

State of New Jersey
Christine Todd Whitman, Governor

AMBIENT BIOMONITORING NETWORK
Watershed Management Areas 19, and 20

Delaware Region
Upper Tidal Portion

1998 Benthic Macroinvertebrate Data



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

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NJ Department of Environmental Protection

Environmental Planning & Science

Bob Tudor, Assistant Commissioner

Division of Watershed Management

Lance Miller, Director

Water Monitoring Management

James E. Mumman, Administrator

Bureau of Freshwater & Biological Monitoring

Alfred L. Korndoerfer, Jr., Chief

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Water Monitoring Report Prepared By:

Bureau of Freshwater and Biological Monitoring

John Kurtz, Project Manager

Barbara Kurtz

Victor Poretti

Thomas Miller

Dean Bryson

Map Preparation:

John Sell

Edited By:

Alfred L. Korndoerfer, Jr.

Paul Olsen



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INTRODUCTION

Historical Perspective

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

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

Rationale for Biological Monitoring

Biological monitoring, as referenced in this report, pertains to the collection and analysis of stream macroinvertebrate communities as indicators of water or habitat quality. Macroinvertebrates are larger-than-microscopic, primarily benthic (bottom-dwelling) fauna, which are generally ubiquitous in freshwater and estuarine environments, and play an integral role in the aquatic food web. Insects (largely immature forms) are especially characteristic of freshwaters; other major groups include worms, mollusks (snails, clams) and crustaceans (scuds, shrimp, water fleas, etc.). They are more readily collected and quantified than either fish or periphyton communities. Species comprising the in-stream community occupy various niches, based on functional adaptation or feeding mode (e.g. predators, filter or detritus feeders, scavengers); their presence and relative abundance is governed by environmental conditions (which may determine available food supply), and by pollution tolerance levels of the respective species. The overall community thus is holistically reflective of conditions in its environment. Assessments of ambient water and habitat quality can then be made based upon standardized procedures, which can show perturbations measured as changes or differences in community structure [2, 4].

STUDY DESIGN

Data Quality Objectives

The major goal of AMNET is to establish a network of stream sites that would adequately represent New Jersey's major drainage basins and NJDEP's Watershed Management Areas (WMA). Twenty WMAs have recently been delineated within New Jersey's five basins. Each basin constitutes a "Water Region." Within each WMA are several sub-basins, delineated by the United States Geological Survey (USGS) as "hydrologic units," scale 11 (HUC11). The study area of the present report includes WMAs 19 and 20 (see Maps 1 – 5). The sampling frequency reflects a realistic temporal lag between cessation of an environmental perturbation and recovery of the impacted biological community. The 305b Water Quality Inventory [3], which reexamines changes in New Jersey's stream systems on a two-year cycle, has indicated that five years is an optimum period for long-term biomonitoring. An ample network of stations is required for the creation of a long-term database, which in turn, is necessary for trend analysis and operation of water quality predictive models.

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

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

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

Site Selection

For the first round of AMNET (1992–1993), a total of 192 stations had been established in the upper Delaware basin [5]. This area (shown in Figure 1) included all sub-basins that drain to the Delaware River from its upper tidal portion at Cooper River (Camden County) northward to Clove Brook near the New Jersey/New York border (Sussex County). On the smallest tributaries, sampling sites were located as closely to headwaters as was practical. To ensure enough flow for sampling, sites on "first-order" streams were situated at least three miles downstream of headwaters (first order streams are those with no tributaries). Since most streams at this level have very little, or only intermittent, flow, most of our sites were situated on second-order streams (with only first-order streams as tributaries) and higher (with a greater hierarchy of tributaries). All sites were located in reasonably accessible and primarily wadable segments, proceeding downstream to just above the confluence with the Delaware River. The Delaware River main stem was not monitored, since this was presumably being done by the Delaware River Basin Commission (DRBC).

For the second round of AMNET (FY98), the original study area was divided into two segments in conformance with the boundary between the newly established Water Regions. The upper portion (WMA #1, 2, & 11), which drains to the non-tidal Delaware River, constitutes the Upper Delaware Region, and results of that study are presented in a separate report. The study area of the present report consists of those sub-basins that drain to the upper tidal Delaware River and now form a portion of the Lower Delaware Water Region. The Assunpink Creek sub-basin forms the southern boundary of the Upper Delaware Water Region against the Crosswicks Creek drainage basin in the Lower Delaware Region (top of Map 1). The present study area, including the original 73 sites from the first AMNET sampling in 1992 – 93 [5], plus fourteen new sites, encompasses WMAs #19 & 20 (Crosswicks Creek southward to the Cooper River sub-basin) (Figure 2). One site (AN0141) was not sampled due to low flow conditions. Future AMNET studies will include the present study area in its proper jurisdiction with the Lower Delaware Water Region.

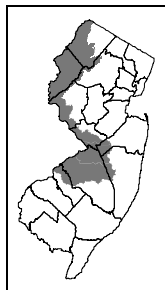


Figure 1

Map of 1992 – '93 study area

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

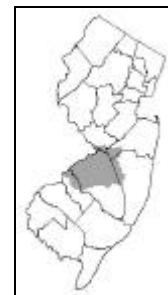


Figure 2

Map of 1997 – '98 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 – 5, Appendix A).

