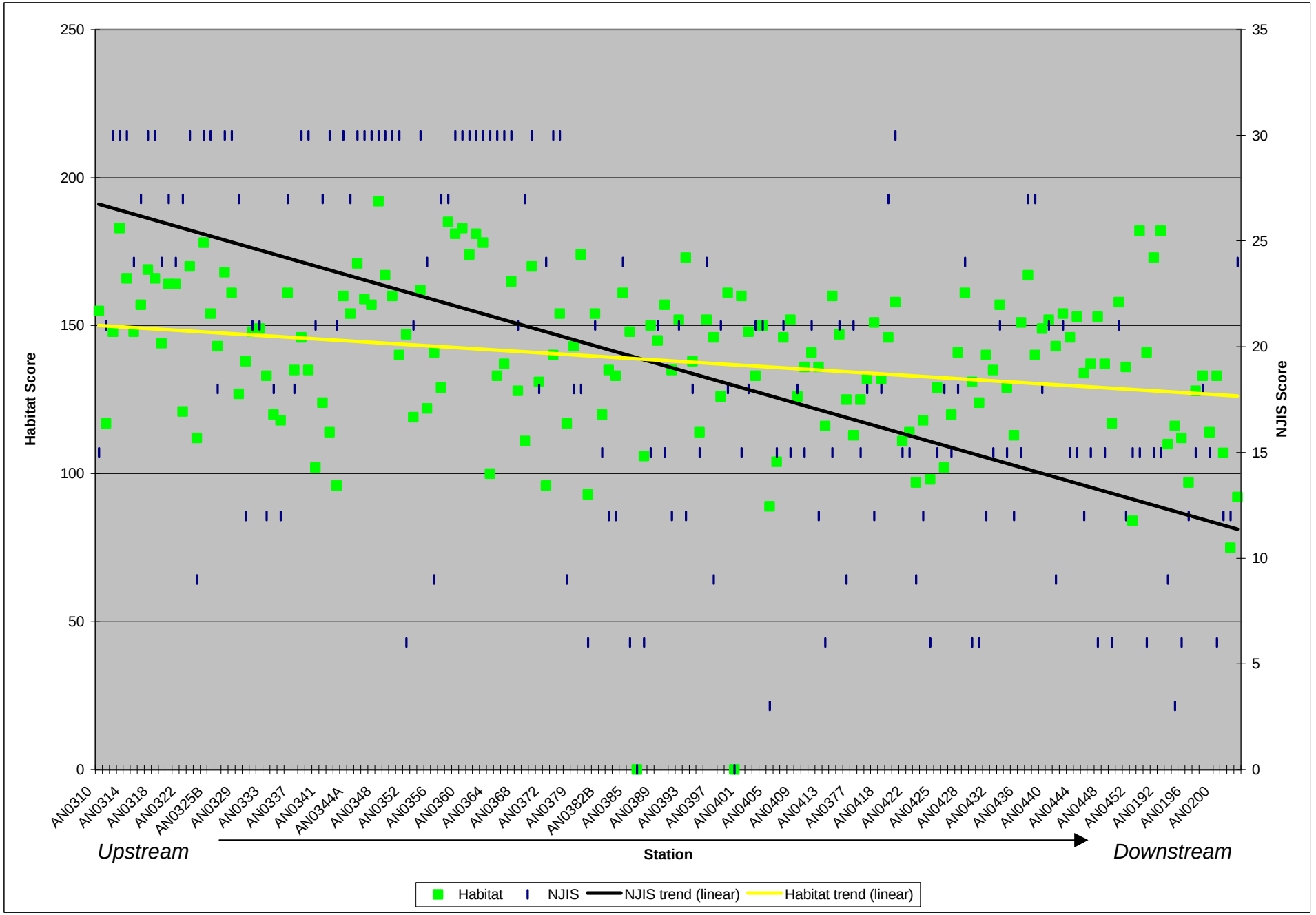
1999



Comparative Scores of
HABITAT vs. NJIS

COMBINED

Raritan Watershed Region 1999



APPENDIX D

Taxonomic and Statistical Data, NJIS Scores*, Habitat Assessment Scores and Observations from the 1999 Raritan 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/Chronomid 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.

APPENDIX D (cont.)

Taxonomic List of Macroinvertebrate Families Found at New Jersey AMNET Sites*

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

* Includes only those taxa that are employed in calculation of the NJIS rating; major taxa are listed in the order presented in Pennak1978) [16].

Order ODONATA
Suborder ANISOPTERA (dragonflies)
Family Aeshnidae
Cordulegastridae
Corduliidae
Gomphidae
Libellulidae
Macromiidae
Suborder ZYGOPTERA (damselflies)
Family Calopterygidae
Coenagrionidae
Lestidae
Order HEMIPTERA (true bugs)
Family Belostomatidae
Corixidae
Gerridae
Mesoveliidae
Nepidae
Notonectidae
Pleidae
Veliidae
Order MEGALOPTERA
Family Corydalidae (dobsonflies, fishflies)
Sialidae (alderflies)
Order NEUROPTERA
Family Sisyridae (spongilla flies)
Order TRICHOPTERA (caddisflies)
Family Brachycentridae
Calamoceratidae
Glossosomatidae
Helicopsychidae
Hydropsychidae
Hydroptilidae
Lepidostomatidae
Leptoceridae
Limnephilidae
Molannidae
Odontoceridae
Philopotamidae
Phryganeidae
Polycentropodidae
Psychomyiidae
Rhyacophilidae
Sericostomatidae
Order LEPIDOPTERA (aquatic caterpillars)
Family Nepticulidae
Pyralidae
Order COLEOPTERA (beetles)
Family Chrysomelidae
Curculionidae
Dryopidae
Dytiscidae
Elmidae
Gyrinidae
Haliplidae
Hydrophilidae
Lampyridae
Noteridae
Psephenidae
Ptilodactylidae
Scirtidae

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

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

Station: AN0192
Rahway R, Northfield Ave , W Orange, Essex County
Caldwell USGS Quadrangle
Date Sampled: 02/01/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Planariidae	4	57
Chironomidae	6	22
Simuliidae	6	10
Hydropsychidae	4	5
Lumbriculidae	8	3
Coenagrionidae	9	1
Asellidae	8	1
BloodRed Chironomidae	8	1
Empididae	6	1
Tubificidae	10	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 103
% Contribution of Dominant Family: 55.34 % (Planariidae)
Family Biotic Index: 4.97
Scraper/Filterer Collector Ratio: 0.07
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 4.85
EPT/C: 0.21
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 128
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 16/1
Substrate: Cobbles,mud....StreamBank Vegetation/Stability: Trees,shrubs,grass/Unstable
Canopy: Mostly Open....Other: Urban; Water temp.0.5 / pH 7.5 /DO 16.2 /Cond.1339

Station: AN0193
Rahway R, Morris Ave { Rt 82 } , Springfield, Union County
Roselle USGS Quadrangle
Date Sampled: 02/01/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	55
Chironomidae	6	16
Asellidae	8	11
BloodRed Chironomidae	8	7
Gammaridae	4	5
Coenagrionidae	9	3
Hydropsychidae	4	2
Lumbriculidae	8	2
Planariidae	4	1
Enchytraeidae	10	1
Chydoridae	4	1
Glossiphoniidae	8	1
Psychodidae	10	1
Corixidae	9	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 107
% Contribution of Dominant Family: 51.40 % (Tubificidae)
Family Biotic Index: 8.47
Scraper/Filterer Collector Ratio: 2.33
Shredder/Total Ratio: 0.10
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.87
EPT/C: 0.08
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 110
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 37/2
Substrate: Cobbles,mud,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Urban/Forested upstream; Water temp.1.6 /pH 7.6 /DO 12.6 /Cond.757
Road name correction;

Station: AN0194
Rahway R, Kenilworth Blvd , Springfield, Union County
Roselle USGS Quadrangle
Date Sampled: 02/01/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	71
Gammaridae	4	12
Chironomidae	6	9
BloodRed Chironomidae	8	8
Hydropsychidae	4	3
Asellidae	8	2
Nematoda	6	2
Coenagrionidae	9	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 109
% Contribution of Dominant Family: 65.14 % (Tubificidae)
Family Biotic Index: 8.54
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.75
EPT/C: 0.16
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 116
Deficiency(s) noted: Tubificidae Family Overwhelmingly Dominant - - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 33/2
Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Forested; Water temp.1.9 /pH 7.3 /DO 14.2 /Cond.693

Station: AN0195
Rahway R, River Rd & Church St , Rahway, Union County
Perth Amboy USGS Quadrangle
Date Sampled: 02/04/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	70
Gammaridae	4	16
Asellidae	8	2
Chironomidae	6	2
Simuliidae	6	2
Lymnaeidae	6	2
Urnatellidae	0	2
Enchytraeidae	10	1
Empididae	6	1
Plagiostomidae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 70.00 % (Tubificidae)
Family Biotic Index: 8.40
Scraper/Filterer Collector Ratio: 0.25
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
EPT/C: 0.50
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 112
Deficiency(s) noted: Tubificidae Family Overwhelmingly Dominant - - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 65/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Urban/Forested; Water temp.5.2 /pH 7.7 /DO 13.8 /Cond.547
Trash & debris in water;

Station: AN0196
Robinsons Br, Goodmans Crossing , Scotch Plains, Union County
Perth Amboy USGS Quadrangle
Date Sampled: 02/04/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydrobiidae	8	20
Tubificidae	10	20
Asellidae	8	14
Plagiostomidae	4	13
Sphaeriidae	8	11
Chironomidae	6	8
Cyclopidae	4	5
Gammaridae	4	2
Planariidae	4	2
Viviparidae	6	1
BloodRed Chironomidae	8	1
Coenagrionidae	9	1
Physidae	7	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Hydrobiidae & Tubificidae)
Family Biotic Index: 7.36
Scraper/Filterer Collector Ratio: 2.00
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: 97
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 33/2
Substrate: Cobbles,gravel,sand,mud....StreamBank Vegetation/Stability:
Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Urban/Ash Brook Swamp upstream; Water temp.3.3 /pH 7.6
/DO 10.1 /Cond.279
Trash in water;

Station: AN0197
Robinsons Br Trib, Raritan { Terrell } Rd , Scotch Plains, Union County
Roselle USGS Quadrangle
Date Sampled: 02/01/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Planariidae	4	33
Asellidae	8	8
Hydropsychidae	4	7
Chironomidae	6	3
Gammaridae	4	1
Gomphidae	1	1
Lumbriculidae	8	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 55
% Contribution of Dominant Family: 60.00 % (Planariidae)
Family Biotic Index: 4.75
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.15
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 12.73
EPT/C: 4.24
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 128
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 7/<1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Grass,shrubs,trees/Unstable
Canopy: Mostly Open....Other: Suburban/Lake upstream; Water temp.2.5 /pH 7.6 /DO 15.1
/Cond.541

Station: AN0198
Robinsons Br Trib, Lamberts Mill Rd , Westfield Twp, Union County
Perth Amboy USGS Quadrangle
Date Sampled: 02/01/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Planariidae	4	50
Hydropsychidae	4	24
Chironomidae	6	9
Asellidae	8	6
Empididae	6	5
Gammaridae	4	2
Tubificidae	10	2
BloodRed Chironomidae	8	2
Simuliidae	6	2
Enchytraeidae	10	1
Lebertiidae	4	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 105
% Contribution of Dominant Family: 47.62 % (Planariidae)
Family Biotic Index: 4.80
Scraper/Filterer Collector Ratio: 0.08
Shredder/Total Ratio: 0.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 22.86
EPT/C: 2.08
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 133
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/<1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Shrubs,grass,trees/Unstable
Canopy: Mostly Open....Other: Suburban/Industrial; Water temp.1.5 /pH 7.6 /DO 15.8
/Cond.573

Station: AN0199
Robinsons Br, Rt 27 , Rahway, Union County
Perth Amboy USGS Quadrangle
Date Sampled: 02/04/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	17
Plagiostomidae	4	16
Tubificidae	10	12
Chironomidae	6	9
Planariidae	4	8
Planorbidae	6	7
Gammaridae	4	5
BloodRed Chironomidae	8	5
Naididae	7	5
Hydropsychidae	4	3
Lymnaeidae	6	3
Urnatellidae	0	3
Hydrobiidae	8	1
Glossiphoniidae	8	1
Hydridae	5	1
Veliidae	9	1
Physidae	7	1
Psychodidae	10	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 17.00 % (Asellidae)
Family Biotic Index: 6.23
Scraper/Filterer Collector Ratio: 0.82
Shredder/Total Ratio: 0.23
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
EPT/C: 0.21
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 114
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 37/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Urban/Middlesex Res. upstream; Water temp.5.0 /pH 7.7 /DO 14.1 /Cond.287
Trash in water;

Station: AN0200
S Br Rahway R, Parsonage Rd , Menlo Park, Middlesex County
Perth Amboy USGS Quadrangle
Date Sampled: 02/04/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	61
Naididae	7	13
Hydropsychidae	4	8
Cypridae	6	6
Lumbricidae	10	5
BloodRed Chironomidae	8	4
Planariidae	4	3
Sphaeriidae	8	3
Chironomidae	6	2

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 105
% Contribution of Dominant Family: 58.10 % (Tubificidae)
Family Biotic Index: 8.56
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 7.62
EPT/C: 1.27
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 133
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 6/<1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Urban/Forested/Pond upstream; Water temp.6.6 /pH 7.4 /DO 13.4 /Cond.564
Trash in water;

Station: AN0202
W Br Elizabeth R, Vaux Hall Rd , Union, Union County
Elizabeth USGS Quadrangle
Date Sampled: 09/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	34
Chironomidae	6	26
Planariidae	4	16
Tubificidae	10	10
Glossiphoniidae	8	6
Coenagrionidae	9	5
Naididae	7	3
BloodRed Chironomidae	8	3
Erpobdellidae	8	2
Hydridae	5	1
Lumbricidae	10	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 107
% Contribution of Dominant Family: 31.78 % (Sphaeriidae)
Family Biotic Index: 7.11
Scraper/Filterer Collector Ratio: 0.43
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 75
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 6/1
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability:
Grass,weeds,shrubs/Unstable
Canopy: Mostly Open....Other: Suburban/Partially channelized; Water temp.24.1 /pH 7.5
/DO 7.3 /Cond.484
Trash;

Station: AN0203
Elizabeth River, Springfield Ave. (NJ Rt. 24), Irvington, Essex
Elizabeth USGS Quadrangle
Date Sampled: 09/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals

This site was not sampled due to channelization

Station: AN0204
Elizabeth R, North Ave , Union, Union County
Elizabeth USGS Quadrangle
Date Sampled: 09/16/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	30
Baetidae	4	29
Chironomidae	6	23
Planariidae	4	5
Lumbricidae	10	5
Empididae	6	2
Coenagrionidae	9	1
Enchytraeidae	10	1
Erpobdellidae	8	1
Hydroptilidae	4	1
Tubificidae	10	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 30.00 % (Hydropsychidae)
Family Biotic Index: 5.03
Scraper/Filterer Collector Ratio: 0.44
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 60.00
EPT/C: 2.61
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 92
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25/2
Substrate: Cobbles,gravel,sand,silt....StreamBank Vegetation/Stability: Weeds,grass,trees/Unstable
Canopy: Open....Other: Urban/Partially channelized; Water temp.22.1 /pH 7.1 /DO 7.7 /Cond.737
Location change upstr of original site due to brackish conditions;

Station: AN0310
South Branch Raritan River, Smithtown Rd., Mt. Olive Twp., Morris
Hackettstown USGS Quadrangle
Date Sampled: 07/07/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	26
Gammaridae	4	24
Asellidae	8	21
Coenagrionidae	9	5
Planariidae	4	4
Planorbidae	6	4
Sphaeriidae	8	4
Hydrobiidae	8	3
Chironomidae	6	3
Astacidae	7	2
Simuliidae	6	2
Physidae	7	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Naididae)
Family Biotic Index: 6.46
Scraper/Filterer Collector Ratio: 1.33
Shredder/Total Ratio: 0.22
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 155
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Mostly Open....Other: Rural, Forested; Small dam
Fish, Crayfish; Water temp. 25.8C / pH 7.3SU / DO 3.1mg/L / Cond. 317umhos

Station: AN0311
Drakes Brook, Emmans Rd., Roxbury Twp., Morris
Chester USGS Quadrangle
Date Sampled: 06/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	46
Chironomidae	6	20
Elmidae	4	13
Philopotamidae	3	7
Asellidae	8	3
Hydropsychidae	4	3
BloodRed Chironomidae	8	2
Psephenidae	4	2
Ephemerellidae	1	1
Tubificidae	10	1
Lumbriculidae	8	1
Naididae	7	1
Corydalidae	0	1
Perlidae	1	1
Rhyacophilidae	0	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 104
% Contribution of Dominant Family: 44.23 % (Gammaridae)
Family Biotic Index: 4.52
Scraper/Filterer Collector Ratio: 1.45
Shredder/Total Ratio: 0.22
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 12.50
EPT/C: 0.59
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 117
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 10/1.5
Substrate: Gravel/Sand, Mud, Silt....StreamBank Vegetation/Stability: Weeds, Trees/Fair
Canopy: Mostly Open....Other: Suburban; Macrophytes
Water temp. 24.5C / pH 7.0SU / DO 6.9mg/L / Cond. 533umhos;

Station: AN0312
Drakes Brook, Bartley Rd., Washington Twp., Morris
Chester USGS Quadrangle
Date Sampled: 06/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	23
Elmidae	4	22
Heptageniidae	4	13
Asellidae	8	10
Hydropsychidae	4	8
Baetidae	4	6
Brachycentridae	1	6
Gammaridae	4	4
Perlidae	1	4
Psephenidae	4	4
Philopotamidae	3	3
Limnephilidae	4	2
Pleuroceridae	6	1
Planorbidae	6	1
Oligoneuriidae	2	1
Ephemerellidae	1	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 109
% Contribution of Dominant Family: 21.10 % (Chironomidae)
Family Biotic Index: 4.48
Scraper/Filterer Collector Ratio: 1.75
Shredder/Total Ratio: 0.18
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 40.37
EPT/C: 1.91
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 148
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Partly Open....Other: Rural, Forested; 13 - 55gal. drums stored on banks - Morris Co Haz Waste - Lead compound
Minnows; Water temp. 19.8C / pH 7.0SU / DO 8.7mg/L / Cond. 369umhos

Station: AN0313
Stony Brook, Fairview Ave., Washington Twp., Morris
Hackettstown USGS Quadrangle
Date Sampled: 07/07/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	20
Hydropsychidae	4	19
Leuctridae	0	9
BloodRed Chironomidae	8	7
Lepidostomatidae	1	6
Elmidae	4	6
Pteronarcidae	0	6
Baetidae	4	4
Tipulidae	3	4
Gerridae	8	3
Caenidae	7	2
Philopotamidae	3	2
Glossosomatidae	0	2
Gomphidae	1	2
Lumbriculidae	8	2
Limnephilidae	4	1
Ceratopogonidae	6	1
Gammaridae	4	1
Perlidae	1	1
Sphaeriidae	8	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Chironomidae)
Family Biotic Index: 4.01
Scraper/Filterer Collector Ratio: 0.70
Shredder/Total Ratio: 0.21
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 52.00
EPT/C: 1.93
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 183
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/<1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Closed....Other: Rural, Forested; Storm sewers, Rock dam
Minnows, Ducks, Macrophytes; Water temp. 20.6C / pH 8.4SU / DO 11.9mg/L / Cond. 156umhos

Station: AN0314
Electric Brook, Fairview Ave., Washington Twp., Morris
Hackettstown USGS Quadrangle
Date Sampled: 07/07/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	24
Glossosomatidae	0	18
Chironomidae	6	15
Baetidae	4	14
Peltoperlidae	1	4
Philopotamidae	3	3
Psephenidae	4	3
Dytiscidae	5	2
Perlidae	1	2
Ephemerellidae	1	2
Gerridae	8	2
Tipulidae	3	1
Asellidae	8	1
Astacidae	7	1
Empididae	6	1
Coenagrionidae	9	1
Gomphidae	1	1
Tubificidae	10	1
Rhyacophilidae	0	1
BloodRed Chironomidae	8	1
Heptageniidae	4	1
Tricorythidae	4	1

Statistical Analysis

Number of Taxa: 22
Total Number of Individuals: 100
% Contribution of Dominant Family: 24.00 % (Hydropsychidae)
Family Biotic Index: 3.57
Scraper/Filterer Collector Ratio: 0.81
Shredder/Total Ratio: 0.21
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 70.00
EPT/C: 4.38
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 166
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5/<1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Closed....Other: Forested; Storm sewers
Minnows, Crayfish, Salamanders; Water temp. 23.0C / pH 7.6SU / DO 12.6mg/L / Cond. 215umhos

Station: AN0315
South Br. Raritan River, Rt. 517, Washington Twp., Morris
Hackettstown USGS Quadrangle
Date Sampled: 07/07/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	28
Gammaridae	4	13
Hydropsychidae	4	12
Baetidae	4	5
Lumbriculidae	8	5
BloodRed Chironomidae	8	5
Elmidae	4	4
Ephemerellidae	1	4
Tricorythidae	4	4
Planariidae	4	3
Cambaridae	5	3
Tipulidae	3	2
Philopotamidae	3	2
Sphaeriidae	8	2
Asellidae	8	1
Tubificidae	10	1
Corixidae	9	1
Planorbidae	6	1
Lepidostomatidae	1	1
Mesoveliidae	9	1
Brachycentridae	1	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 99
% Contribution of Dominant Family: 28.28 % (Chironomidae)
Family Biotic Index: 5.08
Scraper/Filterer Collector Ratio: 0.63
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 29.29
EPT/C: 0.88
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 148
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25/>1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Grass/Fair
Canopy: Mostly Open....Other: Suburban; Storm sewers
Minnows, trout, crayfish; Water temp. 22.3C / pH 8.1SU / DO 11.3mg/L / Cond. 303umhos

Station: AN0316
S. Br. Raritan River, Off Raritan River Rd. (Rt. 512), Califon Boro, Hunterdon County
Califon USGS Quadrangle
Date Sampled: 05/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	34
Chironomidae	6	21
Elmidae	4	15
Psephenidae	4	8
Lumbriculidae	8	7
Tipulidae	3	5
Hydropsychidae	4	3
Philopotamidae	3	3
Empididae	6	3
Gammaridae	4	2
Simuliidae	6	2
Planariidae	4	1
Oligoneuriidae	2	1
Hydroptilidae	4	1
Naididae	7	1
Sialidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 108
% Contribution of Dominant Family: 31.48 % (Ephemerellidae)
Family Biotic Index: 3.73
Scraper/Filterer Collector Ratio: 2.67
Shredder/Total Ratio: 0.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 38.89
EPT/C: 2.00
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 157
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 35/1.5
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Stable
Canopy: Partly Open....Other: Rural; Dam upstr., Sample taken in channel along lt. bank
Trout stocked; Water temp. 13.8C / pH 8.0SU / DO 11.7mg/L / Cond. 260umhos

Station: AN0317
South Br. Raritan River, River Rd. (Ken Lockwood Gorge), Lebanon Twp., Hunterdon County
Califon USGS Quadrangle
Date Sampled: 05/04/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	25
BloodRed Chironomidae	8	21
Hydropsychidae	4	15
Chironomidae	6	14
Heptageniidae	4	7
Tipulidae	3	5
Elmidae	4	5
Perlidae	1	4
Empididae	6	2
Oligoneuriidae	2	2
Lumbriculidae	8	2
Psephenidae	4	2
Nemouridae	2	1
Lumbricidae	10	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 107
% Contribution of Dominant Family: 23.36 % (Ephemerellidae)
Family Biotic Index: 4.32
Scraper/Filterer Collector Ratio: 1.89
Shredder/Total Ratio: 0.34
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 50.47
EPT/C: 1.54
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 169
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30/2
Substrate: Cobbles, Gravel/Sand, Snags....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Forested; Ducks, Geese, Minnows
Water temp. 12.6C / pH 8.2SU / DO 10.5mg/L / Cond. 263;

Station: AN0318
Spruce Run, Newport Rd., Lebanon Twp., Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 05/11/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	40
Chironomidae	6	16
Baetidae	4	15
Philopotamidae	3	6
Elmidae	4	5
Simuliidae	6	5
Lumbriculidae	8	4
Heptageniidae	4	4
Nemouridae	2	3
BloodRed Chironomidae	8	3
Psephenidae	4	2
Rhyacophilidae	0	2
Perlidae	1	1
Glossosomatidae	0	1
Empididae	6	1
Psychomyiidae	2	1
Leptoceridae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 110
% Contribution of Dominant Family: 36.36 % (Ephemerellidae)
Family Biotic Index: 3.30
Scraper/Filterer Collector Ratio: 6.09
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 67.27
EPT/C: 3.89
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 166
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Vines, Ferns/Fair
Canopy: Partly Open....Other: Suburban, Forested; Trash - metal/ car parts Filamentous algae; Water temp. 14.7C / pH 8.0SU / DO 10.6mg/L / Cond. 125umhos

Station: AN0319
Spruce Run, NJ Rt. 31, Glen Gardner Boro., Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 05/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	40
Lumbriculidae	8	33
BloodRed Chironomidae	8	12
Naididae	7	6
Ephemerellidae	1	4
Lepidostomatidae	1	3
Psephenidae	4	2
Simuliidae	6	2
Perlidae	1	1
Nemouridae	2	1
Gammaridae	4	1
Empididae	6	1
Leptoceridae	4	1
Polycentropodidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 109
% Contribution of Dominant Family: 36.70 % (Chironomidae)
Family Biotic Index: 6.39
Scraper/Filterer Collector Ratio: 0.67
Shredder/Total Ratio: 0.51
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 10.09
EPT/C: 0.21
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 144
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25-30/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Rural, Forested; Retaining wall both banks
Water temp. 14.4C / pH 7.7SU / DO 11.6mg/L / Cond. 174umhos;

Station: AN0320
Willoughby Brook, NJ Rt. 31, Lebanon Twp., Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 05/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Baetidae	4	52
Nemouridae	2	11
Glossosomatidae	0	8
Chironomidae	6	7
Ephemerellidae	1	7
Polycentropodidae	6	4
Elmidae	4	3
Hydropsychidae	4	1
Tipulidae	3	1
Oligoneuriidae	2	1
Naididae	7	1
Capniidae	1	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 97
% Contribution of Dominant Family: 53.61 % (Baetidae)
Family Biotic Index: 3.42
Scraper/Filterer Collector Ratio: 11.67
Shredder/Total Ratio: 0.20
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 87.63
EPT/C: 12.14
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 164
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 13.5/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Stable
Canopy: Partly Open....Other: Rural, Forested, Autobody shop adjacent; Water temp. 16.2C / pH 8.1SU / DO 10.7mg/L / Cond. 148umhos

Station: AN0321
Mulhockaway Creek, Van Syckel Rd. (Rt. 635), Union Twp, Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 05/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	64
Ephemerellidae	1	13
Baetidae	4	8
Elmidae	4	5
Glossosomatidae	0	4
Heptageniidae	4	4
Hydropsychidae	4	3
Tipulidae	3	2
Psephenidae	4	2
Nemouridae	2	1
Lumbriculidae	8	1
Corydalidae	0	1
Simuliidae	6	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 110
% Contribution of Dominant Family: 58.18 % (Chironomidae)
Family Biotic Index: 4.66
Scraper/Filterer Collector Ratio: 2.50
Shredder/Total Ratio: 0.59
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 30.00
EPT/C: 0.52
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 164
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20-25/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Stable
Canopy: Partly Open....Other: Rural, Forested; Filamentous algae, Trout stocked, USGS gauge
Water temp. 15.8C / pH 7.5SU / DO 11.9mg/L / Cond. 202umhos;

Station: AN0322
S Branch Raritan River, Rt. 173 (Crt. 513), Clinton Town, Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 05/11/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	33
Ephemerellidae	1	22
Hydropsychidae	4	9
Planariidae	4	9
Simuliidae	6	8
Baetidae	4	4
Corbiculidae	8	3
Lumbriculidae	8	3
Elmidae	4	3
Gammaridae	4	2
BloodRed Chironomidae	8	1
Perlodidae	2	1
Sphaeriidae	8	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 33.00 % (Chironomidae)
Family Biotic Index: 4.46
Scraper/Filterer Collector Ratio: 0.24
Shredder/Total Ratio: 0.33
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 37.00
EPT/C: 1.09
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 121
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25/2
Substrate: Cobbles, Gravel/Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs,Weeds/Poor
Canopy: Open....Other: 70% Urban, 30% Forested; Storm sewers, Dam Ducks, Sampled dwnstr of bridge; Water temp. 15.5C / pH 7.5SU / DO 9.4mg/L / Cond. 253umhos

Station: AN0323
Beaver Brook, Herman Thau Rd., Clinton Twp., Hunterdon County
Califon USGS Quadrangle
Date Sampled: 05/05/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	28
Baetidae	4	28
Ephemerellidae	1	13
Nemouridae	2	12
Simuliidae	6	4
Perlidae	1	3
Hydropsychidae	4	3
Psephenidae	4	2
Elmidae	4	2
Siphlonuridae	7	1
Empididae	6	1
Tipulidae	3	1
Limnephilidae	4	1
Pteronarcidae	0	1
Peltoperlidae	1	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 101
% Contribution of Dominant Family: 27.72 % (Chironomidae & Baetidae)
Family Biotic Index: 3.89
Scraper/Filterer Collector Ratio: 4.71
Shredder/Total Ratio: 0.14
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 62.38
EPT/C: 2.25
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 170
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10-12/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Mostly Closed....Other: 90% Forested, 10% Rural; Water temp. 13.0 / pH 7.7SU / DO 10.9mg/L / Cond. 163umhos

Station: AN0324
Beaver Brook, Lehigh Street, Clinton Town, Hunterdon County
High Bridge USGS Quadrangle
Date Sampled: 05/11/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	40
Chironomidae	6	30
Simuliidae	6	10
Gammaridae	4	5
Elmidae	4	5
Planariidae	4	4
Hydropsychidae	4	3
Psephenidae	4	2
Ephemerellidae	1	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 40.00 % (Naididae)
Family Biotic Index: 5.97
Scraper/Filterer Collector Ratio: 0.54
Shredder/Total Ratio: 0.30
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.00
EPT/C: 0.13
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 112
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 6/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Weeds/Poor
Canopy: Closed....Other: Urban; Ducks, Filamentous algae
Sampled dwnstr of bridge; Water temp. 13.7C / pH 7.4SU / DO 12.0mg/L / Cond. 420umhos

Station: AN0325
Cakepoulin Creek, Lower Lansdown Rd., Franklin Twp., Hunterdon County
Pittstown USGS Quadrangle
Date Sampled: 05/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	23
Chironomidae	6	22
Naididae	7	20
Heptageniidae	4	11
Oligoneuriidae	2	5
Baetidae	4	3
Elmidae	4	3
Perlidae	1	2
Tipulidae	3	2
Lumbriculidae	8	2
Psephenidae	4	2
Rhyacophilidae	0	2
Gammaridae	4	1
Lepidostomatidae	1	1
Hydropsychidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 23.00 % (Ephemerellidae)
Family Biotic Index: 4.14
Scraper/Filterer Collector Ratio: 2.67
Shredder/Total Ratio: 0.23
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 48.00
EPT/C: 2.18
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 178
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/<1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Mostly Open....Other: Forested, Rural; Fish, Salamanders, Crayfish
Water temp. 13.8C / pH 8.4SU / DO 11.3mg/L / Cond. 181umhos;

Station: AN0325B
Cakepoulin Creek, Rt. 513 (Pittstown), Franklin Twp., Hunterdon County
Pittstown USGS Quadrangle
Date Sampled: 05/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	33
Chironomidae	6	31
Naididae	7	10
Baetidae	4	4
Hydropsychidae	4	3
Psephenidae	4	3
Heptageniidae	4	3
Nemouridae	2	2
Rhyacophilidae	0	2
Capniidae	1	1
Leptoceridae	4	1
Philopotamidae	3	1
Hydroptilidae	4	1
Leptophlebiidae	2	1
Elmidae	4	1
Polycentropodidae	6	1
Limnephilidae	4	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 33.00 % (Ephemerellidae)
Family Biotic Index: 3.79
Scraper/Filterer Collector Ratio: 1.33
Shredder/Total Ratio: 0.35
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 13
% EPT: 54.00
EPT/C: 1.74
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 154
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/<1
Substrate: Cobbles, Gravel....StreamBank Vegetation/Stability: Grasses, Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Agriculture - 40% cropland, 40% livestock, 20% Rural; Storm sewers
Filamentous algae, Macrophytes; Water temp. 13.4C / pH 8.0SU / DO 9.5mg/L / Cond. 195umhos

Station: AN0326
South Br. Raritan River, Stanton Rd., Readington Twp., Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/12/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	76
Ephemerellidae	1	4
Heptageniidae	4	4
Sphaeriidae	8	3
Hydrobiidae	8	2
Lumbriculidae	8	2
Perlidae	1	2
Coenagrionidae	9	1
Asellidae	8	1
Baetidae	4	1
Planorbidae	6	1
Lumbricidae	10	1
Elmidae	4	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 76.00 % (Gammaridae)
Family Biotic Index: 4.30
Scraper/Filterer Collector Ratio: 4.00
Shredder/Total Ratio: 0.77
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 11.00
EPT/C: 0.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 143
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 45/2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Weeds/Fair
Canopy: Open....Other: Agriculture-livestock, Forested; Sampled dwstr of bridge, USGS gauge
Macrophytes, Geese, Clam shells; Water temp. 17.8C / pH 8.0SU / DO 9.9mg/L / Cond. 269umhos

Station: AN0327
Prescott Brook, Stanton Rd., Readington Twp., Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/12/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	24
Chironomidae	6	12
Philopotamidae	3	11
Gammaridae	4	11
Elmidae	4	7
Heptageniidae	4	6
Hydropsychidae	4	4
BloodRed Chironomidae	8	4
Plagiostomidae	4	3
Psephenidae	4	3
Baetidae	4	2
Naididae	7	2
Planariidae	4	2
Glossosomatidae	0	2
Perlidae	1	2
Aeshnidae	3	1
Gomphidae	1	1
Lumbricidae	10	1
Leptoceridae	4	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 24.00 % (Ephemerellidae)
Family Biotic Index: 3.51
Scraper/Filterer Collector Ratio: 2.80
Shredder/Total Ratio: 0.28
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 53.00
EPT/C: 3.31
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 168
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Vines, Weeds/Fair
Canopy: Mostly Open....Other: Suburban, Forested; Storm sewers, Sampled dwnstr of bridge
Minnows, Macrophytes; Water temp. 14.6C / pH 7.9SU / DO 10.2mg/L / Cond. 238umhos

Station: AN0328
Assiscong Creek, River Rd., Raritan Twp., Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/12/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	22
Chironomidae	6	20
Heptageniidae	4	16
Nemouridae	2	15
Leptophlebiidae	2	13
Baetidae	4	5
Perlodidae	2	4
Gammaridae	4	3
Aeshnidae	3	2
Gomphidae	1	2
Naididae	7	2
Calopterygidae	5	1
Hydropsychidae	4	1
Psephenidae	4	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 108
% Contribution of Dominant Family: 20.37 % (Ephemerellidae)
Family Biotic Index: 3.16
Scraper/Filterer Collector Ratio: 40.00
Shredder/Total Ratio: 0.35
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 70.37
EPT/C: 3.80
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 161
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 8/1
Substrate: Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Vines/Fair
Canopy: Mostly Closed....Other: Forested (S. Br. Res.); Sampled dwnstr of bridge
Minnows, Fish (>4"), Salamanders; Water temp. 14.1C / pH 8.0SU / DO 9.9mg/L / Cond. 263umhos

Station: AN0329
South Br Raritan River, Rt. 613, Readington Twp., Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/12/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Baetidae	4	18
Chironomidae	6	17
Elmidae	4	13
Heptageniidae	4	11
Psephenidae	4	10
Ephemerellidae	1	10
Gammaridae	4	7
Naididae	7	3
Coenagrionidae	9	2
BloodRed Chironomidae	8	2
Asellidae	8	1
Empididae	6	1
Gomphidae	1	1
Glossosomatidae	0	1
Tubificidae	10	1
Lumbriculidae	8	1
Pyralidae	5	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 18.00 % (Baetidae)
Family Biotic Index: 4.41
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.20
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 40.00
EPT/C: 2.11
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 127
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 100/2
Substrate: Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Open....Other: Agriculture-cropland, Suburban; Sampled upstr of bridge
Macrophytes, Filamentous algae, Geese, Large (>1.5ft.) fish; Water temp. 10.3C / pH 7.7SU / DO 10.7mg/L / Cond. 493umhos

Station: AN0330
First Neshanic River, NJ Rt. 31, Raritan Twp., Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 04/06/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	84
Lumbriculidae	8	8
Simuliidae	6	4
Tubificidae	10	2
Dytiscidae	5	1
Lumbricidae	10	1
Nemouridae	2	1
BloodRed Chironomidae	8	1
Physidae	7	1
Limnephilidae	4	1
Ephemerellidae	1	1
Siphlonuridae	7	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 107
% Contribution of Dominant Family: 78.50 % (Chironomidae)
Family Biotic Index: 6.17
Scraper/Filterer Collector Ratio: 0.75
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 3.74
EPT/C: 0.05
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 138
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10-20/1-2
Substrate: Cobbles, Gravel/Sand, Silt....StreamBank Vegetation/Stability: Some Trees, Shrubs, Grasses/Fair
Canopy: Mostly Open....Other: Urban, large parking lot, service station; Storm sewers
Water Temp. 8.5C / pH 7.7SU / DO 14.2mg/L / Cond. 266umhos;

Station: AN0331
Second Neshanic River, NJ Rt. 31, Union Twp., Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 04/06/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	35
Chironomidae	6	31
Elmidae	4	9
Gammaridae	4	8
Psephenidae	4	4
Planariidae	4	3
Ephemerellidae	1	2
Siphlonuridae	7	1
Nemouridae	2	1
Baetidae	4	1
Caenidae	7	1
Empididae	6	1
Corixidae	9	1
Lymnaeidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 35.00 % (Simuliidae)
Family Biotic Index: 5.39
Scraper/Filterer Collector Ratio: 0.46
Shredder/Total Ratio: 0.32
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 7.00
EPT/C: 0.23
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 148
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 6-20/1-2
Substrate: Cobbles, Gravel/Sand, Silt....StreamBank Vegetation/Stability: Some Trees, Shrubs, Grasses/Good
Canopy: Mostly Open....Other: Urban, Rural, Storage tank facility adjacent; Storm sewers (from storage facility)
Waterfowl, tadpoles, minnows, black fly larvae; Water temp. 6.9C / pH 7.4SU / DO 14.5mg/L / Cond. 255umhos

Station: AN0332
Third Neshanic River, NJ Rt. 31, Raritan Twp., Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 04/06/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	30
Chironomidae	6	28
Elmidae	4	21
Baetidae	4	4
Planorbidae	6	4
Hydrophilidae	5	2
Planariidae	4	2
Asellidae	8	1
Aeshnidae	3	1
Caenidae	7	1
Hydropsychidae	4	1
Ephemerellidae	1	1
Gammaridae	4	1
Empididae	6	1
Coenagrionidae	9	1
Leptoceridae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 101
% Contribution of Dominant Family: 29.70 % (Simuliidae)
Family Biotic Index: 5.35
Scraper/Filterer Collector Ratio: 0.87
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 8.91
EPT/C: 0.32
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 149
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15-18/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Partly Open....Other: Rural, Car dealer & autobody shop; Storm sewer
Minnow, Sunfish, Trash & debris; Water temp. 7.8C / pH 7.5SU / DO 13.4mg/L / Cond. 222umhos