FIELD & LABORATORY METHODS

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

Field Collection

Because the low gradient of the southern regions precludes streams from having dominant riffle areas (the preferred sampling habitat) we modified the RBP field methods for New Jersey streams by collecting multi-habitat sampling. This type of sampling includes both riffle and run areas, with various types of substrate (e.g. fine sediment, gravel/rocks, woody debris, stream and bank vegetation), plus coarse particulate matter or leaf litter (CPOM). This would minimize habitat or substrate variation between stations, and include all likely functional groups of macroinvertebrates. Samples were collected in semi-quantitative fashion either with a Surber Sampler, kick net, Petite Ponar dredge, or by hand picking. During the field investigation, semi-qualitative observations of habitat, surrounding land use, potential pollution sources, and other aquatic biota were recorded, although these did not figure into the final numerical rating. At each site, the entire sample was sieved through 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 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 is an important part of the RBP protocol, developed under USEPA auspices as an expedient and cost-effective monitoring tool. It recognizes a multiple approach, utilizing several "biometrics," that measure different components of community structure, including population and functional parameters, each with a different range of sensitivity to pollution stresses [2, 4]. The use of a variety of biometrics assures a more robust or valid assessment; therefore, an anomaly in any one metric is less likely to invalidate the study findings. The results are integrated through common scoring criteria, derived from an established comparable database, to determine a final numerical rating and consequent biological condition category (see Table 1). This provides the analyst with an easily communicated evaluation of relative impairment, referred to in this report as the "bioassessment rating." For RBP II protocols, results are based on 100 organism sub-samples, and scoring criteria are validated for family level taxonomy, giving three final rating categories (non-impaired, moderately impaired, and severely impaired).

The biometrics we employ are modified from RBP II methods, having been statistically validated for New Jersey based upon data from 200 stream sites throughout the state [10]. The final numerical rating is referred to as the "New Jersey impairment score" (NJIS). The scoring criteria and rating categories are presented in Table 1. The metrics from which the NJIS is derived are explained below:

1. **Total Taxa or Taxa Richness** (# families) — an index of community diversity; the number usually increases with increasing water or habitat quality.
2. **Percent Contribution of the Dominant Family** (to the total # families) — dominance by relatively few species/families would indicate environmental stress.
3. **# EPT Families** — the number of families represented within the orders Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies), which are generally pollution-sensitive.
4. **Percent EPT** (of the total # individuals) — would increase with increasing water quality.
5. **Hilsenhoff (Family) Biotic Index** — tolerance values of 0 - 10 assigned to individual families increase as water quality decreases; summarizes the overall pollution tolerance of the entire benthic macroinvertebrate community with a single value.

Comparison with 1992 — 1993 Results

In evaluating the current (1997–1998) AMNET data for the upper tidal Delaware sub-basins against that for 1992–1993 [5], 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. The cause of the abnormalities is, at this time, undetermined. Further investigation will depend upon the identification of adequate additional resources.

Chironomid larvae were examined for abnormalities on a more or less random basis, with a maximum of 25 individuals examined, regardless of the total number of midges in the sample (sometimes > 50 or > 100). These results for Chironomidae and other taxa are listed, by sample site, in Table 3 as (# positive results obtained / # individuals examined for abnormalities). 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 1992-1993 and 1997-1998 sampling periods (see Table 3). Photographic examples of abnormalities in midge larvae and amphipods (scuds), plus maps of the sites where these were found, are contained in Appendix B. AMNET sites found with significant and chronic abnormalities in chironomids are also indicated in Maps 1 — 5.

SUPPLEMENTAL ANALYSIS / EVALUATION

Habitat Assessment

The physical attributes of habitat play an integral role in the health of the macroinvertebrate community. Where stations are physically comparable, detected impacts can be attributed to water quality factors; however, habitat degradation alone can account for biological impairment in a stream [2]. Parameters we evaluated included in-stream substrate, channel morphology, bank structural features, and riparian vegetation. The area evaluated included the sample site and its immediate surroundings (usually within a 100 – 200 foot radius).

The qualitative habitat assessment involves four condition categories, rating each parameter as optimal, suboptimal, marginal or poor based on recently revised USEPA criteria [11]. Habitat assessments may be temporarily downgraded by adverse weather conditions, such as excessive rainfall or prolonged drought (which existed during this study period). It should also be noted that habitat assessments are performed independently of the macroinvertebrate community analysis; thus they do not factor into the final impairment score, but are used primarily as supplementary information. For each parameter, the range of conditions and the numerical rating scale are presented for high and low gradient streams, respectively, in Table 4. Comparisons of these final scores against the respective NJIS scores and relative trends, are shown in **Appendix C**.

All streams in the northern portion of New Jersey, i.e. the Piedmont, Valley/Ridge and Highlands regions, are considered to be “high gradient” streams, having substrates of rock and cobble of various sizes, and with relatively swift flow. Those in the Coastal Plain region of southern New Jersey are considered as “low gradient” streams, having slower flow and more homogeneous substrates, primarily of sand or gravel and finer sediments. These major physiographic subregions are illustrated in the New Jersey State EcoMap [12]. The transition from high gradient to low gradient is marked by the “Fall Line”, a geologic/topographic feature that bisects New Jersey in a southwest–northeasterly direction from the Delaware River at Trenton (where it forms the “head-of-tide”) through the lower Raritan River near New Brunswick. The trajectory of the Fall Line is superficially traced by the lower Assunpink Creek at the southwest juncture, and its alignment with Lawrence Brook to the northeast in the Raritan River drainage. The Delaware River drainage system encompasses portions of both high and low gradient regions, the division being in the Assunpink sub-basin, which is included in the upper Delaware basin [5]. The Crosswicks Creek drainage (Map 1) is the northernmost sub-basin situated entirely within the low gradient terrain of the Coastal Plain and the lower Delaware basin. Administratively, the boundary between the Upper and Lower Delaware Water Regions conforms with that separating the Assunpink and Crosswicks Creek sub-basins.