Station: AN0333
Neshanic River, Everitt Rd. (Usgs Gauge), East Amwell Twp., Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 04/06/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	52
Notonectidae	9	12
Gammaridae	4	9
Hydrobiidae	8	8
Simuliidae	6	6
Physidae	7	5
Baetidae	4	4
BloodRed Chironomidae	8	3
Glossiphoniidae	8	1
Limnephilidae	4	1
Coenagrionidae	9	1
Lumbriculidae	8	1
Planorbidae	6	1
Elmidae	4	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 106
% Contribution of Dominant Family: 49.06 % (Chironomidae)
Family Biotic Index: 6.38
Scraper/Filterer Collector Ratio: 2.50
Shredder/Total Ratio: 0.58
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.72
EPT/C: 0.09
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 133
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 45-50/1-2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, some Shrubs/Fair
Canopy: Mostly Open....Other: Agriculture - cropland, Rural; Trout stocked (trout observed), Tadpoles, Minnows
Water Temp. 9.2C / pH 7.5SU / DO 16.9mg/L / Cond. 244umhos;

Station: AN0334
Back Brook, Wertsville Rd. (Rt.602), East Amwell Twp., Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 04/14/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	46
Gammaridae	4	16
Heptageniidae	4	10
Caenidae	7	6
Hydropsychidae	4	5
Elmidae	4	5
Simuliidae	6	4
Coenagrionidae	9	3
Pyralidae	5	1
Tubificidae	10	1
Hydrophilidae	5	1
Empididae	6	1
Ephemerellidae	1	1
Gomphidae	1	1
Naididae	7	1
Sphaeriidae	8	1
BloodRed Chironomidae	8	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 105
% Contribution of Dominant Family: 43.81 % (Chironomidae)
Family Biotic Index: 5.41
Scraper/Filterer Collector Ratio: 1.10
Shredder/Total Ratio: 0.45
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 20.95
EPT/C: 0.47
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 120
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 4-6/1-2
Substrate: Cobbles, Gravel/Sand, Silt....StreamBank Vegetation/Stability: Grasses/Poor
Canopy: Open....Other: Agriculture - cropland & livestock; Storm sewer (ditch)
Waterfowl, Sampled dwnstr of bridge; Water temp. 11.3C / pH 7.3SU / DO 16.6mg/L / Cond. 326uhmos

Station: AN0335
Back Brook, Manners Rd. (Rt. 609), East Amwell Twp., Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 04/14/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	48
Lumbriculidae	8	18
Ephemerellidae	1	12
Naididae	7	6
BloodRed Chironomidae	8	6
Elmidae	4	4
Muscidae	6	3
Hydrophilidae	5	2
Gammaridae	4	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 48.00 % (Chironomidae)
Family Biotic Index: 5.82
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.55
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 12.00
EPT/C: 0.22
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 118
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12-15/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Mostly Grasses, some Trees & Shrubs/Fair
Canopy: Mostly Open....Other: Agriculture-cropland, Rural; Storm ditch
Stream goes thru nursery, Minnows; Water temp. 9.0C / pH 7.8SU / DO 16.1mg/L / Cond. 210umhos

Station: AN0336
Furmans Brook, Off Back Brook Rd. (Welisewitz Rd.), East Amwell Twp., Hunterdon County
Hopewell USGS Quadrangle
Date Sampled: 04/14/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Nemouridae	2	43
Chironomidae	6	26
Psephenidae	4	8
Simuliidae	6	5
Caenidae	7	4
Empididae	6	4
Siphlonuridae	7	3
Tipulidae	3	3
Ephemerellidae	1	2
Heptageniidae	4	2
Perlodidae	2	1
Lumbricidae	10	1
Elmidae	4	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 104
% Contribution of Dominant Family: 41.35 % (Nemouridae)
Family Biotic Index: 4.02
Scraper/Filterer Collector Ratio: 2.00
Shredder/Total Ratio: 0.41
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 52.88
EPT/C: 2.12
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 161
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15-18/<1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Closed....Other: Agriculture-cropland, Rural; Sampled below confluence of streams
Fish observed; Water temp. 11.0C / pH7.8SU / DO 14.5mg/L / Cond. 149umhos

Station: AN0337
Neshanic River, Rt. 514 (Old York Rd.), Hillsborough Twp., Somerset County
Hopewell USGS Quadrangle
Date Sampled: 04/06/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	53
Gammaridae	4	10
Caenidae	7	7
Haliplidae	5	6
Planorbidae	6	5
Tubificidae	10	5
Elmidae	4	5
Empididae	6	3
Siphlonuridae	7	2
Baetidae	4	2
Physidae	7	2
Sphaeriidae	8	2
Corixidae	9	1
BloodRed Chironomidae	8	1
Lumbricidae	10	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 106
% Contribution of Dominant Family: 50.00 % (Chironomidae)
Family Biotic Index: 6.04
Scraper/Filterer Collector Ratio: 6.00
Shredder/Total Ratio: 0.56
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 10.38
EPT/C: 0.20
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 135
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 70-80/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Agriculture-cropland, Rual; Storm sewers, Ditch
Waterfowl; Water temp. 10.8C / pH 7.5SU / DO 13.1mg/L / Cond. 223umhos

Station: AN0338
South Br. Raritan River, Elm St., Hillsboro Twp., Hunterdon County
Raritan USGS Quadrangle
Date Sampled: 05/18/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	27
Leptoceridae	4	9
Perlidae	1	9
Potamanthidae	4	8
Baetidae	4	7
Gammaridae	4	6
Chironomidae	6	6
Ephemerellidae	1	5
Heptageniidae	4	5
Glossosomatidae	0	4
Naididae	7	4
Pleuroceridae	6	3
Corbiculidae	8	2
Coenagrionidae	9	1
Hydrophilidae	5	1
Planorbidae	6	1
Sphaeriidae	8	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 27.00 % (Elmidae)
Family Biotic Index: 3.92
Scraper/Filterer Collector Ratio: 16.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 47.00
EPT/C: 7.83
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 146
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30/2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Grasses/Fair
Canopy: Mostly Open....Other: Suburban; Sampled ustr., Minnows, Cray Fish, Trout stocked, Trash
Water temp. 19.7C / pH 8.3su / DO 13.1mg/L / Cond. 300umhos;

Station: AN0339
Pleasant Run, Pleasant Run Rd., Readington Twp., Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/12/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	24
Leptophlebiidae	2	21
Chironomidae	6	14
Nemouridae	2	12
Baetidae	4	12
Ephemerellidae	1	5
Caenidae	7	4
Psephenidae	4	4
BloodRed Chironomidae	8	2
Perlodidae	2	2
Perlidae	1	2
Lumbriculidae	8	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 104
% Contribution of Dominant Family: 23.08 % (Naididae)
Family Biotic Index: 4.32
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.12
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 55.77
EPT/C: 3.63
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 135
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/1
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Weeds/Fair
Canopy: Mostly Open....Other: Suburban; Sampled upstr of bridge
Minnows; Water temp. 19.4C / pH 8.8SU / DO 14.2mg/L / Cond. 194umhos

Station: AN0340
Pleasant Run, South Branch Rd, Branchburg Twp., Somerset
Raritan USGS Quadrangle
Date Sampled: 05/18/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	45
Chironomidae	6	16
Elmidae	4	11
Tubificidae	10	7
Nemouridae	2	6
Baetidae	4	4
Leptophlebiidae	2	4
Perlodidae	2	2
Perlidae	1	2
Ephemerellidae	1	1
Gammaridae	4	1
Lumbricidae	10	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Naididae)
Family Biotic Index: 5.82
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.22
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 19.00
EPT/C: 1.19
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 102
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 6/1
Substrate: Cobbles, Gravel/Sand, Mud, Silt....StreamBank Vegetation/Stability: Weeds, Grass, Trees/Poor
Canopy: Open....Other: Agriculture- livestock; Water temp. 20.9C / pH 8.3su / DO 13.0mg/L / Cond. 252umhos
Sampled upst., Geese, Cows, Macrophytes;

Station: AN0341
South Br. Raritan River, Studdiford Drive, Hillsborough Twp., Somerset County
Raritan USGS Quadrangle
Date Sampled: 05/18/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	24
Chironomidae	6	24
Elmidae	4	14
Naididae	7	7
BloodRed Chironomidae	8	6
Potamanthidae	4	5
Baetidae	4	5
Caenidae	7	4
Tipulidae	3	4
Heptageniidae	4	3
Sphaeriidae	8	2
Ephemerellidae	1	2
Planariidae	4	1
Helicopsychidae	3	1
Leptophlebiidae	2	1
Perlidae	1	1
Ceratopogonidae	6	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 105
% Contribution of Dominant Family: 22.86 % (Gammaridae & Chironomidae)
Family Biotic Index: 4.94
Scraper/Filterer Collector Ratio: 14.50
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 20.95
EPT/C: 0.73
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 124
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 60/1.5
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Grasses/Fair
Canopy: Open....Other: Agriculture-livestock, Suburban; Sampled dwstr.
Geese, Fish, Filamentous algae, Macrophytes; Water temp. 18.6C / pH 8.2SU / DO 10.7mg/L / Cond. 307umhos

Station: AN0342
Holland Brook, Holland Brook Rd., Readington Twp., Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/12/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	32
Perlodidae	2	14
Elmidae	4	10
Naididae	7	9
Caenidae	7	7
Hydropsychidae	4	7
Nemouridae	2	6
Ephemerellidae	1	4
Psephenidae	4	4
Coenagrionidae	9	3
Leptophlebiidae	2	1
Polycentropodidae	6	1
Heptageniidae	4	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 32.00 % (Chironomidae)
Family Biotic Index: 4.74
Scraper/Filterer Collector Ratio: 1.88
Shredder/Total Ratio: 0.07
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 41.00
EPT/C: 1.28
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 114
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/1
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: no data/Poor
Canopy: Open....Other: Agriculture-cropland, Rural, "semi-wild" sign; Storm sewers
Minnows, Salamanders, Macro plants, Sampled dwnstr of bridge; Water temp. 18.9C / pH
8.6SU / DO 12.7mg/L / Cond. 225umhos

Station: AN0343
Holland Brook, South Branch Rd., Branchburg Twp., Somerset
Raritan USGS Quadrangle
Date Sampled: 05/18/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	29
Chironomidae	6	21
Caenidae	7	14
BloodRed Chironomidae	8	8
Tubificidae	10	7
Gammaridae	4	5
Elmidae	4	4
Baetidae	4	2
Psephenidae	4	2
Nemouridae	2	1
Hydrophilidae	5	1
Gomphidae	1	1
Dytiscidae	5	1
Coenagrionidae	9	1
Perlodidae	2	1
Lumbriculidae	8	1
Perlidae	1	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Naididae)
Family Biotic Index: 6.46
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 19.00
EPT/C: 0.66
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 96
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/1
Substrate: Gravel/Sand, Silt, Snags....StreamBank Vegetation/Stability: Grass, Weeds/Fair
Canopy: Open....Other: Agriculture-livestock; Sampled dwnstr. Cows, Geese, Minnows, Macrophytes; Water temp. 17.4C / pH 8.8SU / DO 12.8mg/L / Cond. 326umhos

Station: AN0344
India Bk Trib, Calais Rd , Randolph Twp, Morris County
Mendham USGS Quadrangle
Date Sampled: 11/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	24
Taeniopterygidae	2	14
Perlodidae	2	8
Tipulidae	3	7
Chironomidae	6	7
Limnephilidae	4	6
Ephemerellidae	1	5
Elmidae	4	5
Ptilodactylidae	1	4
Brachycentridae	1	4
Peltoperlidae	1	4
Chloroperlidae	1	3
Hydroptilidae	4	3
Gomphidae	1	2
Leuctridae	0	2
Naididae	7	2
Sphaeriidae	8	2
Aeshnidae	3	1
Lumbricidae	10	1
Nematoda	6	1
Ceratopogonidae	6	1
Rhyacophilidae	0	1
Philopotamidae	3	1

Statistical Analysis

Number of Taxa: 23
Total Number of Individuals: 108
% Contribution of Dominant Family: 22.22 % (Hydropsychidae)
Family Biotic Index: 3.14
Scraper/Filterer Collector Ratio: 0.44
Shredder/Total Ratio: 0.26
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 69.44
EPT/C: 9.92
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 160
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,weeds,vines/Stable
Canopy: Mostly Open....Other: Suburban; Water temp.7.6 /pH 7.9 /DO 9.6 /Cond.217

Station: AN0344A
India Bk, Calais Rd , Randolph Twp, Morris County
Mendham USGS Quadrangle
Date Sampled: 11/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Taeniopterygidae	2	53
Chironomidae	6	9
Tipulidae	3	3
Philopotamidae	3	3
Ephemerellidae	1	3
Hydropsychidae	4	3
Elmidae	4	3
Leptophlebiidae	2	3
Perlidae	1	2
Chloroperlidae	1	2
Planariidae	4	2
Naididae	7	2
Rhyacophilidae	0	2
Lymnaeidae	6	2
Calopterygidae	5	1
Ptilodactylidae	1	1
Dryopidae	5	1
Talitridae	8	1
Leptoceridae	4	1
Nematoda	6	1
Simuliidae	6	1
Phryganeidae	4	1

Statistical Analysis

Number of Taxa: 22
Total Number of Individuals: 100
% Contribution of Dominant Family: 53.00 % (Taeniopterygidae)
Family Biotic Index: 2.88
Scraper/Filterer Collector Ratio: 0.43
Shredder/Total Ratio: 0.55
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 73.00
EPT/C: 8.11
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 154
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5/<1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Shrubs,trees/Stable
Canopy: Mostly Open....Other: Rural; Water temp.5.7 /pH 8.3 /DO 9.3 /Cond.462

Station: AN0345
India Bk, Mountainside Rd , Mendham Twp, Morris County
Mendham USGS Quadrangle
Date Sampled: 11/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Limnephilidae	4	15
Heptageniidae	4	13
Taeniopterygidae	2	13
Tipulidae	3	11
Oligoneuriidae	2	11
Philopotamidae	3	9
Chloroperlidae	1	5
Perlidae	1	4
Lumbriculidae	8	4
Chironomidae	6	4
Ephemerellidae	1	3
Hydropsychidae	4	3
Carabidae	5	1
Nematoda	6	1
Psephenidae	4	1
Rhyacophilidae	0	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 15.00 % (Limnephilidae)
Family Biotic Index: 3.21
Scraper/Filterer Collector Ratio: 1.42
Shredder/Total Ratio: 0.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 77.00
EPT/C: 19.25
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 171
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 13/1
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Rural/Forested; Water temp.5.6 /pH 8.4 /DO 11.2 /Cond.235

Station: AN0346
Raritan R N Br, Rt 24 , Ralston, Morris County
Chester USGS Quadrangle
Date Sampled: 11/05/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	22
Ephemerellidae	1	21
Heptageniidae	4	12
Chironomidae	6	11
Elmidae	4	7
Glossosomatidae	0	4
Taeniopterygidae	2	4
Philopotamidae	3	4
Tetrastemmatidae	7	4
Gammaridae	4	3
Baetidae	4	2
Planariidae	4	2
Psephenidae	4	2
Hydroptilidae	4	1
Chloroperlidae	1	1
Ceratopogonidae	6	1
Tipulidae	3	1
Hygrobatidae	2	1
Lymnaeidae	6	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 105
% Contribution of Dominant Family: 20.95 % (Hydropsychidae)
Family Biotic Index: 3.46
Scraper/Filterer Collector Ratio: 0.42
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 67.62
EPT/C: 6.15
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 159
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27/1
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Rural/Agricultural cropland; Water temp.5.5 /pH 7.7 /DO 12.1 /Cond.367

Station: AN0347
Dawsons Bk, South Rd & Ironia Rd , Mendham Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 11/05/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tipulidae	3	18
Hydropsychidae	4	18
Heptageniidae	4	13
Taeniopterygidae	2	13
Limnephilidae	4	12
Elmidae	4	8
Chironomidae	6	7
Perlidae	1	4
Lumbriculidae	8	2
Psychomyiidae	2	2
Baetidae	4	2
Rhyacophilidae	0	2
Planariidae	4	1
Ephemerellidae	1	1
Gomphidae	1	1
Naididae	7	1
Tetrastemmatidae	7	1
Peltoperlidae	1	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 107
% Contribution of Dominant Family: 16.82 % (Tipulidae & Hydropsychidae)
Family Biotic Index: 3.54
Scraper/Filterer Collector Ratio: 1.94
Shredder/Total Ratio: 0.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 63.55
EPT/C: 9.08
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 157
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5/<1
Substrate: Cobbles....StreamBank Vegetation/Stability: Grass,trees/Stable
Canopy: Mostly Open....Other: Rural; Water temp.5.5 /pH 7.9 /DO 11.0 /Cond.230

Station: AN0348
Burnetts Bk, Old Mill Rd , Mendham Twp, Morris County
Chester USGS Quadrangle
Date Sampled: 12/29/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Taeniopterygidae	2	24
Nemouridae	2	20
Chironomidae	6	11
Ephemerellidae	1	6
Capniidae	1	5
Heptageniidae	4	4
Hydropsychidae	4	4
Tipulidae	3	3
Philopotamidae	3	3
Simuliidae	6	3
Limnephilidae	4	3
Siphlonuridae	7	2
Cordulegastridae	3	2
Lumbriculidae	8	2
Elmidae	4	2
Rhyacophilidae	0	2
Perlidae	1	1
Baetidae	4	1
Gomphidae	1	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 24.00 % (Taeniopterygidae)
Family Biotic Index: 3.02
Scraper/Filterer Collector Ratio: 0.60
Shredder/Total Ratio: 0.52
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 75.00
EPT/C: 6.82
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 192
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 19/1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Rural/Forested; Water temp.0.7 /pH 7.6 /DO 13.9 /Cond.284

Station: AN0349
Peapack Brook, Fox Chase Rd., Chester Twp., Morris
Chester USGS Quadrangle
Date Sampled: 06/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	20
Philopotamidae	3	19
Baetidae	4	13
Gammaridae	4	8
Hydropsychidae	4	7
Naididae	7	7
Limnephilidae	4	5
Brachycentridae	1	4
Elmidae	4	4
Tipulidae	3	3
Planariidae	4	2
Lumbriculidae	8	2
Nemouridae	2	1
Glossosomatidae	0	1
Lumbricidae	10	1
Pteronarcidae	0	1
Simuliidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Chironomidae)
Family Biotic Index: 4.33
Scraper/Filterer Collector Ratio: 0.74
Shredder/Total Ratio: 0.26
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 52.00
EPT/C: 2.60
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 167
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 6/0.5
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Closed....Other: Suburban; Minnows, Darter
Water temp. 20.8C / pH 7.6SU / DO 8.4mg/L / Cond. 268umhos;

Station: AN0350
Peapack Brook, Old Dutch Rd. (Off Rt. 512), Bedminster Twp., Somerset
Gladstone USGS Quadrangle
Date Sampled: 06/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	24
Baetidae	4	22
Chironomidae	6	19
Ephemerellidae	1	13
Perlidae	1	7
Hydropsychidae	4	7
Gammaridae	4	2
Psephenidae	4	2
Philopotamidae	3	1
Glossosomatidae	0	1
Naididae	7	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 24.00 % (Elmidae)
Family Biotic Index: 3.78
Scraper/Filterer Collector Ratio: 0.33
Shredder/Total Ratio: 0.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 51.00
EPT/C: 2.68
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 160
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12-15/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Closed....Other: Rural (sparsely populated); Deeper at bridge
Fish, Minnows; Water temp. 18.0C / pH 7.7SU / DO 10.2mg/L / Cond. 346umhos