Sediment Toxicity Testing

To supplement the results of the benthic macroinvertebrate sampling, the BFWM from 1996 to 1998 performed acute sediment toxicity tests on several AMNET sites that exhibited “severely impaired” biological conditions in the earlier upper Delaware survey. The methods conformed to standardized USEPA protocols as reflected in our laboratory Standard Operating Procedures [9]. The amphipod *Hyaella azteca* was used as the test organism in the 10-day tests that measured effects on both survival and growth. Results from the test sites were compared to the responses observed in reference sediment from non-impaired AMNET sites that were similar in morphology or habitat features. Most of the AMNET sites tested have been in WMA #19 (Maps 3 – 5). The test sites, and correlating reference sites are as follows:

Test Site	Reference Site Used
AN0150 Budds Run, Main St	AN0154 Burrs Mill Bk
AN0151 North Br Rancocas Ck	AN0154 Burrs Mill Bk
AN0153 Burrs Mill Bk	AN0154 Burrs Mill Bk
AN0166 Barton Run	AN0154 Burrs Mill Bk
AN0168 Haynes Ck	AN0154 Burrs Mill Bk
AN0180 North Br Pennsauken Ck	AN0154 Burrs Mill Bk
AN0184 South Br Pennsauken Ck	AN0154 Burrs Mill Bk

RESULTS AND DISCUSSION

Overall, bioassessment ratings developed for each of the monitoring stations were used as the basis for evaluating the degree of biological impairment within the coincident stream segments. The estimated bioassessment ratings for each stream segment are presented as color-coded highlighted segments on the GIS maps # 1 through 5. In each WMA, starting from the AMNET station farthest downstream, estimated bioassessment ratings were assigned to the stream segments by interpolating from the downstream station to the next contiguous upstream station. These ratings are best estimates of the in-stream biological impairment based upon the available data. For any given segment, however, the actual in-situ conditions may vary due to unknown differences in habitat or sources of degradation. Detailed taxonomic and statistical data, bioassessment ratings, habitat assessment scores and observations for each AMNET site are given in Appendix D.

Overall, out of 86 AMNET stations sampled during this study period, 8 or **9.3%** were rated as **NON-IMPAIRED**, 63 or **74.4%** were rated as **MODERATELY IMPAIRED**, and 14 or **16.3%** were rated as **SEVERELY IMPAIRED** (see Figure 3).

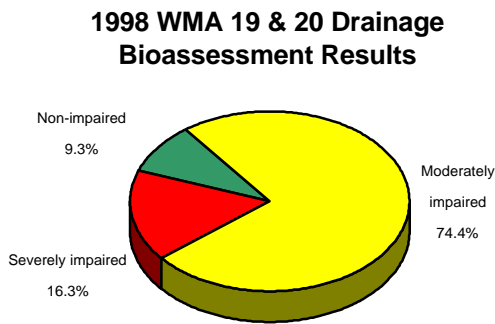


Figure 3

For comparison, Figure 4 depicts the results of the 73 monitoring sites within the same Watershed Management Areas that were sampled during the 1993 study period.

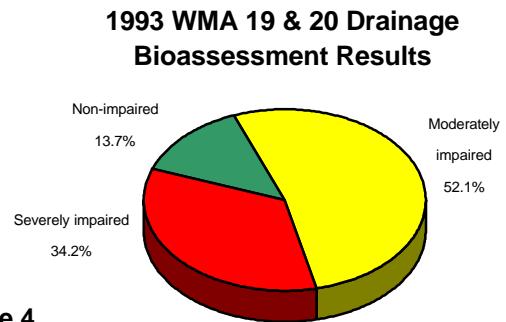


Figure 4

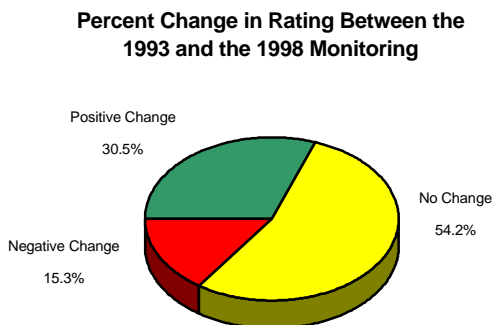


Figure 5

Figure 5 displays the percentage of change in rating that has occurred for the 72 sites that were sampled during both the 1993 and 1998 monitorings. The green indicates a positive change, yellow indicates no change, and red indicates a change for the worse (see Table 3). Notably, the recent sampling found fewer severely impaired sites than were found previously; however, there were more moderately impaired sites and fewer non-impaired sites than were previously found (Figures 3 and 4).

In the upper tidal portion of the lower Delaware Water Region, the majority of NJIS scores (74.4%) were in the "moderately impaired" range; only 9.3% were "non-impaired", but 16.3% were severely impaired (Figure 3). This is in contrast to the upper Delaware Water Region where, in the current (1997) sampling, the majority of scores (58%) were in the non-impaired range, less than half were moderately impaired, and only one site was rated as severely impaired [6]. The upper Delaware Water Region is situated in the northwestern quarter of New Jersey, which features forested uplands and high-gradient terrain. Conversely, the area of the present study, situated south of the Fall Line and largely within the Inner Coastal Plain sub-region [12], features low-gradient terrain, extensive agricultural areas, and greater urbanization than in northwestern New Jersey. Thus, impacts of an anthropogenic nature are reflected in the biotic integrity of our stream systems.