Station: AN0351
North Br. Raritan River, Usrt. 202, Far Hills Boro., Somerset
Gladstone USGS Quadrangle
Date Sampled: 06/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Baetidae	4	19
Elmidae	4	15
Ephemerellidae	1	14
Hydropsychidae	4	8
Lumbriculidae	8	6
Perlidae	1	6
Caenidae	7	5
Philopotamidae	3	5
Gammaridae	4	4
BloodRed Chironomidae	8	4
Chironomidae	6	3
Limnephilidae	4	3
Planariidae	4	2
Naididae	7	2
Psephenidae	4	2
Glossosomatidae	0	1
Coenagrionidae	9	1
Simuliidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 102
% Contribution of Dominant Family: 18.63 % (Baetidae)
Family Biotic Index: 4.05
Scraper/Filterer Collector Ratio: 1.57
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 60.78
EPT/C: 8.86
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 140
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 35-45/2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Grasses, Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Urban, Rural (ball fields); Trout stocked stream
Water temp. 20.5C / pH 7.9SU / DO 10.5mg/L / Cond. 272umhos;

Station: AN0352
Mine Bk, Bernardsville Rd , Bernardsville, Somerset County
Bernardsville USGS Quadrangle
Date Sampled: 12/29/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	64
Planariidae	4	14
Planorbidae	6	7
Chironomidae	6	4
Gammaridae	4	4
Simuliidae	6	3
Tipulidae	3	1
Tubificidae	10	1
Tetrastemmatidae	7	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 64.00 % (Naididae)
Family Biotic Index: 6.32
Scraper/Filterer Collector Ratio: 1.75
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: 147
Deficiency(s) noted: Naididae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 9/1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Rural/Industrial/Agricultural cropland and livestock; STP upstream
Water temp.8.9 /pH 7.4 /DO 11.1 /Cond.739;

Station: AN0353
Mine Bk, Far Hills Rd { Rt 512 } , Far Hills, Somerset County
Gladstone USGS Quadrangle
Date Sampled: 12/29/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	59
Gammaridae	4	12
Ephemerellidae	1	5
Elmidae	4	5
Simuliidae	6	5
Planorbidae	6	4
Hydroptilidae	4	2
Taeniopterygidae	2	2
Capniidae	1	1
Coenagrionidae	9	1
Planariidae	4	1
Lumbriculidae	8	1
Hydropsychidae	4	1
Tricorythidae	4	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 59.00 % (Chironomidae)
Family Biotic Index: 5.23
Scraper/Filterer Collector Ratio: 2.67
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 12.00
EPT/C: 0.20
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 119
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 16/1
Substrate: Cobbles,sand,silt....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Rural/Agricultural cropland and livestock; Channelized
Water temp.1.3 /pH 7.6 /DO 14.5 /Cond.433;

Station: AN0354
Middle Bk, Spook Hollow Rd , Bedminster Twp, Somerset County
Gladstone USGS Quadrangle
Date Sampled: 12/29/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	26
Taeniopterygidae	2	15
Nemouridae	2	13
Hydropsychidae	4	11
Chironomidae	6	8
Siphlonuridae	7	6
Heptageniidae	4	6
Capniidae	1	4
Gammaridae	4	2
Elmidae	4	2
Tipulidae	3	1
Glossosomatidae	0	1
Gomphidae	1	1
Lumbriculidae	8	1
Psychomyiidae	2	1
Simuliidae	6	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Ephemerellidae)
Family Biotic Index: 2.86
Scraper/Filterer Collector Ratio: 0.83
Shredder/Total Ratio: 0.32
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 83.00
EPT/C: 10.38
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 162
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/<1
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Rural/Forested; Water temp.0.9 /pH 7.9 /DO 13.7 /Cond.235

Station: AN0355
Middle Brook, Cutting Witney Rd (River Rd), Bedminster, Somerset County
Gladstone USGS Quadrangle
Date Sampled: 05/18/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	45
Elmidae	4	14
Gammaridae	4	6
Baetidae	4	5
Nemouridae	2	4
Heptageniidae	4	4
Naididae	7	3
Perlidae	1	3
Ceratopogonidae	6	2
Caenidae	7	2
Corydalidae	0	2
Ephemerellidae	1	2
Psephenidae	4	2
Limnephilidae	4	1
Planariidae	4	1
Oligoneuriidae	2	1
Perlodidae	2	1
Leptophlebiidae	2	1
Lumbriculidae	8	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Chironomidae)
Family Biotic Index: 4.76
Scraper/Filterer Collector Ratio: 9.00
Shredder/Total Ratio: 0.49
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 24.00
EPT/C: 0.53
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 129
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/1
Substrate: Cobbles, Gravel/Sand, Mud....StreamBank Vegetation/Stability: Weeds, Trees, Vines/Fair
Canopy: Open....Other: Forested; Sampled upstr. of bridge
Turtles, Fish, Frogs, Filamentous algae; Water temp. 15.6C / pH 8.4su / DO 8.8mg/L / Cond. 295umhos

Station: AN0356
Lamington River, Ironia Rd., Chester Twp., Morris
Chester USGS Quadrangle
Date Sampled: 06/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	94
Asellidae	8	2
Elmidae	4	2
Hydrobiidae	8	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 5
Total Number of Individuals: 100
% Contribution of Dominant Family: 94.00 % (Gammaridae)
Family Biotic Index: 4.15
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: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 141
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/1
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Weeds/Poor
Canopy: Open....Other: Rural; Macrophytes
"Public Water Supply"; Water temp. 26.2C / pH 7.2SU / DO 8.0mg/L / Cond. 538umhos

Station: AN0357
Tanners Brook, Tanners Brook Rd., Chester Twp., Morris
Chester USGS Quadrangle
Date Sampled: 06/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	38
Hydropsychidae	4	10
Chironomidae	6	10
Glossosomatidae	0	7
Lumbriculidae	8	7
Elmidae	4	6
Heptageniidae	4	6
Baetidae	4	4
Simuliidae	6	4
Naididae	7	3
Limnephilidae	4	2
Ephemerellidae	1	2
Dryopidae	5	1
Leuctridae	0	1
Lumbricidae	10	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 103
% Contribution of Dominant Family: 36.89 % (Gammaridae)
Family Biotic Index: 4.37
Scraper/Filterer Collector Ratio: 1.33
Shredder/Total Ratio: 0.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 31.07
EPT/C: 3.20
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 129
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 4/1
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Weeds/Fair
Canopy: Open....Other: Agriculture-cropland, Forested; Minnows, Macrophytes
Water temp. 20.7C / pH 7.1SU / DO 8.0mg/L / Cond. 163umhos;

Station: AN0358
Lamington River, NJ Rt. 24 (Cooper Mill Park), Chester Twp., Morris
Chester USGS Quadrangle
Date Sampled: 06/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	36
Chironomidae	6	15
Elmidae	4	10
Asellidae	8	8
Hydropsychidae	4	7
Perlidae	1	6
Brachycentridae	1	5
Naididae	7	4
Glossosomatidae	0	3
Baetidae	4	2
Philopotamidae	3	2
Heptageniidae	4	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 36.00 % (Gammaridae)
Family Biotic Index: 4.26
Scraper/Filterer Collector Ratio: 1.56
Shredder/Total Ratio: 0.29
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 26.00
EPT/C: 1.73
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 185
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 12/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Ferns, Weeds/Good
Canopy: Mostly Closed....Other: Forested; Macrophytes
Water temp. 23.2C / pH 6.8SU / DO 7.6mg/L / Cond. 351umhos;

Station: AN0359
Trout Brook, State Park Rd. (Nr Hacklebarney St. Pk.), Chester Twp., Morris
Chester USGS Quadrangle
Date Sampled: 06/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	34
Philopotamidae	3	10
Baetidae	4	10
Chironomidae	6	8
Hydropsychidae	4	6
Naididae	7	6
Simuliidae	6	6
Lumbriculidae	8	4
Tipulidae	3	3
Nemouridae	2	2
Ephemerellidae	1	2
Rhyacophilidae	0	2
Perlidae	1	1
Psephenidae	4	1
Glossosomatidae	0	1
Lepidostomatidae	1	1
Leuctridae	0	1
Lumbricidae	10	1
Corydalidae	0	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 34.00 % (Gammaridae)
Family Biotic Index: 4.19
Scraper/Filterer Collector Ratio: 0.64
Shredder/Total Ratio: 0.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 36.00
EPT/C: 4.50
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 181
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 6-8/<1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Mostly Closed....Other: Forested; Bridge # 1264
Water temp. 16.3C / pH 7.9SU / DO 9.8mg/L / Cond. 334umhos;

Station: AN0360
Lamington River, Rt 512, Hunterton/Somerset County
Gladstone USGS Quadrangle
Date Sampled: 05/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	36
Ephemerellidae	1	17
Naididae	7	14
Baetidae	4	9
Tipulidae	3	5
Elmidae	4	4
Perlidae	1	2
Hydropsychidae	4	2
Polycentropodidae	6	2
Glossosomatidae	0	1
Capniidae	1	1
Corydalidae	0	1
Philopotamidae	3	1
Hydroptilidae	4	1
Lepidostomatidae	1	1
BloodRed Chironomidae	8	1
Psephenidae	4	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 36.00 % (Chironomidae)
Family Biotic Index: 4.45
Scraper/Filterer Collector Ratio: 6.60
Shredder/Total Ratio: 0.40
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
% EPT: 38.00
EPT/C: 1.03
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 183
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Mostly Closed....Other: Rural, Forested; Water temp. 15.3C / pH 8.8SU / DO 10.2mg/L / Cond. 287umhos

Station: AN0361
Unt Lamington River, Black River Rd., Chester Twp., Somerset
Gladstone USGS Quadrangle
Date Sampled: 05/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	32
Chironomidae	6	26
Philopotamidae	3	9
Baetidae	4	7
Simuliidae	6	5
Elmidae	4	4
Heptageniidae	4	3
Lumbriculidae	8	3
Glossosomatidae	0	2
Nemouridae	2	2
Rhyacophilidae	0	2
Perlidae	1	1
Blephariceridae	0	1
Curculionidae	7	1
Lepidostomatidae	1	1
Polycentropodidae	6	1
BloodRed Chironomidae	8	1
Psephenidae	4	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 103
% Contribution of Dominant Family: 31.07 % (Ephemerellidae)
Family Biotic Index: 3.50
Scraper/Filterer Collector Ratio: 1.20
Shredder/Total Ratio: 0.31
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
% EPT: 59.22
EPT/C: 2.26
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 174
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12/>1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Grass/Fair
Canopy: Mostly Closed....Other: Agriculture-livestock, Forested; Large amount of filamentous algae
Water temp. 14.7C / pH 8.5SU / DO 12.2mg/L / Cond. 193umhos;

Station: AN0362
Cold Brook, Vliettown Rd., Tewksbury Twp., Hunterdon County
Gladstone USGS Quadrangle
Date Sampled: 05/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	27
Ephemerellidae	1	17
Elmidae	4	11
Baetidae	4	11
Chironomidae	6	9
Hydropsychidae	4	9
Tipulidae	3	5
Hydroptilidae	4	2
Philopotamidae	3	1
Gammaridae	4	1
Empididae	6	1
Limnephilidae	4	1
Lumbricidae	10	1
Lumbriculidae	8	1
Naididae	7	1
Polycentropodidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 27.00 % (Simuliidae)
Family Biotic Index: 4.32
Scraper/Filterer Collector Ratio: 0.66
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 43.00
EPT/C: 4.78
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 181
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12/<1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Good
Canopy: Mostly Open....Other: Forested, Agricluture-livestock; Water temp. 14.9C / pH 8.4SU / DO 10.4mg/L / Cond. 280umhos

Station: AN0363
Lamington River, Rt 523, Bedminster Twp, Hunterdon County
Gladstone USGS Quadrangle
Date Sampled: 05/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	31
Chironomidae	6	18
Baetidae	4	11
Heptageniidae	4	7
Blephariceridae	0	4
Limnephilidae	4	4
BloodRed Chironomidae	8	4
Philopotamidae	3	3
Gammaridae	4	3
Oligoneuriidae	2	2
Perlidae	1	2
Psephenidae	4	2
Simuliidae	6	2
Tipulidae	3	1
Hydropsychidae	4	1
Corydalidae	0	1
Perlodidae	2	1
Lumbricidae	10	1
Lumbriculidae	8	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 31.00 % (Ephemerellidae)
Family Biotic Index: 3.37
Scraper/Filterer Collector Ratio: 6.13
Shredder/Total Ratio: 0.25
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 62.00
EPT/C: 2.82
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 178
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Grass, Shrubs/Good
Canopy: Mostly Closed....Other: 75% Forested, 25% Agriculture- livestock; Water temp. 15.7C / pH 8.6SU / DO 10.8mg/L / Cond. 270umhos

Station: AN0364
N Branch Rockaway Creek, Rt. 512 (Fairmount Rd.), Tewksbury Twp., Hunterdon County
Califon USGS Quadrangle
Date Sampled: 05/11/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	29
Chironomidae	6	19
Elmidae	4	11
Baetidae	4	6
Lepidostomatidae	1	6
Tipulidae	3	4
Limnephilidae	4	4
Gomphidae	1	3
Glossosomatidae	0	2
Lumbriculidae	8	2
Leptoceridae	4	2
Naididae	7	2
Perlidae	1	1
Ptilodactylidae	1	1
Calopterygidae	5	1
Philopotamidae	3	1
Empididae	6	1
Perlodidae	2	1
Brachycentridae	1	1
Peltoperlidae	1	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 98
% Contribution of Dominant Family: 29.59 % (Ephemerellidae)
Family Biotic Index: 3.12
Scraper/Filterer Collector Ratio: 13.00
Shredder/Total Ratio: 0.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
% EPT: 55.10
EPT/C: 2.84
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 100
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 3/1
Substrate: Gravel/Sand, Mud, Snags....StreamBank Vegetation/Stability: Vines, Trees/Poor
Canopy: Open....Other: Rural; Storm sewers, Rip rap, New bridge & storm sewers
Macrophytes, Salamander, Sampled upstr of bridge; Water temp. 14.1C, pH 7.9SU / DO 10.4mg/L / Cond. 156umhos

Station: AN0365
N. Branch Rockaway Creek, Rockaway Rd., Tewksbury Twp., Hunterdon County
Califon USGS Quadrangle
Date Sampled: 05/11/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	20
Philopotamidae	3	14
Chironomidae	6	11
Glossosomatidae	0	7
Nemouridae	2	7
Baetidae	4	6
BloodRed Chironomidae	8	5
Psephenidae	4	5
Simuliidae	6	5
Lumbriculidae	8	4
Rhyacophilidae	0	3
Chloroperlidae	1	2
Heptageniidae	4	2
Perlodidae	2	2
Hydropsychidae	4	2
Perlidae	1	1
Tipulidae	3	1
Empididae	6	1
Peltoperlidae	1	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Ephemerellidae)
Family Biotic Index: 3.25
Scraper/Filterer Collector Ratio: 1.00
Shredder/Total Ratio: 0.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
% EPT: 67.00
EPT/C: 4.19
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 133
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 12/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Grasses/Fair
Canopy: Partly Open....Other: Suburban; Storm sewer
Sampled dwstr of bridge, Fish, Filamentous algae; Water temp. 15.2 / pH 7.9SU / DO 11.2mg/L / Cond. 128umhos

Station: AN0366
N. Branch Rockaway Creek, Rockaway Rd. (Taylor's Mill), Readington Twp., Hunterdon County
Califon USGS Quadrangle
Date Sampled: 05/11/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	27
Chironomidae	6	24
Simuliidae	6	14
Baetidae	4	10
Nemouridae	2	4
Elmidae	4	4
Philopotamidae	3	3
Oligoneuriidae	2	2
Heptageniidae	4	2
Glossosomatidae	0	1
Planariidae	4	1
Lumbriculidae	8	1
Brachycentridae	1	1
Leptoceridae	4	1
Perlidae	1	1
Psephenidae	4	1
Pteronarcidae	0	1
Rhyacophilidae	0	1
Hydropsychidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 27.00 % (Ephemerellidae)
Family Biotic Index: 3.66
Scraper/Filterer Collector Ratio: 0.90
Shredder/Total Ratio: 0.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 13
% EPT: 55.00
EPT/C: 2.29
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 137
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 20/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Weeds, Shrubs/Poor
Canopy: Mostly Open....Other: Rural, Industrial (Quarry), Old dam; Sampled upstr of bridge, Erodded banks
Minnows; Water temp. 16.0 / pH 7.8SU / DO 11.2mg/L / Cond. 146umhos

Station: AN0367
South Br. Rockaway Creek, Windy Acres Farm (Unpaved Rd.), Clinton Twp., Hunterdon County
Califon USGS Quadrangle
Date Sampled: 05/12/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Ephemerellidae	1	35
Chironomidae	6	13
Gammaridae	4	12
Baetidae	4	11
Elmidae	4	8
Tipulidae	3	5
Naididae	7	3
BloodRed Chironomidae	8	3
Hydropsychidae	4	2
Rhyacophilidae	0	2
Asellidae	8	1
Philopotamidae	3	1
Perlidae	1	1
Astacidae	7	1
Simuliidae	6	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 35.00 % (Ephemerellidae)
Family Biotic Index: 3.34
Scraper/Filterer Collector Ratio: 11.00
Shredder/Total Ratio: 0.14
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 53.00
EPT/C: 3.31
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 165
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 7/1
Substrate: Gravel/Sand, Bedrock....StreamBank Vegetation/Stability: Trees, Shrubs, Weeds/Fair
Canopy: Mostly Open....Other: Agriculture-cropland; Sampled upstr of bridge
Filamentous algae; Water temp. 12.8C / pH 8.2SU / DO 11.4mg/L / Cond. 319umhos

Station: AN0368
South Br. Rockaway Creek, Nj Route 22, Readington Twp., Hunterdon County
Flemington USGS Quadrangle
Date Sampled: 05/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	32
Elmidae	4	18
Naididae	7	12
Simuliidae	6	11
BloodRed Chironomidae	8	6
Caenidae	7	4
Hydropsychidae	4	4
Gammaridae	4	4
Philopotamidae	3	3
Perlidae	1	3
Planariidae	4	1
Tipulidae	3	1
Lumbriculidae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 32.00 % (Chironomidae)
Family Biotic Index: 5.49
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.32
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 14.00
EPT/C: 0.37
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 128
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/<1
Substrate: Gravel/Sand, Mud, Cobble....StreamBank Vegetation/Stability: Trees, Grass/Poor
Canopy: Open....Other: 80% Urban, 20% Suburban; Storm sewers
Water temp. 18.6C / pH 8.3SU/ DO 8.9mg/L / Cond. 299umhos;

Station: AN0369
Rockaway Creek, Island Road, Readington Twp., Hunterdon
Raritan USGS Quadrangle
Date Sampled: 07/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	25
Lepidostomatidae	1	14
Tubificidae	10	12
Tricorythidae	4	9
Caenidae	7	6
Sphaeriidae	8	6
Potamanthidae	4	5
Pleuroceridae	6	4
BloodRed Chironomidae	8	3
Elmidae	4	3
Planorbidae	6	3
Chironomidae	6	3
Leptoceridae	4	2
Lumbriculidae	8	2
Physidae	7	2
Asellidae	8	1
Hydropsychidae	4	1
Corixidae	9	1
Empididae	6	1
Lumbricidae	10	1
Macromiidae	3	1
Ephemerellidae	1	1

Statistical Analysis

Number of Taxa: 22
Total Number of Individuals: 106
% Contribution of Dominant Family: 23.58 % (Gammaridae)
Family Biotic Index: 5.24
Scraper/Filterer Collector Ratio: 1.20
Shredder/Total Ratio: 0.14
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 7
% EPT: 35.85
EPT/C: 6.33
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 111
Deficiency(s) noted:
-

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 50/>3
Substrate: Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Grasses/Poor
Canopy: Mostly Open....Other: Agriculture - livestock, Horses, Cows; Plovers, Some macrophytes
Water temp. 24.8C / pH 8.2SU / DO 9.4mg/L / Cond. 136umhos;

Station: AN0370
Lamington River, Cowperthwiate Rd., Branchburg Twp., Somerset
Raritan USGS Quadrangle
Date Sampled: 07/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	23
Elmidae	4	18
Planariidae	4	12
Simuliidae	6	9
Glossosomatidae	0	7
Chironomidae	6	7
Baetidae	4	6
Ephemerellidae	1	6
Potamanthidae	4	4
Perlidae	1	2
Gammaridae	4	2
Lepidostomatidae	1	2
Leptoceridae	4	2
Heptageniidae	4	2
Tipulidae	3	1
Pleuroceridae	6	1
Polymitarcyidae	2	1
Planorbidae	6	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 106
% Contribution of Dominant Family: 21.70 % (Hydropsychidae)
Family Biotic Index: 3.76
Scraper/Filterer Collector Ratio: 0.91
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 10
% EPT: 51.89
EPT/C: 7.86
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 170
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Fast....Width/Depth (ft): 70/2
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Weeds/Fair
Canopy: Open....Other: Suburban, Forested; Macrophytes, Minnows
Water temp. 24.1C / pH 7.8SU / DO 8.6mg/L / Cond. 142umhos;

Station: AN0371
Chambers Bk { B }, Love Rd , Bedminster Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 12/29/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	45
Caenidae	7	23
Chironomidae	6	8
Coenagrionidae	9	5
Physidae	7	5
Heptageniidae	4	4
Baetidae	4	1
Planariidae	4	1
Ephemerellidae	1	1
Planorbidae	6	1
Dytiscidae	5	1
Tubificidae	10	1
Nematoda	6	1
Sphaeriidae	8	1
Lymnaeidae	6	1
Hydrophilidae	5	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Gammaridae)
Family Biotic Index: 5.40
Scraper/Filterer Collector Ratio: 1.11
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 29.00
EPT/C: 3.63
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 131
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 11/<1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural/Agricultural cropland; Water temp.1.6 /pH 7.4 /DO 14.6 /Cond.595

Station: AN0372
Chambers(A) Brook, Coddington Rd., Readington Twp., Hunterdon County
Raritan USGS Quadrangle
Date Sampled: 05/18/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Caenidae	7	20
Chironomidae	6	19
Baetidae	4	11
Naididae	7	10
Heptageniidae	4	10
Ephemerellidae	1	8
BloodRed Chironomidae	8	6
Dytiscidae	5	4
Lumbriculidae	8	3
Perlidae	1	3
Gammaridae	4	2
Elmidae	4	2
Tubificidae	10	1
Gomphidae	1	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Caenidae)
Family Biotic Index: 5.38
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 52.00
EPT/C: 2.08
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 96
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 12/1
Substrate: Cobbles, Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Weeds/Poor
Canopy: Mostly Closed....Other: Suburban; Sampled dwstr.
Minnows, Macrophytes; Water temp. 14.2C / pH 8.6SU / DO 11.7mg/L / Cond. 321umhos

Station: AN0373
Chambers Bk { A }, Station Rd , N Branch Depot, Somerset County
Raritan USGS Quadrangle
Date Sampled: 12/29/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	18
Caenidae	7	17
Planariidae	4	11
Simuliidae	6	7
Hydropsychidae	4	5
Heptageniidae	4	5
Capniidae	1	3
Tipulidae	3	3
Tubificidae	10	3
Philopotamidae	3	2
Ephemerellidae	1	2
Planorbidae	6	2
Hydroptilidae	4	2
Leuctridae	0	2
Nemouridae	2	2
Daphnidae	4	2
Elmidae	4	2
Taeniopterygidae	2	2
Baetidae	4	1
Gyrinidae	3	1
Chydoridae	4	1
Glossosomatidae	0	1
Oligoneuriidae	2	1
Lumbriculidae	8	1
Macromiidae	3	1
Naididae	7	1
Psephenidae	4	1
Sialidae	4	1

Statistical Analysis

Number of Taxa: 28
Total Number of Individuals: 100
% Contribution of Dominant Family: 18.00 % (Chironomidae)
Family Biotic Index: 4.86
Scraper/Filterer Collector Ratio: 0.36
Shredder/Total Ratio: 0.09
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 13
% EPT: 45.00
EPT/C: 2.50
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 140
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 13/<1
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural; Water temp.1.0 /pH 7.6 /DO 12.6 /Cond.502

Station: AN0374
N. Branch Raritan River, Usrt. 202, Branchburg Twp., Somerset
Raritan USGS Quadrangle
Date Sampled: 06/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Baetidae	4	31
Ephemerellidae	1	20
Elmidae	4	13
Chironomidae	6	9
Perlidae	1	9
Potamanthidae	4	9
Caenidae	7	4
Hydropsychidae	4	3
Naididae	7	3
Heptageniidae	4	3
Leptoceridae	4	2
Planariidae	4	1
Gammaridae	4	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 109
% Contribution of Dominant Family: 28.44 % (Baetidae)
Family Biotic Index: 3.60
Scraper/Filterer Collector Ratio: 11.75
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 74.31
EPT/C: 9.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 154
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 80-100/1-2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Open....Other: Rural, Forested; USGS gauge
Macrophytes; Water temp. 24.7C / pH 8.8SU / DO 14.7mg/L / Cond. 295umhos

Station: AN0375
Dukes Bk, Dukes Pkwy , Hillsbourgh Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	30
Gammaridae	4	29
Hydropsychidae	4	15
Asellidae	8	10
Tubificidae	10	7
Fredericellidae	2	4
Elmidae	4	3
Pleuroceridae	6	2
Cambaridae	5	2
Planariidae	4	1
Plagiostomidae	4	1
Leptoceridae	4	1
Baetidae	4	1
Gerridae	8	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 108
% Contribution of Dominant Family: 27.78 % (Chironomidae)
Family Biotic Index: 5.37
Scraper/Filterer Collector Ratio: 0.26
Shredder/Total Ratio: 0.37
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 15.74
EPT/C: 0.51
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 147
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/1
Substrate: Gravel,mud....StreamBank Vegetation/Stability: Trees,weeds,grass/Unstable
Canopy: Closed....Other: Rural/Forested; Water temp.17.6 /pH 7.6 /DO 6.8 /Cond.272

Station: AN0376
Peters Bk, Rt 28 , Somerville, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	61
Chironomidae	6	7
Gammaridae	4	5
BloodRed Chironomidae	8	5
Tetrastemmatidae	7	5
Hydrophilidae	5	3
Caenidae	7	3
Coenagrionidae	9	2
Corbiculidae	8	2
Lumbriculidae	8	2
Baetidae	4	1
Hydropsychidae	4	1
Macromiidae	3	1
Physidae	7	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 61.00 % (Tubificidae)
Family Biotic Index: 8.55
Scraper/Filterer Collector Ratio: 1.40
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 5.00
EPT/C: 0.42
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 125
Deficiency(s) noted: Tubificidae Family Overwhelmingly Dominant - - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 20/2
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability: Trees,grass/Unstable
Canopy: Mostly Closed....Other: Suburban; Water temp.16.7 /pH 7.6 /DO 8.3 /Cond.389
Trash;

Station: AN0377
Raritan River, Abv. Confl. Millstone River, Manville Boro., Somerset
Bound Brook USGS Quadrangle
Date Sampled: 07/20/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	21
Planorbidae	6	14
Coenagrionidae	9	11
Hydroptilidae	4	10
Physidae	7	9
Gammaridae	4	7
BloodRed Chironomidae	8	5
Tricorythidae	4	4
Elmidae	4	3
Baetidae	4	3
Caenidae	7	3
Planariidae	4	3
Corixidae	9	2
Hydrobiidae	8	2
Lumbriculidae	8	1
Nepidae	8	1
Libellulidae	9	1
Haliplidae	5	1
Gerridae	8	1
Valvatidae	4	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 103
% Contribution of Dominant Family: 20.39 % (Chironomidae)
Family Biotic Index: 6.11
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 19.42
EPT/C: 0.77
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 113
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): ~200/2-3
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Weeds/Poor
Canopy: Mostly Open....Other: Accessed thru compost fac. @ Huff & Lincoln Aves.; Forested, Industrial nearby
Sunfish, Minnows, Frogs, Macrophytes, Filamentous algae; Water temp. 27.3C / pH 7.9SU / DO 9.0mg/L / Cond. 182umhos

Station: AN0378
Millstone River, Baird Rd., Millstone Twp., Monmouth County
Roosevelt USGS Quadrangle
Date Sampled: 04/22/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	47
Chironomidae	6	35
Tubificidae	10	10
Hydropsychidae	4	2
Elmidae	4	2
BloodRed Chironomidae	8	2
Empididae	6	1
Heptageniidae	4	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 101
% Contribution of Dominant Family: 46.53 % (Simuliidae)
Family Biotic Index: 6.31
Scraper/Filterer Collector Ratio: 0.02
Shredder/Total Ratio: 0.38
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.97
EPT/C: 0.08
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 117
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/<1
Substrate: Gravel/Sand, Snags....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Poor
Canopy: Mostly Open....Other: Agriculture-cropland & livestock; Forested
Water temp. 10.3C / pH 8.7SU / DO 12.0mg/L / Cond. 96umhos;

Station: AN0379
Millstone River, NJ Rt. 33, Millstone Twp., Monmouth
Jamesburg USGS Quadrangle
Date Sampled: 07/01/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	28
Chironomidae	6	18
Hydrobiidae	8	7
Corixidae	9	6
BloodRed Chironomidae	8	5
Hydropsychidae	4	4
Planorbidae	6	4
Simuliidae	6	4
Heptageniidae	4	4
Dytiscidae	5	3
Sphaeriidae	8	3
Baetidae	4	2
Aeshnidae	3	2
Elmidae	4	2
Cambaridae	5	2
Physidae	7	2
Gyrinidae	3	1
Empididae	6	1
Hydrophilidae	5	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 28.00 % (Tubificidae)
Family Biotic Index: 7.23
Scraper/Filterer Collector Ratio: 1.55
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 10.00
EPT/C: 0.43
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 143
Deficiency(s) noted:
- Significant Organic Pollution -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 10-12/1-2
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: Shrubs/Good
Canopy: Mostly Open....Other: Rural (Agriculture-cropland nearby); Sampled dwnstr of bridge
Tadpoles, Minnows, Large mussels, Macrophytes; Water temp. 21.0C / pH 7.8SU / DO 8.1mg/L / Cond. 110umhos

Station: AN0380
Rocky Bk, Perrineville Rd , Perrineville, Monmouth County
Roosevelt USGS Quadrangle
Date Sampled: 08/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	25
Paludicellidae	7	17
Hydropsychidae	4	16
Planariidae	4	13
Naididae	7	11
BloodRed Chironomidae	8	7
Tetrastemmatidae	7	4
Coenagrionidae	9	2
Ceratopogonidae	6	1
Viviparidae	6	1
Gammaridae	4	1
Simuliidae	6	1
Gerridae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 25.00 % (Chironomidae)
Family Biotic Index: 5.94
Scraper/Filterer Collector Ratio: 0.02
Shredder/Total Ratio: 0.32
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 16.00
EPT/C: 0.50
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 174
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 10/<1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Closed....Other: Rural/Forested/Lake upstream; Water temp.22.5 /pH 8.5 /DO 7.3 /Cond.126

Station: AN0381
Rocky Bk, Rt 33 , Hightstown, Mercer County
Hightstown USGS Quadrangle
Date Sampled: 10/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Paludicellidae	7	81
Spongillidae	5	7
Hydropsychidae	4	3
Gammaridae	4	2
Simuliidae	6	2
Sphaeriidae	8	2
Elmidae	4	1
Tubificidae	10	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 81.00 % (Paludicellidae)
Family Biotic Index: 6.71
Scraper/Filterer Collector Ratio: 0.01
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
EPT/C: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 93
Deficiency(s) noted: Paludicellidae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 17/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: None/Stable
Canopy: Open....Other: Urban/Lake upstream; Water temp.20.4 /pH 7.6 /DO 8.4 /Cond.183

Station: AN0382
Millstone River, Grovers Mill Road, West Windsor Twp., Mercer/Middlesex
Hightstown USGS Quadrangle
Date Sampled: 07/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	29
Chironomidae	6	23
Hydropsychidae	4	14
Elmidae	4	10
BloodRed Chironomidae	8	9
Coenagrionidae	9	5
Leptoceridae	4	3
Caenidae	7	2
Planorbidae	6	1
Tubificidae	10	1
Baetidae	4	1
Sphaeriidae	8	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Gammaridae)
Family Biotic Index: 5.25
Scraper/Filterer Collector Ratio: 0.32
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 21.00
EPT/C: 0.66
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 154
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 15/
Substrate: Mud, Silt, Snags....StreamBank Vegetation/Stability: Trees, Bushes, Weeds/Good
Canopy: Mostly Open....Other: Forested, Wetlands; Water color - greenish brown
Large fish, Minnows, Macrophytes; Water temp. 20.3C / pH 7.4SU / DO 11.1mg/L / Cond. 339umhos

Station: AN0382B
Millstone River, Route 535, East Windsor Twp., Mercer/Middlesex
Hightstown USGS Quadrangle
Date Sampled: 07/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Coenagrionidae	9	25
BloodRed Chironomidae	8	19
Elmidae	4	15
Chironomidae	6	14
Planorbidae	6	12
Corixidae	9	9
Gammaridae	4	6
Physidae	7	2
Tubificidae	10	1
Planariidae	4	1
Lumbriculidae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 105
% Contribution of Dominant Family: 23.81 % (Coenagrionidae)
Family Biotic Index: 6.99
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: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 120
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 14/2
Substrate: Mud....StreamBank Vegetation/Stability: Trees, Shrubs, Weeds/Poor
Canopy: Mostly Open....Other: Forested; Water color - Greenish brown
Crayfish, Macrophytes; Water temp. 21.1C / pH 7.5SU / DO 9.8mg/L / Cond. 238umhos

Station: AN0382D
Millstone River, Applegarth Rd., Monroe Twp., Middlesex County
Jamesburg USGS Quadrangle
Date Sampled: 07/01/99

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	38
Chironomidae	6	17
Naididae	7	11
Coenagrionidae	9	9
Planorbidae	6	9
Corixidae	9	3
Haliplidae	5	3
Physidae	7	3
Hydrophilidae	5	2
Gammaridae	4	1
Dryopidae	5	1
Macromiidae	3	1
Sphaeriidae	8	1
Glossiphoniidae	8	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 38.00 % (BloodRed Chironomidae)
Family Biotic Index: 7.19
Scraper/Filterer Collector Ratio: 13.00
Shredder/Total Ratio: 0.42
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 135
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 25-30/2-3
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Rural, Forested (Lt. bank sparsely residential); Bridge # 5-B-152, Adj. sm. pond upstr. seperate <12ft.
Macrophytes, Canada geese; Water temp. 21.5C / pH 7.4SU / DO 6.6mg/L / Cond. 135umhos

Station: AN0383
Bear Bk, Old Trenton Rd {Rt 535} , W Windsor Twp, Mercer County
Hightstown USGS Quadrangle
Date Sampled: 10/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	40
Tubificidae	10	17
Hydrobiidae	8	15
Elmidae	4	8
Hydropsychidae	4	7
Chironomidae	6	4
Coenagrionidae	9	3
Planariidae	4	3
Calopterygidae	5	1
Corbiculidae	8	1
Veliidae	9	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 101
% Contribution of Dominant Family: 39.60 % (Naididae)
Family Biotic Index: 7.14
Scraper/Filterer Collector Ratio: 2.88
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 6.93
EPT/C: 1.73
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 133
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 22/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,shrubs,grass/Unstable
Canopy: Mostly Closed....Other: Suburban/Forested/Agricultural cropland; Water
temp.17.6 /pH 7.3 /DO 7.1 /Cond.82

Station: AN0384
Bear Brook, Cranbury Rd. (Rt. 615), West Windsor Twp., Mercer
Hightstown USGS Quadrangle
Date Sampled: 07/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	22
Chironomidae	6	21
Gammaridae	4	18
Elmidae	4	18
Planariidae	4	9
Philopotamidae	3	5
Sphaeriidae	8	4
Planorbidae	6	2
Heptageniidae	4	2
Hydrobiidae	8	1
Coenagrionidae	9	1
Lumbricidae	10	1
Mesoveliidae	9	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 106
% Contribution of Dominant Family: 20.75 % (Hydropsychidae)
Family Biotic Index: 4.75
Scraper/Filterer Collector Ratio: 0.72
Shredder/Total Ratio: 0.20
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 27.36
EPT/C: 1.38
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 161
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Weeds, Vines/Fair
Canopy: Mostly Closed....Other: Suburban; Minnows, Macrophytes
Water Temp. 21.5C / pH 7.7SU / DO 5.5mg/L / Cond. 159umhos;

Station: AN0385
Cranbury Brook, Applegarth Rd., Monroe Twp., Middlesex
Jamesburg USGS Quadrangle
Date Sampled: 07/01/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	44
BloodRed Chironomidae	8	43
Asellidae	8	7
Naididae	7	3
Corixidae	9	1
Gammaridae	4	1
Coenagrionidae	9	1

Statistical Analysis

Number of Taxa: 7
Total Number of Individuals: 100
% Contribution of Dominant Family: 44.00 % (Chironomidae)
Family Biotic Index: 7.07
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 148
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 12-15/1
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Partly Open....Other: Rural, Forested; Storm sewers (upstr. Rt. bank), Lt. upstr. bank reinforced with concrete
Macrophytes, Frog, Minnows; Water temp. 18.2C / pH 7.4SU / DO 8.0mg/L / Cond. 166umhos

Station: AN0386
Cranbury Brook, Maple Ave., Plainsboro Twp., Middlesex
Hightstown USGS Quadrangle
Date Sampled: 07/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals

This site was not sampled due to bridge construction

Station: AN0387
Devils Bk, New Rd , S Brunswick Twp, Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 10/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	50
Tubificidae	10	16
Sphaeriidae	8	13
Naididae	7	6
Chironomidae	6	4
Daphnidae	4	4
Glossiphoniidae	8	3
BloodRed Chironomidae	8	2
Corixidae	9	1
Libellulidae	9	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 50.00 % (Asellidae)
Family Biotic Index: 8.04
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: 106
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: None....Width/Depth (ft): 10/2
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural/Forested; Water temp.18.6 /pH 7.1 /DO - /Cond.84
Stream impounded by log and debris jam; No flow dowstr of road

Station: AN0388
Shallow Bk, Scotts Corner Rd , S Brunswick Twp, Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 10/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	33
Asellidae	8	10
Talitridae	8	10
Paludicellidae	7	9
Daphnidae	4	7
Caenidae	7	6
Elmidae	4	5
Sphaeriidae	8	5
Chironomidae	6	4
Fredericellidae	2	3
BloodRed Chironomidae	8	2
Dytiscidae	5	2
Coenagrionidae	9	2
Cyclopidae	4	2
Planorbidae	6	2
Hydrophilidae	5	1
Corixidae	9	1
Gammaridae	4	1
Lumbriculidae	8	1
Physidae	7	1
Tetrastemmatidae	7	1
Sididae	3	1

Statistical Analysis

Number of Taxa: 22
Total Number of Individuals: 109
% Contribution of Dominant Family: 30.28 % (Naididae)
Family Biotic Index: 6.61
Scraper/Filterer Collector Ratio: 0.20
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 5.50
EPT/C: 0.92
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 150
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 6/1
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability: Grass,trees,shrubs/Stable
Canopy: Mostly Open....Other: Suburban/Forested; Water temp.18.1 /pH 7.3 /DO 5.0 /Cond.121

Station: AN0389
Devils Bk, Schalks Rd , Plainsboro, Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 10/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	50
Heptageniidae	4	28
Chironomidae	6	8
Planariidae	4	3
Elmidae	4	3
Gammaridae	4	2
Leptophlebiidae	2	2
Sphaeriidae	8	2
Hydridae	5	1
Corydalidae	0	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 50.00 % (Hydropsychidae)
Family Biotic Index: 4.17
Scraper/Filterer Collector Ratio: 0.52
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 80.00
EPT/C: 10.00
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 145
Deficiency(s) noted:
-