Locations of all AMNET sites yielding macroinvertebrate abnormalities are shown in Appendix B, while only those sites with "significant" (> 5%) and "chronic" (> 5% in both 1992 - 1993 and 1997 - 1998) abnormalities are shown in Maps 1-5. The occurrence of chronic abnormalities at a given site signifies the presence of chronic environmental stressor(s), possibly from toxicants, in the vicinity, therefore indicating that these areas should be more intensely investigated. Such locations found in the current sampling included one in the main branch Rancocas Creek drainage, and one in the South Branch Rancocas Creek drainage (Maps 3 and 4, WMA #19).

Habitat Assessment vs. Biological Condition

Habitat assessment scores and corresponding NJIS scores for each station in the upper tidal Delaware AMNET area are plotted along a spatial gradient, north to south, upstream to downstream, in Appendix C. In this scenario, paralleling of the trend lines, in some degree (which is seen in much of the data), would reflect a direct relationship or positive correlation between the two parameters. WMA #20 (Crosswicks Creek to Assiscunk Creek watersheds) shows a slight upward trend in NJIS scores relative to habitat scores, but with both at somewhat depressed levels. This indicates that habitat, as well as other factors (physiochemical conditions), have varying degrees of negative influence on NJIS scores. In WMA #19 (Rancocas Creek to Cooper River), a pronounced downward trend is seen, with both lines closely parallel to each other, thus reflecting the influence of habitat degradation on biological conditions.

Overall, in the upper tidal Delaware basin, there is a southward trend of declining NJIS scores as well as of habitat scores. The relative difference in numerical scores is perhaps slightly less for habitat than for the NJIS. In a few situations, a non-impaired biological community was found where habitat was impaired. Conversely, in some cases of optimal habitat, an impaired biological community was found. Therefore, water quality or other physiochemical factors likely were involved. Habitat assessments were not performed in the earlier (1992-1993) upper tidal Delaware AMNET survey [5], thus, no temporal comparisons could be made. Further assessments and statistical analyses along these lines should be conducted in order to reveal possible trends and correlations.

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), at most sites, also were not significantly different from those of the control, thus indicating no chronic effects in this regard over the 10-day test period. One exception to this however, was at site AN0153, which is situated downstream of numerous cranberry bogs on Burrs Mill Brook (see Map 4). Since the test site results show no significant difference from the control results, the severe impairment levels previously found were likely due to other causes, such as habitat alteration or various physiochemical factors. This also does not preclude the presence of toxic substances at low, but chronically toxic, levels undetectable by the present methodology, or which may have been introduced into the stream episodically rather than continuously. Therefore, it is advisable based on these study results that supplemental sampling be performed for target analytes such as fertilizer nutrients (usually forms of nitrogen and phosphorus), pesticides, or other suspected toxic compounds.

Causes and Conditions of Impairment

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

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

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

1. Deforestation/development/construction (largely via runoff from non-point sources)
2. Urbanization/industrialization (largely via runoff from non-point sources)
3. Agricultural operations (largely via runoff from non-point sources)
4. Municipal or industrial wastewater discharge (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 [13].

The following section discusses observed impairment of AMNET sites within each Water Management Area of the upper tidal portion of the Lower Delaware Water Region, and possible contributing factors.

Evaluation by WMA

Watershed Management Area #20 includes the Crosswicks Creek and the tributaries to the Delaware River from northern Burlington County having a total of 30 AMNET sites sampled (see Maps 1, & 2). Figure 6 shows that 10% of the sites were non-impaired; the majority of the sites (70%) were found to be moderately impaired, and the remaining sites (20%) were severely impaired.

A significant improvement occurred at seven sites and a significant decline occurred at three sites (see Table 2). Figure 7 depicts the results of the 1993 survey for comparison. Although there has been a general increase in NJIS scores in WMA 20, most sites exhibit some level of impairment. While habitat is generally less than optimal, biological impairment is generally worse than habitat degradation would indicate; therefore, physiochemical conditions are likely having the greater impact. Suboptimal habitat is likely a contributing factor in 57%

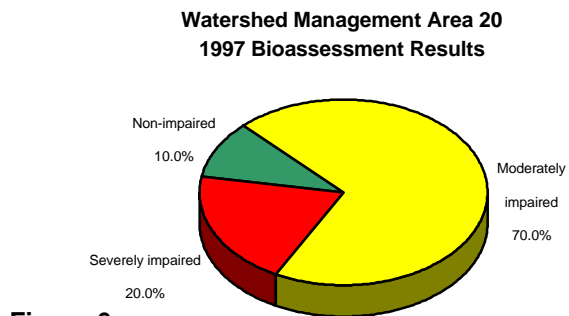


Figure 6

of impaired sites. Agriculture appears to be a source of degraded conditions at 53% of impaired sites. Abnormalities in chironomid larvae were found to be chronic at one site (AN0127), while two additional sites, although not chronic at this time, exhibited significant levels of abnormalities in chironomid larvae.

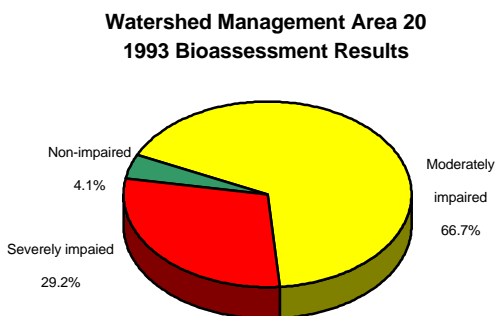


Figure 7

Watershed Management Area #19 extends from the Rancocas Creek to the Cooper River and includes a total of 56 AMNET sites sampled (see Maps 3, 4, & 5). Figure 8 shows that just 8.9% of the sites were non-impaired, the majority of the sites (76.8%) were moderately impaired, and the remaining sites (14.3%) were rated as severely impaired. A significant improvement was seen at fifteen sites, and a significant decline, at eight sites (see Table 2). Figure 9

**Watershed Management Area 19
1997 Bioassessment Results**

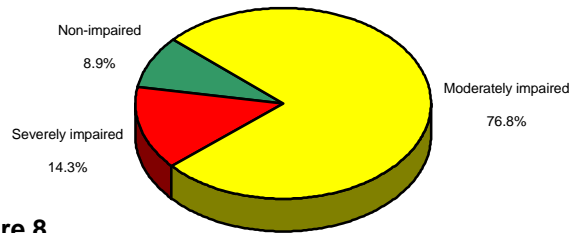


Figure 8

depicts the results of the 1993 survey for comparison. There has been a slight decline in NJIS scores in the Rancocas Creek drainage but an increase in scores in the Pennsauken and Cooper River drainages, since the earlier study period. The improvement in the latter two areas may reflect a slight recovery since regionalization of the sewage treatment plants in the early 1990's. Habitat is mostly favorable north of the lower South Branch Rancocas Creek, at which point a general trend toward increasingly degraded habitat continues southward from Burlington into Camden County (Cooper River). In WMA 19, physiochemical conditions are likely involved in most cases of biological impairment, while 59%

**Watershed Management Area 19
1993 Bioassessment Results**

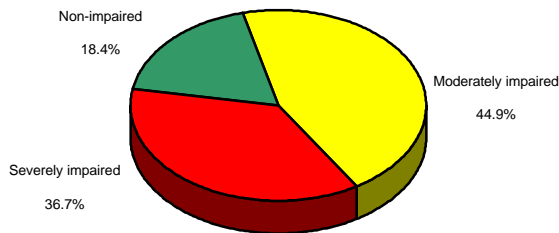


Figure 9

of impaired sites also exhibit suboptimal habitat. Agriculture is implicated as contributing to degraded conditions in 47% of impaired sites. Abnormalities in chironomid larvae were found to be chronic at two sites (AN0160, & AN0174), while four additional sites, although not chronic at this time, exhibited significant levels of abnormalities in chironomid larvae.

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TABLE 1

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

Scoring Criteria for Rapid Bioassessments¹

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

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

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

Attributes

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

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

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

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

Table 2

Comparative Scores / Ratings (see notes)

Watershed Management Areas 19 and 20

Station	NJ Impairment Score		Change in Rating	Habitat Score		Station	NJ Impairment Score		Change in Rating	Habitat Score		Station	NJ Impairment Score		Change in Rating	Habitat Score
	92 / 93	97 / 98					92 / 93	97 / 98					92 / 93	97 / 98		
119	6	9	+	134		151	15	3	—	126		187	0	9	+	141
119A	-	3		160		151A	-	18		121		188	0	15	+	75
120	0	15	+	89		152	27	21	—	171		189	6	3	/-	142
121	9	21	/+	114		153	3	21	+	177		190	0	6	/+	124
122	15	6	—	142		154	30	21	—	147		191	6	9	+	131
123	9	18	/+	151		155	15	12	/-	177						
124	21	18	/-	130		156	6	18	+	166						
125	6	24	+	131		157	12	15	/+	131						
125B	-	18		124		157A	-	18		183						
126	15	9	/-	127		158	30	27	/-	165						
126A	-	6		152		159	15	6	—	167						
126B	-	6		143		160	18	12	/-	160						
127	9	15	/+	100		161	18	18	/	166						
128	18	15	/-	128		162	6	12	+	165						
129	18	18	/	141		163	18	21	/+	132						
130	27	27	/	144		164	30	24	/-	181						
131	9	9	/	118		165	12	18	/+	178						
131A	-	15		152		166	3	21	+	157						
132	15	12	/-	160		167	12	9	/-	139						
133	18	15	/-	129		168	24	18	—	148						
134	9	15	/+	101		169	15	18	/+	166						
135	6	15	+	121		170	9	15	/+	158						
136	9	3	—	136		171	12	12	/	139						
137	3	24	+	139		171A	-	9		77						
138	6	12	+	120		172	6	15	+	153						
139	21	18	/-	129		173	9	18	/+	132						
140	6	15	+	111		174	9	12	/+	86						
141	18	-				175	6	9	+	150						
141O	-	21		-		176	3	6	/+	103						
142	9	3	—	143		176R	-	12		157						
142C	-	21		122		176S	-	21		129						
143	24	12	—	178		177	9	9	/	142						
144	21	12	/-	172		178	9	9	/	135						
145	30	30	/	187		179	9	15	/+	121						
146	15	21	/+	165		180	12	9	/-	91						
147	9	24	+	187		181	3	9	+	82						
148	27	27	/	159		182	6	3	/-	101						
149	27	21	—	171		183	6	9	+	70						
149A	-	3		169		184	0	18	+	93						
149B	-	15		174		185	3	12	+	66						
150	9	6	—	137		186	6	9	+	168						

NOTES:

Comparison of NJ impairment score with earlier study results:

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

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

Table 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)	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

1998 Delaware AMNET Study

WMAs 19, & 20 SUPPLEMENT

AMNET site locations and their respective biological ratings, for each major sub-basin, are shown in maps 1-5. Also identified are sites that exhibited significant and chronic macroinvertebrate abnormalities.