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 13/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Rural/Forested/4 track railroad upstream; Water temp.16.1 /pH 7.2 /DO 6.9 /Cond.171

Station: AN0390
Camp Harmony Br Of Stony Brook, Vandyke Rd., Hopewell Twp., Mercer County
Hopewell USGS Quadrangle
Date Sampled: 04/14/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	66
Nemouridae	2	9
Chironomidae	6	4
Perlodidae	2	4
Polycentropodidae	6	4
Elmidae	4	3
Sphaeriidae	8	2
Philopotamidae	3	1
Gammaridae	4	1
Tubificidae	10	1
Lumbriculidae	8	1
Naididae	7	1
Limnephilidae	4	1
Corydalidae	0	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 66.00 % (Simuliidae)
Family Biotic Index: 5.41
Scraper/Filterer Collector Ratio: 0.07
Shredder/Total Ratio: 0.09
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 19.00
EPT/C: 4.75
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 157
Deficiency(s) noted: Simuliidae Family Overwhelmingly Dominant -
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15-18/1
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Partly Open....Other: Rural, Forested, Few homes nearby; Storm ditch Macrophytes, some Filamentous algae, was Dry in Early Winter; Water temp. 9.1C / pH 8.3SU / DO 12.9mg/L / Cond. 95umhos

Station: AN0391
Stony Brook, Mine Rd., Hopewell Twp., Mercer County
Pennington USGS Quadrangle
Date Sampled: 04/06/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	81
Chironomidae	6	6
Gammaridae	4	3
Planariidae	4	2
Psephenidae	4	2
Coenagrionidae	9	1
Philopotamidae	3	1
Empididae	6	1
Nemouridae	2	1
Limnephilidae	4	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 81.00 % (Simuliidae)
Family Biotic Index: 5.78
Scraper/Filterer Collector Ratio: 0.04
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 3.00
EPT/C: 0.50
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 135
Deficiency(s) noted: Simuliidae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 15-20/1-2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Agriculture-cropland, Rural; Trout stocked
Filamentous algae on rocks; Water Temp. 11.2C / pH 7.7SU / DO 16.3mg/L / Cond. 168umhos

Station: AN0392
Stony Brook, Old Mill Rd., Pennington Boro, Mercer
Pennington USGS Quadrangle
Date Sampled: 05/18/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	28
Elmidae	4	26
Perlidae	1	11
Planariidae	4	9
Philopotamidae	3	5
Chironomidae	6	5
Simuliidae	6	5
Psephenidae	4	4
Sphaeriidae	8	3
Erpobdellidae	8	2
Tubificidae	10	1
Lumbriculidae	8	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 28.00 % (Naididae)
Family Biotic Index: 4.96
Scraper/Filterer Collector Ratio: 2.31
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 16.00
EPT/C: 3.20
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 152
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 12/<1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Weeds/Fair
Canopy: Partly Open....Other: Suburban, Forested; Color brown, Geese, Ducks, Frogs, Filamentous algae
Trash - tires, concrete, plastic; Water temp. 19.3C / ph 9.0SU / DO 13.8mg/L / Cond. 303umhos

Station: AN0393
Stony Brook, Usrt. 206, Princeton, Mercer County
Princeton USGS Quadrangle
Date Sampled: 04/22/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	56
Chironomidae	6	25
Elmidae	4	16
Nemouridae	2	1
Hydropsychidae	4	1
Philopotamidae	3	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 100
% Contribution of Dominant Family: 56.00 % (Simuliidae)
Family Biotic Index: 5.59
Scraper/Filterer Collector Ratio: 0.28
Shredder/Total Ratio: 0.26
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 3.00
EPT/C: 0.12
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 173
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 40/2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, grass/Good
Canopy: Mostly Open....Other: 25% Suburban, 25% Rural, 50% Forested; Storm sewers
Water temp. 10.8C / pH 7.7SU / DO 13.6mg/L / Cond. 207umhos;

Station: AN0394
Duck Pond Run, Usrt. 1, West Windsor, Mercer County
Princeton USGS Quadrangle
Date Sampled: 04/22/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	24
Simuliidae	6	20
Asellidae	8	19
Physidae	7	9
Chironomidae	6	6
Psychomyiidae	2	5
BloodRed Chironomidae	8	5
Lumbriculidae	8	3
Sphaeriidae	8	2
Tetrastemmatidae	7	2
Phryganeidae	4	1
Tipulidae	3	1
Limnephilidae	4	1
Tubificidae	10	1
Muscidae	6	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 24.00 % (Gammaridae)
Family Biotic Index: 5.98
Scraper/Filterer Collector Ratio: 0.41
Shredder/Total Ratio: 0.50
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 7.00
EPT/C: 0.64
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 138
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12/<1
Substrate: Sand....StreamBank Vegetation/Stability: Trees, Grass/Fair
Canopy: Mostly Closed....Other: 25% Urban, 75% Forested; Stream banks undercut with roots, etc.
Odors from West Windsor sewer manholes; Water temp. 10.6C / pH 7.9SU / DO 12.5mg/L / Cond. 165umhos

Station: AN0395
Heathcote Bk, Stouts Ln , S Brunswick Twp, Middlesex County
Monmouth Junction USGS Quadrangle
Date Sampled: 10/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Paludicellidae	7	17
BloodRed Chironomidae	8	13
Planorbidae	6	13
Naididae	7	12
Tubificidae	10	11
Asellidae	8	8
Elmidae	4	7
Gammaridae	4	5
Physidae	7	4
Chironomidae	6	4
Hydrobiidae	8	3
Hydropsychidae	4	2
Hydridae	5	2
Planariidae	4	1
Psephenidae	4	1
Coenagrionidae	9	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 104
% Contribution of Dominant Family: 16.35 % (Paludicellidae)
Family Biotic Index: 6.90
Scraper/Filterer Collector Ratio: 1.11
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.92
EPT/C: 0.11
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 114
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 6/2
Substrate: Cobbles,gravel,sand,mud....StreamBank Vegetation/Stability:
Trees,shrubs,vines/Unstable
Canopy: Closed....Other: Forested/Industrial but abandoned; Water temp.11.9 /pH 7.5 /DO 4.0 /Cond.257
Trash and tires;

Station: AN0396
Heathcote Bk, Academy St , Kingston, Middlesex County
Hightstown USGS Quadrangle
Date Sampled: 10/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	39
Hydrobiidae	8	22
Elmidae	4	12
Hydropsychidae	4	7
Planariidae	4	6
Lepidostomatidae	1	4
Glossosomatidae	0	3
Psephenidae	4	2
Planorbidae	6	2
Plagiostomidae	4	1
Chironomidae	6	1
Baetidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 39.00 % (Gammaridae)
Family Biotic Index: 4.70
Scraper/Filterer Collector Ratio: 5.13
Shredder/Total Ratio: 0.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 15.00
EPT/C: 15.00
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 152
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,vines/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.12.3 /pH 7.6 /DO 8.0 /Cond.197

Station: AN0397
Millstone R, Rt 27 , Kingston, Mercer/Somerset County
Hightstown USGS Quadrangle
Date Sampled: 10/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Paludicellidae	7	61
Planariidae	4	16
Elmidae	4	9
Hydridae	5	4
Hydropsychidae	4	3
Simuliidae	6	2
BloodRed Chironomidae	8	1
Corbiculidae	8	1
Gammaridae	4	1
Plagiostomidae	4	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 61.00 % (Paludicellidae)
Family Biotic Index: 6.01
Scraper/Filterer Collector Ratio: 0.13
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
EPT/C: 3.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 146
Deficiency(s) noted: Paludicellidae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 25/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,vines,grass/Unstable
Canopy: Mostly Closed....Other: Suburban/Lake upstream; Water temp.14.9 /pH 7.7 /DO 7.1 /Cond.228

Station: AN0398
Bedens Brook, Aunt Molly Rd., Hopewell Twp., Mercer County
Rocky Hill USGS Quadrangle
Date Sampled: 04/27/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	47
Nemouridae	2	11
Elmidae	4	10
Naididae	7	6
Empididae	6	3
Ephemerellidae	1	3
Perlodidae	2	3
Psephenidae	4	3
Baetidae	4	3
Simuliidae	6	3
Lumbricidae	10	2
Heptageniidae	4	2
Coenagrionidae	9	1
Hydrophilidae	5	1
Caenidae	7	1
Planariidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 47.00 % (Chironomidae)
Family Biotic Index: 5.08
Scraper/Filterer Collector Ratio: 7.00
Shredder/Total Ratio: 0.58
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 23.00
EPT/C: 0.49
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 126
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/1
Substrate: Cobbles, Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Shrubs/Poor
Canopy: Open....Other: Forested, Rip Rap on bank; STP
Canadian Geese, Filament algae, Fish; Water temp. 11.6C / pH 7.7SU / DO 15.0mg/L / Cond. 188umhos

Station: AN0399
Rock Brook, Long Hill Rd., Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 04/27/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	65
Ephemerellidae	1	12
Baetidae	4	10
Nemouridae	2	4
Elmidae	4	4
Psephenidae	4	3
Chironomidae	6	2
Ptilodactylidae	1	1
Planorbidae	6	1
Perlodidae	2	1
Gomphidae	1	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 105
% Contribution of Dominant Family: 61.90 % (Simuliidae)
Family Biotic Index: 4.83
Scraper/Filterer Collector Ratio: 0.26
Shredder/Total Ratio: 0.07
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 25.71
EPT/C: 13.50
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 161
Deficiency(s) noted: Simuliidae Family Overwhelmingly Dominant -
-

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 15/2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Suburban, Forested; Trout Stocked, Filamentous algae
Water was slight green color; Water temp. 11.6C / pH 7.9SU / DO 11.9mg/L / Cond. 99umhos

Station: AN0400
Rock Brook, Burnt Mill Rd., Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 04/27/99

Family	Family Tolerance Value (FTV)	Number of Individuals

This site was not sampled due to bridge construction

Station: AN0401
Bedens Brook, Usrt. 206, Montgomery Twp., Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 04/27/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	49
Elmidae	4	24
Simuliidae	6	8
Naididae	7	3
BloodRed Chironomidae	8	3
Psephenidae	4	3
Heptageniidae	4	3
Hydropsychidae	4	2
Lumbriculidae	8	2
Hydrophilidae	5	1
Empididae	6	1
Philopotamidae	3	1
Gammaridae	4	1
Perlidae	1	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 102
% Contribution of Dominant Family: 48.04 % (Chironomidae)
Family Biotic Index: 5.39
Scraper/Filterer Collector Ratio: 2.73
Shredder/Total Ratio: 0.48
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 6.86
EPT/C: 0.13
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 160
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40/1.5
Substrate: Gravel/Sand, Cobbles, Silt....StreamBank Vegetation/Stability: Trees, Weeds/Fair
Canopy: Mostly Open....Other: Suburban, Forested; Storm sewer, Rip Rap
Water temp. 11.2C / pH 7.7SU / DO 11.2mg/L / Cond. 204umhos;

Station: AN0402
Pike Run, Rt 206 , Belle Mead, Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 11/12/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	18
Sphaeriidae	8	16
Elmidae	4	12
Chironomidae	6	9
Physidae	7	7
Planorbidae	6	5
Asellidae	8	4
Planariidae	4	3
Tubificidae	10	3
Lymnaeidae	6	3
Corixidae	9	3
Baetidae	4	2
Lumbriculidae	8	2
Tetrastemmatidae	7	2
Daphnidae	4	2
Aeshnidae	3	1
Caenidae	7	1
Naididae	7	1
Gomphidae	1	1
Hydrobiidae	8	1
BloodRed Chironomidae	8	1
Corduliidae	5	1
Taeniopterygidae	2	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 24
Total Number of Individuals: 100
% Contribution of Dominant Family: 18.00 % (Gammaridae)
Family Biotic Index: 5.90
Scraper/Filterer Collector Ratio: 1.37
Shredder/Total Ratio: 0.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 4.00
EPT/C: 0.40
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 148
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 18/1
Substrate: Cobbles,gravel,silt....StreamBank Vegetation/Stability:
Trees,shrubs,grass/Unstable

Canopy: Mostly Open....Other: Forested; Water temp.7.1 /pH 7.5 /DO 6.8 /Cond.272

Station: AN0403
Cruser Bk, Rt 206 , Montgomery Twp, Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 11/12/98

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	23
Chironomidae	6	13
Planorbidae	6	12
Caenidae	7	7
Tubificidae	10	7
Gammaridae	4	6
Asellidae	8	5
Elmidae	4	3
Hydrobiidae	8	3
Corixidae	9	3
Heptageniidae	4	3
Baetidae	4	2
Physidae	7	2
Sialidae	4	2
Aeshnidae	3	1
Planariidae	4	1
Coenagrionidae	9	1
Ephemerellidae	1	1
Leptoceridae	4	1
Nematoda	6	1
Sphaeriidae	8	1
Psephenidae	4	1
Daphnidae	4	1

Statistical Analysis

Number of Taxa: 23
Total Number of Individuals: 100
% Contribution of Dominant Family: 23.00 % (BloodRed Chironomidae)
Family Biotic Index: 6.65
Scraper/Filterer Collector Ratio: 1.40
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 14.00
EPT/C: 0.39
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 133
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 25/1
Substrate: Cobbles,gravel,sand,silt....StreamBank Vegetation/Stability:
Trees,vines,weeds/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.6.5 /pH 7.4 /DO 9.3 /Cond.528

Station: AN0404
Back Brook, Usrt. 206, Montgomery Twp., Somerset
Rocky Hill USGS Quadrangle
Date Sampled: 06/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	21
Elmidae	4	21
BloodRed Chironomidae	8	8
Chironomidae	6	8
Hydropsychidae	4	7
Naididae	7	5
Planorbidae	6	4
Baetidae	4	3
Coenagrionidae	9	3
Hydrobiidae	8	3
Physidae	7	3
Psephenidae	4	3
Philopotamidae	3	2
Planariidae	4	2
Gammaridae	4	2
Heptageniidae	4	2
Perlidae	1	1
Sphaeriidae	8	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 21.00 % (Asellidae & Elmidae)
Family Biotic Index: 5.92
Scraper/Filterer Collector Ratio: 2.00
Shredder/Total Ratio: 0.21
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
% EPT: 15.00
EPT/C: 0.94
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 150
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 12-15/1-2
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Good
Canopy: Mostly Closed....Other: Forested; Bridge # 1810-153/60.28
Minnows; Water temp. 18.8C / pH 7.9SU / DO 5.8mg/L / Cond. 254umhos

Station: AN0405
Pike Run, Rt. 533, Montgomery Twp., Somerset County County
Rocky Hill USGS Quadrangle
Date Sampled: 04/27/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	77
Chironomidae	6	30
Nemouridae	2	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 4
Total Number of Individuals: 109
% Contribution of Dominant Family: 70.64 % (Naididae)
Family Biotic Index: 6.69
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.28
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.92
EPT/C: 0.03
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 89
Deficiency(s) noted: Naididae Family Overwhelmingly Dominant - Low Diversity - - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 3/0.5
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Fair
Canopy: Mostly Closed....Other: Suburban; Storm sewer, Retention basin upstr.
Water temp. 11.0C / pH 7.6SU / DO 9.2mg/L / Cond. 246umhos;

Station: AN0406
Simonson Bk, Canal Rd , Griggstown, Somerset County
Monmouth Junction USGS Quadrangle
Date Sampled: 10/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Physidae	7	31
Corixidae	9	21
Gammaridae	4	17
Lymnaeidae	6	7
Tubificidae	10	5
BloodRed Chironomidae	8	4
Lumbriculidae	8	4
Asellidae	8	3
Culicidae	8	2
Planorbidae	6	2
Dytiscidae	5	2
Daphnidae	4	2
Elmidae	4	2
Gerridae	8	1
Leuctridae	0	1
Erpobdellidae	8	1
Tetrastemmatidae	7	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 108
% Contribution of Dominant Family: 28.70 % (Physidae)
Family Biotic Index: 6.80
Scraper/Filterer Collector Ratio: 8.75
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.93
EPT/C: 0.25
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 104
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 6/<1
Substrate: Cobbles,gravel,silt....StreamBank Vegetation/Stability:
Grass,shrubs,trees/Unstable
Canopy: Mostly Open....Other: Rural; Water temp.15.6 /pH 7.4 /DO 8.9 /Cond.305

Station: AN0407
Ten Mile Run, Canal Rd , Franklin Twp, Somerset County
Monmouth Junction USGS Quadrangle
Date Sampled: 10/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	35
Caenidae	7	16
Physidae	7	10
Chironomidae	6	6
Elmidae	4	6
Planariidae	4	5
Veliidae	9	3
Tetrastemmatidae	7	3
Baetidae	4	2
Naididae	7	2
Asellidae	8	2
Planorbidae	6	2
Psephenidae	4	2
Coenagrionidae	9	1
Hydrophilidae	5	1
Heptageniidae	4	1
Corixidae	9	1
Hydropsychidae	4	1
Lumbriculidae	8	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 35.00 % (Gammaridae)
Family Biotic Index: 5.47
Scraper/Filterer Collector Ratio: 10.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 20.00
EPT/C: 3.33
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 146
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27/1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Forested/Agricultural cropland; Water temp.15.7 /pH 7.4 /DO 8.9 /Cond.268

Station: AN0408
Six Mile Run, Rt 27 , Franklin Twp, Middlesex/Somerset County
Monmouth Junction USGS Quadrangle
Date Sampled: 10/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	30
Tubificidae	10	17
Tetrastemmatidae	7	12
Fredericellidae	2	10
Sphaeriidae	8	9
Chironomidae	6	8
Elmidae	4	6
Planorbidae	6	5
Hydrobiidae	8	4
Asellidae	8	4
Planariidae	4	2
Hydrophilidae	5	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 108
% Contribution of Dominant Family: 27.78 % (Gammaridae)
Family Biotic Index: 5.97
Scraper/Filterer Collector Ratio: 0.53
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 152
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,shrubs,vines/Stable
Canopy: Mostly Closed....Other: Urban; Water temp.13.2 /pH 7.6 /DO 9.5 /Cond.247

Station: AN0409
Six Mile Run, Canal Rd , Blackwells Mills, Franklin Twp., Somerset County
Monmouth Junction USGS Quadrangle
Date Sampled: 10/06/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	60
Elmidae	4	14
Asellidae	8	5
Psephenidae	4	5
Heptageniidae	4	4
Chironomidae	6	3
Leptoceridae	4	2
Tubificidae	10	2
Tabanidae	6	2
Caenidae	7	1
Corixidae	9	1
Planorbidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 60.00 % (Gammaridae)
Family Biotic Index: 4.52
Scraper/Filterer Collector Ratio: 1.25
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 7.00
EPT/C: 2.33
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 126
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 18/2
Substrate: Cobbles,gravel,mud....StreamBank Vegetation/Stability:
Trees,weeds,shurbs/Unstable
Canopy: Closed....Other: Forested; Water temp.11.4 /pH 7.6 /DO 9.2 /Cond.264

Station: AN0410
Millstone River, Blackwells Mills Rd., Hillsborough Twp., Somerset
Monmouth Junction USGS Quadrangle
Date Sampled: 06/10/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	57
Elmidae	4	16
Hydropsychidae	4	5
Chironomidae	6	4
Planariidae	4	4
Sphaeriidae	8	4
Naididae	7	2
Lumbriculidae	8	2
BloodRed Chironomidae	8	2
Simuliidae	6	2
Asellidae	8	1
Pleuroceridae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 57.00 % (Gammaridae)
Family Biotic Index: 4.56
Scraper/Filterer Collector Ratio: 1.55
Shredder/Total Ratio: 0.64
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 5.00
EPT/C: 0.83
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 136
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 60-70/1-2
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Mostly Open....Other: Rural, Forested; Sampled dwstr of USGS gauge
Some macrophytes, Waterfowl present; Water temp. 25.0C / pH 7.8SU / DO 4.7mg/L / Cond. 310umhos

Station: AN0411
Royce Bk, Rt 206 , Bloomingdale, Somerset County
Rocky Hill USGS Quadrangle
Date Sampled: 11/12/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	51
Planariidae	4	15
Elmidae	4	7
Heptageniidae	4	6
Philopotamidae	3	5
Chironomidae	6	4
Hydropsychidae	4	3
Asellidae	8	2
Planorbidae	6	1
Hydridae	5	1
Plagiostomidae	4	1
Leptoceridae	4	1
Tetrastemmatidae	7	1
Psephenidae	4	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 51.00 % (Gammaridae)
Family Biotic Index: 4.20
Scraper/Filterer Collector Ratio: 1.88
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 15.00
EPT/C: 3.75
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 141
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 6/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,vines,shrubs/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.9.8 /pH 7.3 /DO 10.0 /Cond.306

Station: AN0412
Royce Bk Br, Rt 206 , Hillsborough Twp, Somerset County
Raritan USGS Quadrangle
Date Sampled: 11/12/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	63
Tubificidae	10	14
Planorbidae	6	7
Elmidae	4	4
Hydropsychidae	4	3
Coenagrionidae	9	3
Chironomidae	6	2
Planariidae	4	2
Ephemerellidae	1	2
BloodRed Chironomidae	8	2
Glossiphoniidae	8	1
Physidae	7	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 107
% Contribution of Dominant Family: 58.88 % (Gammaridae)
Family Biotic Index: 5.24
Scraper/Filterer Collector Ratio: 3.25
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.67
EPT/C: 1.17
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 136
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,weeds/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.8.4 /pH 7.5 /DO 10.1 /Cond.287

Station: AN0413
Royce Bk, Rt 533 , Manville, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 11/12/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	64
Tubificidae	10	17
Planariidae	4	4
Asellidae	8	3
Corbiculidae	8	3
Elmidae	4	3
Sphaeriidae	8	2
BloodRed Chironomidae	8	2
Plagiostomidae	4	1
Planorbidae	6	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 64.00 % (Gammaridae)
Family Biotic Index: 5.44
Scraper/Filterer Collector Ratio: 0.80
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 116
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 12/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Mostly Open....Other: Urban; Water temp.8.2 /pH7.3 /DO 9.8 /Cond.420

Station: AN0414
Millstone River, Above Confl. With Raritan River, Manville Boro., Somerset
Bound Brook USGS Quadrangle
Date Sampled: 07/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	65
Hydrobiidae	8	6
Pleuroceridae	6	5
Coenagrionidae	9	5
Corixidae	9	4
Elmidae	4	4
Planorbidae	6	3
Baetidae	4	3
Physidae	7	3
Leptoceridae	4	2
Corbiculidae	8	1
BloodRed Chironomidae	8	1
Chironomidae	6	1
Heptageniidae	4	1
Hydropsychidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 105
% Contribution of Dominant Family: 61.90 % (Gammaridae)
Family Biotic Index: 4.99
Scraper/Filterer Collector Ratio: 9.50
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 6.67
EPT/C: 3.50
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 160
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 35/>3
Substrate: Gravel/Sand, Mud....StreamBank Vegetation/Stability: Trees, Weeds/Good
Canopy: Open....Other: Forested; Frog, Minnows, Macrophytes
Water temp. 28.6C / pH 8.0SU / DO 12.8mg/L / Cond. 268umhos;

Station: AN0415
Cuckels Bk, Talmage Rd , Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	41
Caenidae	7	15
Gammaridae	4	12
Lumbriculidae	8	7
Planariidae	4	4
Chironomidae	6	3
Elmidae	4	3
BloodRed Chironomidae	8	3
Planorbidae	6	3
Physidae	7	2
Naididae	7	2
Erpobdellidae	8	2
Coenagrionidae	9	1
Hydrophilidae	5	1
Isotomidae	10	1
Leptoceridae	4	1
Corixidae	9	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 104
% Contribution of Dominant Family: 39.42 % (Tubificidae)
Family Biotic Index: 7.72
Scraper/Filterer Collector Ratio: 5.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 15.38
EPT/C: 2.56
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 125
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 8/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Industrial; Water temp.15.5 /pH 7.7 /DO 5.4 /Cond.332
Trash;

Station: AN0416
W Br Middle Bk, Crim Rd , Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	27
Heptageniidae	4	15
Psephenidae	4	15
BloodRed Chironomidae	8	10
Elmidae	4	8
Tubificidae	10	7
Gammaridae	4	5
Hydropsychidae	4	3
Tipulidae	3	2
Tabanidae	6	2
Gomphidae	1	2
Asellidae	8	1
Corydalidae	0	1
Veliidae	9	1
Sphaeriidae	8	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 101
% Contribution of Dominant Family: 26.73 % (Chironomidae)
Family Biotic Index: 5.42
Scraper/Filterer Collector Ratio: 1.21
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 17.82
EPT/C: 0.48
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 132
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 10/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,shrubs,weeds/Unstable
Canopy: Closed....Other: Suburban; Water temp.16.0 /pH 7.5 /DO 9.2 /Cond.317

Station: AN0417
W Br Middle Bk, Chimney Rock Rd , Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	68
Planariidae	4	13
Veliidae	9	5
Gammaridae	4	4
Asellidae	8	3
BloodRed Chironomidae	8	3
Heptageniidae	4	2
Hydropsychidae	4	2
Psephenidae	4	2
Baetidae	4	1
Glossiphoniidae	8	1
Elmidae	4	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 106
% Contribution of Dominant Family: 64.15 % (Chironomidae)
Family Biotic Index: 5.80
Scraper/Filterer Collector Ratio: 1.25
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 4.72
EPT/C: 0.07
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 151
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 9/1
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees,shrubs,grass/Stable
Canopy: Mostly Open....Other: Forested/Reservoir upstream; Water temp.21.9 /pH 7.7 /DO 2.5 /Cond.229

Station: AN0418
E Br Middle Bk, Green Valley Rd , Warren Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Elmidae	4	25
Planariidae	4	13
Chironomidae	6	13
Tubificidae	10	11
Tetrastemmatidae	7	7
Baetidae	4	6
Nematoda	6	6
Coenagrionidae	9	3
Sphaeriidae	8	3
Naididae	7	2
Erpobdellidae	8	2
Lumbriculidae	8	2
Psephenidae	4	2
Hydrophilidae	5	1
Hydropsychidae	4	1
Planorbidae	6	1
Hydroptilidae	8	1
Veliidae	8	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 25.00 % (Elmidae)
Family Biotic Index: 5.85
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 7.00
EPT/C: 0.54
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 132
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 3/1
Substrate: Cobbles,gravel,sand,mud....StreamBank Vegetation/Stability:
Trees,vines,grass/Stable
Canopy: Mostly Closed....Other: Suburban; Water temp.17.1 /pH 7.6 /DO 9.3 /Cond.366

Station: AN0419
E Br Middle Bk, Gilbride Rd , Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	21
Hydropsychidae	4	20
Elmidae	4	14
Physidae	7	9
Coenagrionidae	9	7
Gammaridae	4	6
Heptageniidae	4	5
Baetidae	4	4
Psephenidae	4	4
Oligoneuriidae	2	4
Philopotamidae	3	3
Tubificidae	10	2
Pyralidae	5	1
Hydroptilidae	4	1
Cambaridae	5	1
Corydalidae	0	1
Planariidae	4	1
Planorbidae	6	1
Gomphidae	1	1
Haliplidae	5	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 108
% Contribution of Dominant Family: 19.44 % (Chironomidae)
Family Biotic Index: 4.99
Scraper/Filterer Collector Ratio: 0.94
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 34.26
EPT/C: 1.63
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 146
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 17/1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs,grass/Stable
Canopy: Mostly Open....Other: Rural/Forested; Water temp.19.5 /pH 7.1 /DO 9.1 /Cond.342

Station: AN0420
Middle Bk, Talmage Rd , Bridgewater Twp, Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 09/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Planariidae	4	20
Hydropsychidae	4	15
Chironomidae	6	13
Heptageniidae	4	9
Baetidae	4	6
Tetrastemmatidae	7	6
Coenagrionidae	9	5
Fredericellidae	2	4
Hydroptilidae	4	3
Elmidae	4	3
Naididae	7	2
Empididae	6	2
Oligoneuriidae	2	2
Pyralidae	5	1
Hydrophilidae	5	1
Leptoceridae	4	1
Caenidae	7	1
Philopotamidae	3	1
Chrysomelidae	5	1
Simuliidae	6	1
Gammaridae	4	1
Psephenidae	4	1
Tricorythidae	4	1

Statistical Analysis

Number of Taxa: 23
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Planariidae)
Family Biotic Index: 4.74
Scraper/Filterer Collector Ratio: 0.31
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
% EPT: 39.00
EPT/C: 3.00
NJIS Rating: 30
Biological Condition: Nonimpaired
Habitat Analysis: 158
Deficiency(s) noted:
-

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 15/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Open....Other: Urban; Water temp.16.1 /pH 8.1 /DO 10.2 /Cond.328

Station: AN0421
Green Bk, Raymond Ave , Watchung Boro, Somerset-Union County
Chatham USGS Quadrangle
Date Sampled: 02/16/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	20
Hydropsychidae	4	11
Tubificidae	10	3
Philopotamidae	3	2
Chironomidae	6	2
Psephenidae	4	2
Planorbidae	6	1
Dytiscidae	5	1
Lumbriculidae	8	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 44
% Contribution of Dominant Family: 45.45 % (Gammaridae)
Family Biotic Index: 4.61
Scraper/Filterer Collector Ratio: 0.23
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 29.55
EPT/C: 14.77
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 111
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27/<1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Urban/Commercial; Water temp.5.2 /pH 7.8 /DO 15.7 /Cond.698

Station: AN0422
Stony Brook, West End Ave., N. Plainfield Boro., Somerset
Plainfield USGS Quadrangle
Date Sampled: 02/23/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	27
Gammaridae	4	23
Elmidae	4	18
Tubificidae	10	8
Hydropsychidae	4	8
Planariidae	4	7
Tipulidae	3	4
Lumbricidae	10	4
Psephenidae	4	3
BloodRed Chironomidae	8	1
Lumbriculidae	8	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 105
% Contribution of Dominant Family: 25.71 % (Chironomidae)
Family Biotic Index: 5.26
Scraper/Filterer Collector Ratio: 2.33
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 7.62
EPT/C: 0.29
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 114
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Grasses/Poor
Canopy: Open....Other: Suburban; Rock wall rt. bank
Water temp. 0.5C / pH 7.9SU / DO 17.3mg/L / Cond. 443umhos;

Station: AN0423
Green Brook, Clinton Ave., Plainfield, Union & Somerset County
Plainfield USGS Quadrangle
Date Sampled: 02/22/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	43
Gammaridae	4	26
Chironomidae	6	4
Elmidae	4	2
Lumbricidae	10	2
Sphaeriidae	8	2
Oniscidae	7	2
Hydropsychidae	4	2
Enchytraeidae	10	1
Lebertiidae	4	1
Corydalidae	0	1
Planariidae	4	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 88
% Contribution of Dominant Family: 48.86 % (Tubificidae)
Family Biotic Index: 7.39
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.27
EPT/C: 0.40
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 97
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 20-25/1-2
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs, Grass/Poor
Canopy: Mostly Open....Other: Urban, Forested (county park); Trash & Debris
Waterfowl abundant, Minnows; Water temp. 2.9C / pH 7.9SU / DO 16.5mg/L / Cond. 505umhos

Station: AN0424
Bound Brook, Bound Brook Rd., Middlesex Boro., Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 02/22/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	48
Tubificidae	10	13
Plagiostomidae	4	8
Corbiculidae	8	6
Plumatellidae	7	6
Hydropsychidae	4	5
Chironomidae	6	5
Planariidae	4	2
Sphaeriidae	8	2
Asellidae	8	1
Planorbidae	6	1
Nematoda	6	1
Physidae	7	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 48.00 % (Gammaridae)
Family Biotic Index: 5.52
Scraper/Filterer Collector Ratio: 0.11
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 5.00
EPT/C: 1.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 118
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30-35/1
Substrate: Gravel/Sand, Silt....StreamBank Vegetation/Stability: Trees, Shrubs/Poor
Canopy: Partly Open....Other: Urban, Forested; Fish consumption advisory posted, Trash & debris embedded in substrate
Waterfowl upstr; Water temp. 2.7C / pH 7.9SU / DO 14.8mg/L / Cond. 435umhos

Station: AN0424B
Bound Brook, Woodbrook Rd., S. Plainfield, Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 02/23/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	45
Gammaridae	4	37
Asellidae	8	9
Chironomidae	6	6
Lumbriculidae	8	2
Sphaeriidae	8	2
Hydropsychidae	4	1
Coenagrionidae	9	1
Lumbricidae	10	1
Notonectidae	9	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 105
% Contribution of Dominant Family: 42.86 % (Tubificidae)
Family Biotic Index: 7.33
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.09
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.95
EPT/C: 0.17
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 98
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 12/2
Substrate: Mud, Silt....StreamBank Vegetation/Stability: Trees, Vines, Grasses/Fair
Canopy: Partly Open....Other: Forested; Trash, Car parts
Color of water - Brown; Water temp. 1.9C / pH 7.9SU / DO 14.5mg/L / Cond. 556umhos

Station: AN0425
Ambrose Brook, Raritan Ave., Middlesex Boro, Middlesex County
Bound Brook USGS Quadrangle
Date Sampled: 02/22/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	37
Gammaridae	4	26
Planariidae	4	12
Elmidae	4	7
Corbiculidae	8	6
Hydropsychidae	4	3
Hydrobiidae	8	3
Naididae	7	3
Sphaeriidae	8	2
Asellidae	8	1
Corixidae	9	1
Pleuroceridae	6	1
Erpobdellidae	8	1
Chironomidae	6	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 105
% Contribution of Dominant Family: 35.24 % (Tubificidae)
Family Biotic Index: 6.81
Scraper/Filterer Collector Ratio: 1.09
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.86
EPT/C: 3.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 129
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 25-30/1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Poor Canopy: Mostly Open....Other: Urban; Storm sewers
Waterfowl abundant, Minnows, Filamenous algae, Fuzzy masses attached to substrate; Water temp. 2.1C / pH 7.9SU / DO 14.7mg/L / Cond. 438umhos

Station: AN0425A
Ambrose Brook, Behmer Rd., Piscataway Twp., Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 02/23/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	34
Tubificidae	10	16
Elmidae	4	14
Hydropsychidae	4	13
Nematoda	6	7
Chironomidae	6	4
Corbiculidae	8	2
Naididae	7	2
Plumatellidae	7	2
BloodRed Chironomidae	8	1
Coenagrionidae	9	1
Planorbidae	6	1
Physidae	7	1
Sphaeriidae	8	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 34.00 % (Gammaridae)
Family Biotic Index: 5.55
Scraper/Filterer Collector Ratio: 0.89
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 13.00
EPT/C: 2.60
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 102
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 10/1
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees. Vines/Poor
Canopy: Mostly Open....Other: Suburban; Storm sewers
Trash, Geese; Water temp. 0.7C / pH 8.0SU / DO 15.7mg/L / Cond. 390umhos

Station: AN0426
Green Brook, Lincoln Blvd., Bound Brook Boro., Somerset & Middlesex County
Bound Brook USGS Quadrangle
Date Sampled: 02/22/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	35
Chironomidae	6	20
Tubificidae	10	9
BloodRed Chironomidae	8	8
Hydropsychidae	4	8
Corbiculidae	8	4
Tipulidae	3	3
Plagiostomidae	4	3
Lumbricidae	10	2
Physidae	7	2
Asellidae	8	1
Hydrobiidae	8	1
Tetrastemmatidae	7	1
Simuliidae	6	1
Sphaeriidae	8	1
Lymnaeidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 101
% Contribution of Dominant Family: 34.65 % (Gammaridae)
Family Biotic Index: 5.74
Scraper/Filterer Collector Ratio: 0.29
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 7.92
EPT/C: 0.29
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 120
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 25-30/1-2
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Poor
Canopy: Mostly Open....Other: Urban, Forested (park), Industrial; Storm sewers
Sampled abv. conflu. with Ambrose Bk., Waterfowl present; Water temp. 2.4C / pH 7.5SU / DO 14.4mg/L / Cond. 448umhos

Station: AN0427
Raritan R Trib, Rt 527 , Franklin Twp., Somerset County
Bound Brook USGS Quadrangle
Date Sampled: 10/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	51
Asellidae	8	16
Hydropsychidae	4	13
Heptageniidae	4	8
Planorbidae	6	6
Elmidae	4	3
Corbiculidae	8	2
Chironomidae	6	1
Coenagrionidae	9	1
Lymnaeidae	6	1
Plagiostomidae	4	1
Veliidae	9	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 105
% Contribution of Dominant Family: 48.57 % (Gammaridae)
Family Biotic Index: 4.96
Scraper/Filterer Collector Ratio: 0.17
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 20.00
EPT/C: 20.00
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 141
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 13/1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural/Forested; Water temp.16.3 /pH 7.5 /DO 5.8 /Cond.190

Station: AN0428
Raritan River, Bakelite Park (Fieldville Dam), Piscataway Twp., Middlesex/Somerset
Bound Brook USGS Quadrangle
Date Sampled: 07/08/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	40
Chironomidae	6	14
Elmidae	4	10
Pyralidae	5	9
Baetidae	4	4
Hydropsychidae	4	4
Planorbidae	6	2
Hydrobiidae	8	2
Leptoceridae	4	2
Sphaeriidae	8	2
Tricorythidae	4	2
Blephariceridae	0	1
BloodRed Chironomidae	8	1
Corixidae	9	1
Planariidae	4	1
Hydroptilidae	4	1
Tubificidae	10	1
Physidae	7	1
Potamanthidae	4	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 40.00 % (Gammaridae)
Family Biotic Index: 4.73
Scraper/Filterer Collector Ratio: 5.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 14.00
EPT/C: 0.93
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 161
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 60/1
Substrate: Cobbles. Gravel/Sand....StreamBank Vegetation/Stability: Trees, Shrubs/Fair
Canopy: Open....Other: Forested, Park; Fish, Geese, Blue-claw crab, Minnows,
Macrophytes
Entire sample sorted; Water temp. 29.7C / pH 7.7SU / DO 17.0mg/L / Cond. 360umhos

Station: AN0429
Mile Run, Rt 527 , New Brunswick, Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 10/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Physidae	7	46
Tubificidae	10	6
Planorbidae	6	3
Chironomidae	6	2
Calopterygidae	5	2
Hydropsychidae	4	2
Tipulidae	3	1
BloodRed Chironomidae	8	1
Gammaridae	4	1
Erpobdellidae	8	1
Lumbriculidae	8	1
Lymnaeidae	6	1
Lumbricidae	10	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 70
% Contribution of Dominant Family: 65.71 % (Physidae)
Family Biotic Index: 7.03
Scraper/Filterer Collector Ratio: 15.67
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.86
EPT/C: 0.95
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 131
Deficiency(s) noted: Physidae Family Overwhelmingly Dominant - - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 27/1
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Urban; Water temp.16.3 /pH 7.3 /DO 8.0 /Cond.342

Station: AN0430
Lawrence Bk, Ridge Rd , Monmouth Junction, Middlesex County
Monmouth Junction USGS Quadrangle
Date Sampled: 09/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Paludicellidae	7	71
Plumatellidae	7	8
Coenagrionidae	9	4
Talitridae	8	4
Corixidae	9	3
Naididae	7	2
Planorbidae	6	2
Chironomidae	6	2
Aeshnidae	3	1
BloodRed Chironomidae	8	1
Lestidae	9	1
Naucoridae	5	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 71.00 % (Paludicellidae)
Family Biotic Index: 7.11
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 124
Deficiency(s) noted: Paludicellidae Family Overwhelmingly Dominant - - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 25/2
Substrate: Mud....StreamBank Vegetation/Stability: Trees,shrubs,weeds/Unstable
Canopy: Open....Other: Suburban; Water temp.16.1 /pH 7.2 /DO 4.6 /Cond.172