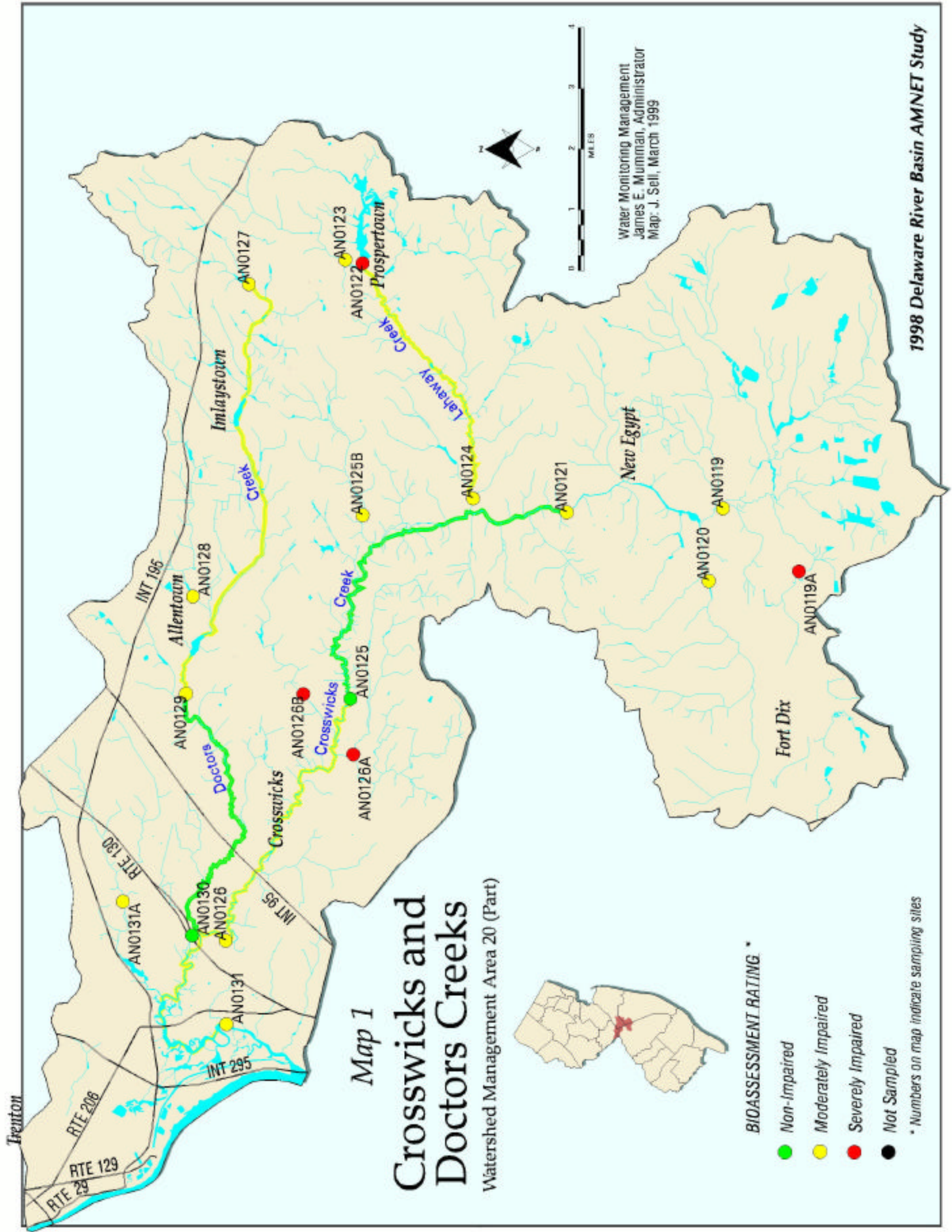
Appendix A — Station Numbers and Locations for the 1998 Delaware Supplemental AMNET Study

Site	Stream	Latitude Longitude	Watershed Management Area
AN0119	Jumping Bk	40 02'46.163"N 74 32'22.678"W	20
AN0119A	South Run	40 01'38.586"N 74 33'35.890"W	20
AN0120	North Run	40 02'58.566"N 74 33'45.724"W	20
AN0121	Crosswicks Ck	40 05'03.177"N 74 32'27.148"W	20
AN0122	Lahaway Ck	40 08'02.478"N 74 27'41.945"W	20
AN0123	Ivanhoe Bk	40 08'17.621"N 74 27'37.970"W	20
AN0124	Lahaway Ck	40 06'25.582"N 74 32'11.319"W	20
AN0125	Crosswicks Ck	40 08'12.885"N 74 36'00.967"W	20
AN0125B	Miry Run	40 08'01.721"N 74 32'32.374"W	20
AN0126	Crosswicks Ck	40 10'02.009"N 74 40'38.249"W	20
AN0126A	UNT to Crosswicks Ck	40 08'09.974"N 74 37'05.598"W	20
AN0126B	Pleasant Run	40 08'54.262"N 74 35'57.293"W	20
AN0127	Doctors Ck	40 09'42.180"N 74 28'05.896"W	20
AN0128	Negro Run	40 10'31.491"N 74 34'03.730"W	20
AN0129	Doctors Ck	40 10'37.270"N 74 35'55.389"W	20
AN0130	Doctors Ck	40 10'31.642"N 74 40'32.327"W	20
AN0131	Crosswicks Ck	40 10'01.332"N 74 42'13.797"W	20
AN0131A	Back Ck	40 11'31.773"N 74 39'55.258"W	20
AN0132	Blacks Ck	40 06'34.757"N 74 38'29.999"W	20
AN0133	Bacons Run	40 06'26.828"N 74 41'06.139"W	20
AN0134	Blacks Ck	40 08'14.734"N 74 42'40.984"W	20
AN0135	Crafts Ck	40 04'30.104"N 74 39'55.313"W	20
AN0136	Crafts Ck	40 04'25.986"N 74 42'04.764"W	20
AN0137	Crafts Ck	40 06'01.643"N 74 45'21.566"W	20
AN0138	Assiscunk Ck	40 03'54.842"N 74 39'59.464"W	20
AN0139	Annaricken Bk	40 03'19.036"N 74 42'08.442"W	20
AN0140	North Br Barkers Bk	40 01'58.261"N 74 40'12.383"W	20
AN0141	Assiscunk Ck	40 03'52.971"N 74 45'24.601"W	20
AN0141O	Barkers Bk	40 01'17.105"N 74 45'06.771"W	20
AN0142	Assiscunk Ck	40 04'23.283"N 74 48'52.267"W	20
AN0142C	UNT to Assiscunk Ck	40 03'07.899"N 74 49'14.030"W	20
AN0143	North Br Rancocas Ck	39 58'46.829"N	19

Site	Stream	Latitude Longitude	Watershed Management Area
		74 31'30.920"W	
AN0144	Pole Bridge Br	39 56'48.978"N 74 33'20.155"W	19
AN0145	Mt Misery Bk	39 55'44.693"N 74 31'51.593"W	19
AN0146	McDonalds Br	39 53'06.213"N 74 30'19.579"W	19
AN0147	Bisphams Mill Ck	39 55'26.003"N 74 35'30.127"W	19
AN0148	Greenwood Br	39 57'22.829"N 74 37'39.577"W	19
AN0149	North Br Rancocas Ck	39 58'12.345"N 74 41'03.227"W	19
AN0149A	Ong Run	39 58'35.529"N 74 34'35.949"W	19
AN0149B	Jacks Run	39 59'31.506"N 74 34'11.172"W	19
AN0150	Budds Run	39 58'34.906"N 74 40'51.343"W	19
AN0151	North Br Rancocas Ck	39 59'31.706"N 74 46'46.513"W	19
AN0151A	Indian Run	39 58'50.239"N 74 42'40.168"W	19
AN0152	Friendship Ck	39 52'15.726"N 74 41'34.923"W	19
AN0153	Burrs Mill Bk	39 51'33.878"N 74 35'53.218"W	19
AN0154	Burrs Mill Bk	39 52'54.599"N 74 40'30.108"W	19
AN0155	Friendship Ck	39 54'59.540"N 74 42'51.537"W	19
AN0156	South Br Rancocas Ck	39 55'23.615"N 74 43'03.539"W	19
AN0157	Jade Run	39 56'26.473"N 74 43'57.203"W	19
AN0157A	Jade Run	39 55'44.289"N 74 40'07.533"W	19
AN0158	Little Ck	39 53'54.326"N 74 47'17.302"W	19
AN0159	Bear Swamp R	39 53'43.556"N 74 46'44.796"W	19
AN0160	Little Ck	39 56'16.831"N 74 47'36.279"W	19
AN0161	South Br Rancocas Ck	39 56'50.311"N 74 47'25.881"W	19
AN0162	SW Br Rancocas Ck	39 53'24.916"N 74 53'01.013"W	19
AN0163	Barton Run	39 51'20.592"N 74 55'17.336"W	19
AN0164	Black Run	39 49'58.943"N 74 53'34.378"W	19
AN0165	UNT to Black Run	39 51'00.889"N 74 54'22.261"W	19
AN0166	Barton Run	39 52'43.625"N 74 51'36.092"W	19
AN0167	Kettle Run	39 48'11.286"N 74 53'34.354"W	19
AN0168	Haynes Ck	39 53'06.698"N 74 49'53.909"W	19
AN0169	SW Br Rancocas Ck (Haynes Ck)	39 54'16.533"N 74 48'45.243"W	19
AN0170	Sharps Run	39 54'19.053"N 74 49'28.169"W	19