Station: AN0431
Lawrence Bk, Davidsons Mill Rd , S Brunswick Twp, Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	20
Chironomidae	6	20
Hydrobiidae	8	16
Coenagrionidae	9	8
BloodRed Chironomidae	8	8
Planorbidae	6	7
Tetrastemmatidae	7	4
Caenidae	7	3
Viviparidae	6	2
Tubificidae	10	2
Libellulidae	9	2
Glossiphoniidae	8	1
Arrenuridae	5	1
Gomphidae	1	1
Chydoridae	4	1
Lumbriculidae	8	1
Palaemonidae	6	1
Lymnaeidae	6	1
Sialidae	4	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 100
% Contribution of Dominant Family: 20.00 % (Sphaeriidae & Chironomidae)
Family Biotic Index: 7.27
Scraper/Filterer Collector Ratio: 1.24
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
EPT/C: 0.11
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 140
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 37/2
Substrate: Gravel,snags,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.19.2 /pH 7.1 /DO 5.2 /Cond.153

Station: AN0432
Oakeys Bk, Davidsons Mill Rd , S Brunswick Twp, Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Fredericellidae	2	53
Planorbidae	6	15
Naididae	7	11
Elmidae	4	4
Tubificidae	10	3
Physidae	7	3
Lumbriculidae	8	2
Daphnidae	4	2
Calopterygidae	5	1
Aeshnidae	3	1
Psephenidae	4	1
Lymnaeidae	6	1
Veliidae	9	1
Corixidae	9	1
Chironomidae	6	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 53.00 % (Fredericellidae)
Family Biotic Index: 4.06
Scraper/Filterer Collector Ratio: 0.44
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 135
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 7/1
Substrate: Cobbles,gravel....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.16.6 /pH 7.1 /DO 7.3 /Cond.186

Station: AN0433
Ireland Bk, Riva Rd Nr Patricks Corner, Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	24
Hydropsychidae	4	16
Naididae	7	14
Elmidae	4	14
Gammaridae	4	11
Simuliidae	6	7
Asellidae	8	3
Tubificidae	10	3
Calopterygidae	5	2
Planariidae	4	2
Tetrastemmatidae	7	2
Veliidae	9	2
Tipulidae	3	1
Baetidae	4	1
Lumbriculidae	8	1
Phryganeidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 104
% Contribution of Dominant Family: 23.08 % (Chironomidae)
Family Biotic Index: 5.49
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 17.31
EPT/C: 0.72
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 157
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 13/1
Substrate: Cobbles,gravel,sand,snags....StreamBank Vegetation/Stability:
Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Forested; Water temp.15.4 /pH 7.1 /DO 8.6 /Cond.145

Station: AN0434
Lawrence Bk, Riva Rd , Milltown, Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	30
Tubificidae	10	19
Planariidae	4	16
Chironomidae	6	11
Gammaridae	4	6
BloodRed Chironomidae	8	6
Lumbriculidae	8	5
Corbiculidae	8	2
Planorbidae	6	2
Sphaeriidae	8	2
Viviparidae	6	1
Plagiostomidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 101
% Contribution of Dominant Family: 29.70 % (Naididae)
Family Biotic Index: 6.89
Scraper/Filterer Collector Ratio: 0.75
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 129
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 45/2
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Shrubs,trees/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.21.9 /pH 6.9 /DO 5.9 /Cond.175

Station: AN0435
Sawmill Bk, Ryders Ln , Milltown, Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	34
Chironomidae	6	20
Coenagrionidae	9	13
Lumbriculidae	8	6
Sphaeriidae	8	6
Calopterygidae	5	4
Tetrastemmatidae	7	4
Corduliidae	5	2
Planariidae	4	2
Glossiphoniidae	8	1
Aeshnidae	3	1
Baetidae	4	1
Planorbidae	6	1
Libellulidae	9	1
Sialidae	4	1
Lymnaeidae	6	1
Naididae	7	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 34.00 % (Tubificidae)
Family Biotic Index: 7.94
Scraper/Filterer Collector Ratio: 0.33
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
EPT/C: 0.05
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 113
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 9/1
Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.17.2 /pH 6.6 /DO 7.2 /Cond.367

Station: AN0436
Mill Brook, Nr. Rt. 514 (Woodbridge Ave.) Off Njtpk. Access Rd., Edison Twp., Middlesex
Plainfield USGS Quadrangle
Date Sampled: 07/13/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	76
Baetidae	4	22
Lumbricidae	10	2
Physidae	7	2
Lumbriculidae	8	1
Chironomidae	6	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 104
% Contribution of Dominant Family: 73.08 % (Hydropsychidae)
Family Biotic Index: 4.23
Scraper/Filterer Collector Ratio: 0.03
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 94.23
EPT/C: 98.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 151
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant -
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Fast....Width/Depth (ft): 10/<1
Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, Weeds/Good
Canopy: Closed....Other: Suburban, Forested, NJTpk.; Storm sewers
Fish; Water temp. 19.8C / pH 7.4SU / DO 11.1mg/L / Cond. 495umhos

Station: AN0437
Manalapan Bk, Rt 524 , Ely { Millstone Twp }, Monmouth County
Roosevelt USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	19
Fredericellidae	2	17
Chironomidae	6	15
Brachycentridae	1	10
Baetidae	4	9
BloodRed Chironomidae	8	4
Elmidae	4	4
Hydropsychidae	4	4
Tubificidae	10	3
Tipulidae	3	2
Pyralidae	5	2
Physidae	7	2
Tetrastemmatidae	7	2
Gyrinidae	3	1
Planorbidae	6	1
Leptophlebiidae	2	1
Polycentropodidae	6	1
Sphaeriidae	8	1
Lymnaeidae	6	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 19.00 % (Simuliidae)
Family Biotic Index: 4.57
Scraper/Filterer Collector Ratio: 0.12
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 26.00
EPT/C: 1.37
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 167
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 7/1
Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Rural/Forested; Water temp.14.4 /pH 7.4 /DO 7.4 /Cond.193

Station: AN0438
Manalapan Bk, Rt 33 , Millhurst, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	41
Fredericellidae	2	20
Chironomidae	6	12
Planorbidae	6	11
Paludicellidae	7	5
Tetrastemmatidae	7	4
Heptageniidae	4	4
Naididae	7	3
Leptoceridae	4	3
Coenagrionidae	9	2
Elmidae	4	1
Tubificidae	10	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 107
% Contribution of Dominant Family: 38.32 % (Hydropsychidae)
Family Biotic Index: 4.54
Scraper/Filterer Collector Ratio: 0.21
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 44.86
EPT/C: 3.74
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 140
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 13/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural/Forested/Lake upstream/Agricultural cropland;
Water temp.23.7 /pH 6.8 /DO 6.6 /Cond.179

Station: AN0439
Manalapan Bk, Federal Rd , Monroe Twp, Middlesex County
Jamesburg USGS Quadrangle
Date Sampled: 09/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Fredericellidae	2	50
Chironomidae	6	27
Calopterygidae	5	5
Baetidae	4	3
Elmidae	4	2
Aeshnidae	3	2
Lebertiidae	4	2
Heptageniidae	4	2
Tipulidae	3	1
Hydropsychidae	4	1
Leuctridae	0	1
Macromiidae	3	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1
Daphnidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 50.00 % (Fredericellidae)
Family Biotic Index: 3.58
Scraper/Filterer Collector Ratio: 0.08
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 7.00
EPT/C: 0.26
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 149
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 25/2
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Rural/Forested/Agricultural cropland; Water temp.18.3 /pH - /DO 8.4 /Cond. -

Station: AN0440
Manalapan Bk, Old Forge Rd , Helmetta, Middlesex County
Jamesburg USGS Quadrangle
Date Sampled: 10/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	40
Heptageniidae	4	14
Sphaeriidae	8	8
Paludicellidae	7	7
Sialidae	4	5
Calopterygidae	5	4
Fredericellidae	2	3
Asellidae	8	2
Talitridae	8	2
Limnephilidae	4	2
Coenagrionidae	9	1
Baetidae	4	1
Brachycentridae	1	1
Hydropsychidae	4	1
Tubificidae	10	1
Pyralidae	5	1
Polycentropodidae	6	1
Tetrastemmatidae	7	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 96
% Contribution of Dominant Family: 41.67 % (Chironomidae)
Family Biotic Index: 5.70
Scraper/Filterer Collector Ratio: 0.67
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 20.83
EPT/C: 0.52
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 152
Deficiency(s) noted:
-

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 33/1
Substrate: Cobbles,mud....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Open....Other: Suburban/Forested/New construction nearby; Water temp.15.0 /pH 7.6 /DO 8.1 /Cond.172

Station: AN0441
Weamaconk Ck, Rt 9 , Freehold Twp., Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	82
Tubificidae	10	7
Physidae	7	5
BloodRed Chironomidae	8	4
Chironomidae	6	2
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 101
% Contribution of Dominant Family: 81.19 % (Gammaridae)
Family Biotic Index: 4.78
Scraper/Filterer Collector Ratio: 3.00
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: 143
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/<1
Substrate: Sand....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Closed....Other: Suburban/Forested; Water temp.14.8 /pH 7.1 /DO 8.4 /Cond.207

Station: AN0442
Wemrock Bk, Wemrock Rd , Freehold Twp, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	22
Chironomidae	6	16
Tipulidae	3	16
Gammaridae	4	15
Hydropsychidae	4	10
Simuliidae	6	9
Calopterygidae	5	4
Planariidae	4	4
Phryganeidae	4	3
Sialidae	4	3
Elmidae	4	2
Sphaeriidae	8	2
Aeshnidae	3	1
Enchytraeidae	10	1
Tetrastemmatidae	7	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 110
% Contribution of Dominant Family: 20.00 % (Tubificidae)
Family Biotic Index: 5.69
Scraper/Filterer Collector Ratio: 0.05
Shredder/Total Ratio: 0.20
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 12.73
EPT/C: 0.80
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 154
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 8/2
Substrate: Sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Closed....Other: Rural/Forested; Water temp.15.9 /pH - /DO 9.5 /Cond.-

Station: AN0443
Weamaconk Ck, Rt 522 , Englishtown, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	26
Paludicellidae	7	19
Elmidae	4	15
Coenagrionidae	9	12
Fredericellidae	2	6
Tubificidae	10	5
Caenidae	7	3
BloodRed Chironomidae	8	3
Naididae	7	2
Hydrobiidae	8	2
Planorbidae	6	2
Hydrophilidae	5	1
Corixidae	9	1
Planariidae	4	1
Leptoceridae	4	1
Libellulidae	9	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Chironomidae)
Family Biotic Index: 6.37
Scraper/Filterer Collector Ratio: 0.28
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.00
EPT/C: 0.14
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 146
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 30/2
Substrate: Sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Suburban/Forested; Water temp.17.5 /pH - /DO 6.9 /Cond. -

Station: AN0444
Mcgellairds Bk, Rt 9 , Freehold, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	18
Gammaridae	4	17
Elmidae	4	13
Hydrobiidae	8	13
Tubificidae	10	9
Leptoceridae	4	4
Coenagrionidae	9	2
Sialidae	4	2
Lumbriculidae	8	1
BloodRed Chironomidae	8	1
Daphnidae	4	1
Zonitoidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 82
% Contribution of Dominant Family: 21.95 % (Chironomidae)
Family Biotic Index: 5.98
Scraper/Filterer Collector Ratio: 13.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 4.88
EPT/C: 0.26
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 153
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 10/2
Substrate: Sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Closed....Other: Urban/Forested; Water temp.19.5 /pH - /DO 7.2 /Cond. -

Station: AN0445
Tepehemus Bk, Tennent Rd , Manalapan Twp, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	43
Paludicellidae	7	24
Tubificidae	10	9
Corixidae	9	8
Physidae	7	5
Calopterygidae	5	1
Hydropsychidae	4	1
Elmidae	4	1
Empididae	6	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1
Gerridae	8	1
Simuliidae	6	1
Corduliidae	5	1
BloodRed Chironomidae	8	1
Dytiscidae	5	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 100
% Contribution of Dominant Family: 43.00 % (Chironomidae)
Family Biotic Index: 6.89
Scraper/Filterer Collector Ratio: 0.19
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
EPT/C: 0.02
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 134
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 9/1
Substrate: Sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural/Forested/Agricultural cropland; Water temp.20.6 /pH 7.1 /DO 7.9 /Cond.181

Station: AN0446
Milford Bk, Pease Rd , Manalapan Twp, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydropsychidae	4	80
Chironomidae	6	10
Calopterygidae	5	5
Tubificidae	10	3
Elmidae	4	1
Planariidae	4	1
Naididae	7	1
Tetrastemmatidae	7	1
Lymnaeidae	6	1
Veliidae	9	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 104
% Contribution of Dominant Family: 76.92 % (Hydropsychidae)
Family Biotic Index: 4.54
Scraper/Filterer Collector Ratio: 0.03
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 76.92
EPT/C: 7.69
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 137
Deficiency(s) noted: Hydropsychidae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 11/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.20.2 /pH 7.2 /DO 7.3 /Cond.320

Station: AN0447
Mcgellairds Bk, Rt 527 , Englishtown, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/09/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	84
Tubificidae	10	6
Hydrobiidae	8	4
Elmidae	4	3
Corixidae	9	1
Coenagrionidae	9	1
Corduliidae	5	1

Statistical Analysis

Number of Taxa: 7
Total Number of Individuals: 100
% Contribution of Dominant Family: 84.00 % (Chironomidae)
Family Biotic Index: 6.31
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: 153
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant - - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 30/3
Substrate: Sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Suburban/Forested; Water temp.17.5 /pH - /DO 7.1 /Cond. -

Station: AN0448
Matchaponix Bk, Rt 527 , Manalapan Twp, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	31
Elmidae	4	13
Tubificidae	10	10
Hydrobiidae	8	9
Calopterygidae	5	7
BloodRed Chironomidae	8	7
Gammaridae	4	6
Hydropsychidae	4	5
Planorbidae	6	2
Physidae	7	2
Aeshnidae	3	1
Planariidae	4	1
Ephydridae	6	1
Coenagrionidae	9	1
Lumbriculidae	8	1
Cambaridae	5	1
Sphaeriidae	8	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 31.00 % (Chironomidae)
Family Biotic Index: 6.18
Scraper/Filterer Collector Ratio: 2.33
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 6.00
EPT/C: 0.16
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 137
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 17/2
Substrate: Sand,mud....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural/Forested/Commercial area; Water temp.21.6 /pH 6.2 /DO 6.9 /Cond.211

Station: AN0449
Pine Bk, Pension Rd , Clarks Mills, Monmouth County
Freehold USGS Quadrangle
Date Sampled: 09/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	80
Dytiscidae	5	11
Sialidae	4	5
Tubificidae	10	3
Hydropsychidae	4	2
Tipulidae	3	2
Corduliidae	5	2
Chironomidae	6	1
Corixidae	9	1
Coenagrionidae	9	1
Lumbriculidae	8	1
Phryganeidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 110
% Contribution of Dominant Family: 72.73 % (BloodRed Chironomidae)
Family Biotic Index: 7.32
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 2.73
EPT/C: 0.03
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 117
Deficiency(s) noted: BloodRed Chironomidae Family Overwhelmingly Dominant - - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 11/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Suburban; Water temp.19.6 /pH 5.0 /DO 6.7 /Cond.316

Station: AN0450
Barclay Bk, Rt 527 , Old Bridge Twp., Middlesex County
Freehold USGS Quadrangle
Date Sampled: 09/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	23
Calopterygidae	5	22
Chironomidae	6	18
Polycentropodidae	6	12
Coenagrionidae	9	7
Phryganeidae	4	5
Dytiscidae	5	4
Sialidae	4	3
Corydalidae	0	2
Tubificidae	10	2
Mesoveliidae	9	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 23.00 % (BloodRed Chironomidae)
Family Biotic Index: 6.22
Scraper/Filterer Collector Ratio: 0.08
Shredder/Total Ratio: 0.28
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 18.00
EPT/C: 0.44
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 158
Deficiency(s) noted:
-

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 13/1
Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Rural/Forested; Water temp.20.6 /pH 2.8 /DO 7.1 /Cond.370

Station: AN0451
Matchaponix Bk, Texas Rd , Texas, Old Bridge Twp., Middlesex County
Freehold USGS Quadrangle
Date Sampled: 09/01/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	33
Calopterygidae	5	15
Tubificidae	10	11
Coenagrionidae	9	6
Corixidae	9	5
Chironomidae	6	3
Aeshnidae	3	1
Elmidae	4	1
Planariidae	4	1
Cambaridae	5	1
BloodRed Chironomidae	8	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 79
% Contribution of Dominant Family: 41.77 % (Gammaridae)
Family Biotic Index: 5.87
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: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 136
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 37/2
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural/Forested/New development in area; Water temp.22.0 /pH 5.4 /DO 7.6 /Cond.390

Station: AN0452
Iresick Bk, Rt 527 , Old Bridge Twp, Middlesex County
S Amboy USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	32
Chironomidae	6	21
Veliidae	9	14
Calopterygidae	5	6
Gerridae	8	5
Lumbriculidae	8	2
Phryganeidae	4	2
Aeshnidae	3	1
Brachycentridae	1	1
Corydalidae	0	1
Tipulidae	3	1
Limnephilidae	4	1
Coenagrionidae	9	1
Naididae	7	1
Sialidae	4	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 91
% Contribution of Dominant Family: 35.16 % (Asellidae)
Family Biotic Index: 7.02
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.26
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 4.40
EPT/C: 0.21
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 84
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 4/<1
Substrate: Sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Urban/Bridge resently replaced/Road construction; Water temp.15.1 /pH 7.6 /DO 9.2 /Cond.98

Station: AN0453
Deep Run, Rt 9 , Old Bridge Twp., Middlesex County
S Amboy USGS Quadrangle
Date Sampled: 08/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	36
Tipulidae	3	4
Polycentropodidae	6	4
Phryganeidae	4	4
Sialidae	4	4
Enchytraeidae	10	3
Tubificidae	10	3
BloodRed Chironomidae	8	3
Calopterygidae	5	2
Elmidae	4	2
Corydalidae	0	2
Simuliidae	6	2
Gyrinidae	3	1
Coenagrionidae	9	1
Physidae	7	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 73
% Contribution of Dominant Family: 49.32 % (Chironomidae)
Family Biotic Index: 5.81
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.10
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 10.96
EPT/C: 0.28
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 182
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 20/2
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Closed....Other: Rural/Forested; Water temp.17.6 /pH 4.9 /DO 7.7 /Cond.317

Station: AN0454
Deep Run, Rt 516 , S Old Bridge, Old Bridge Twp., Middlesex County
S Amboy USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	50
Coenagrionidae	9	24
Asellidae	8	13
Chironomidae	6	12
Calopterygidae	5	2
Aeshnidae	3	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 102
% Contribution of Dominant Family: 49.02 % (Tubificidae)
Family Biotic Index: 8.87
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
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 22/3
Substrate: Gravel,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Rural/Forested/Construction in area; Water temp.16.9 /pH 6.3 /DO 6.0 /Cond.265

Station: AN0455
Tennent Bk, Old Bridge -S Amboy Rd , Old Bridge Twp., Middlesex County
S Amboy USGS Quadrangle
Date Sampled: 08/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	10
Gammaridae	4	5
Corixidae	9	5
Asellidae	8	3
BloodRed Chironomidae	8	3
Tubificidae	10	2
Polycentropodidae	6	2
Ceratopogonidae	6	1
Plagiostomidae	4	1
Hydropsychidae	4	1
Coenagrionidae	9	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 35
% Contribution of Dominant Family: 28.57 % (Chironomidae)
Family Biotic Index: 6.69
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 8.57
EPT/C: 0.66
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 173
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 25/3
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Rural/Forested; Water temp.16.2 /pH 6.3 /DO 3.4 /Cond.260