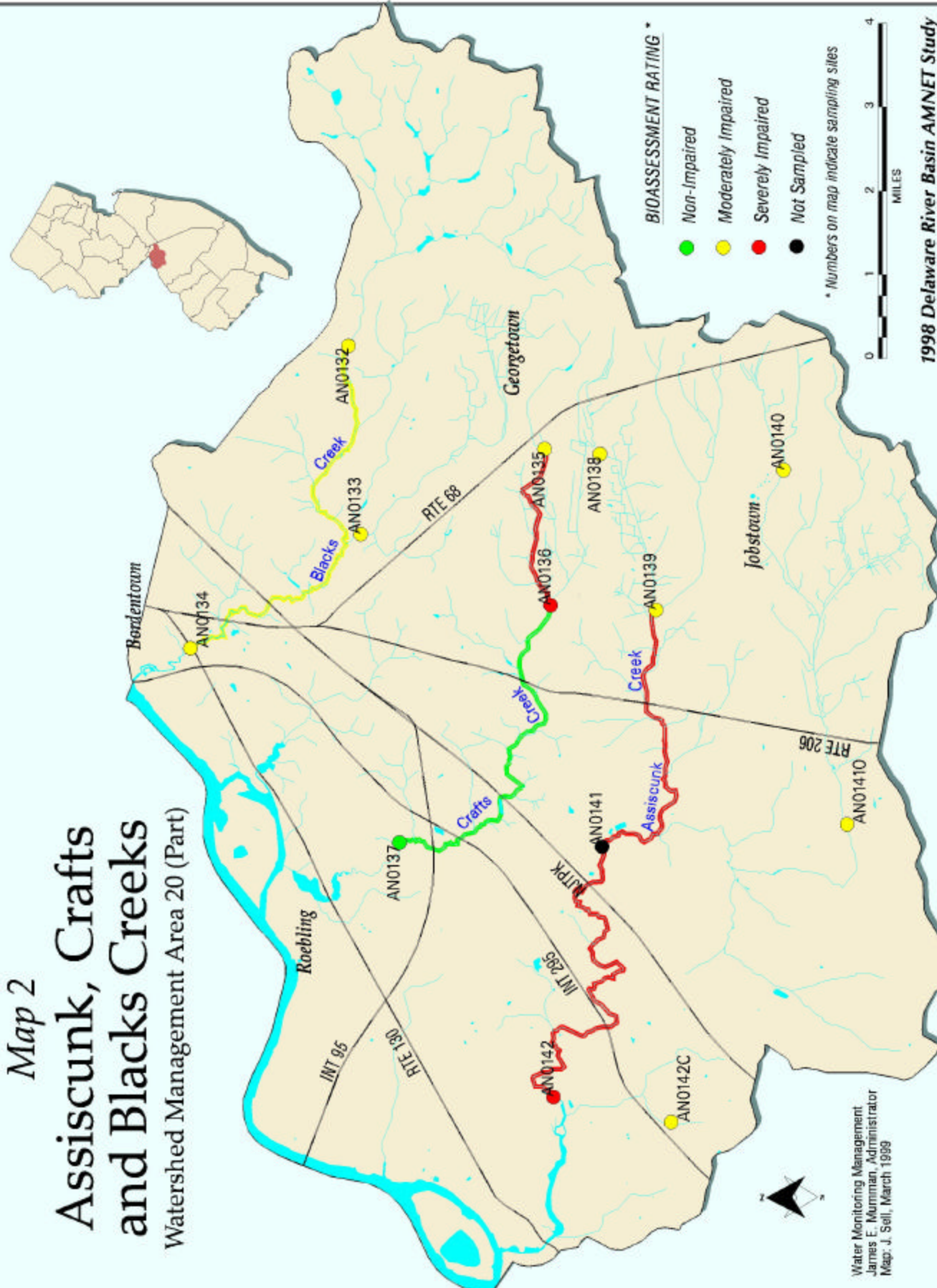
Appendix A — Station Numbers and Locations for the 1998 Delaware Supplemental AMNET Study

Site	Stream	Latitude Longitude	Watershed Management Area
AN0171	Bobbys Run	39 57'47.847"N 74 48'19.039"W	19
AN0171A	Bobbys Run	39 57'39.138"N 74 45'11.489"W	19
AN0172	UNT to Masons Ck	39 56'37.792"N 74 51'22.814"W	19
AN0173	Masons Ck	39 58'19.308"N 74 51'25.370"W	19
AN0174	Parkers Ck	39 59'27.325"N 74 53'16.910"W	19
AN0175	Mill Ck	40 02'09.498"N 74 53'36.917"W	19
AN0176	Swedes Run	40 00'54.105"N 74 57'22.428"W	19
AN0176R	Rancocas Ck	39 59'50.266"N 74 51'33.780"W	19
AN0176S	S Br Rancocas Ck	39 58'44.401"N 74 49'26.880"W	19
AN0177	Pompeston Ck	40 00'12.372"N 74 58'58.234"W	19
AN0178	North Br Pennsauken Ck	39 55'13.326"N 74 53'53.281"W	19
AN0179	North Br Pennsauken Ck	39 56'27.821"N 74 57'14.034"W	19
AN0180	North Br Pennsauken Ck	39 57'25.230"N 74 59'12.011"W	19
AN0181	North Br Pennsauken Ck	39 58'45.330"N 75 00'32.280"W	19
AN0182	South Br Pennsauken Ck	39 54'21.421"N 74 57'08.828"W	19
AN0183	South Br Pennsauken Ck	39 56'25.012"N 74 58'58.010"W	19
AN0184	South Br Pennsauken Ck	39 57'14.813"N 75 00'48.046"W	19
AN0185	South Br Pennsauken Ck	39 58'02.987"N 75 01'09.657"W	19
AN0186	North Br Cooper R	39 51'34.652"N 74 55'45.714"W	19
AN0187	North Br Cooper R	39 53'19.886"N 74 58'07.036"W	19
AN0188	North Br Cooper R	39 54'31.444"N 75 01'30.744"W	19
AN0189	South Br Cooper R	39 49'32.996"N 74 58'28.895"W	19
AN0190	South Br Cooper R	39 51'33.946"N 75 00'57.424"W	19
AN0191	South Br Cooper R	39 54'11.706"N 75 01'18.832"W	19



Map 2 Assiscunk, Crafts and Blacks Creeks

Watershed Management Area 20 (Part)



- BIDASSESSMENT RATING ***
- Non-Impaired
 - Moderately Impaired
 - Severely Impaired
 - Not Sampled

* Numbers on map indicate sampling sites



Water Monitoring Management
James E. Murrinan, Administrator
Map: J. Sell, March 1999

1998 Delaware River Basin AMNET Study

Map 3 Rancocas and North Branch Rancocas Creeks

Watershed Management Area 19 (Part)



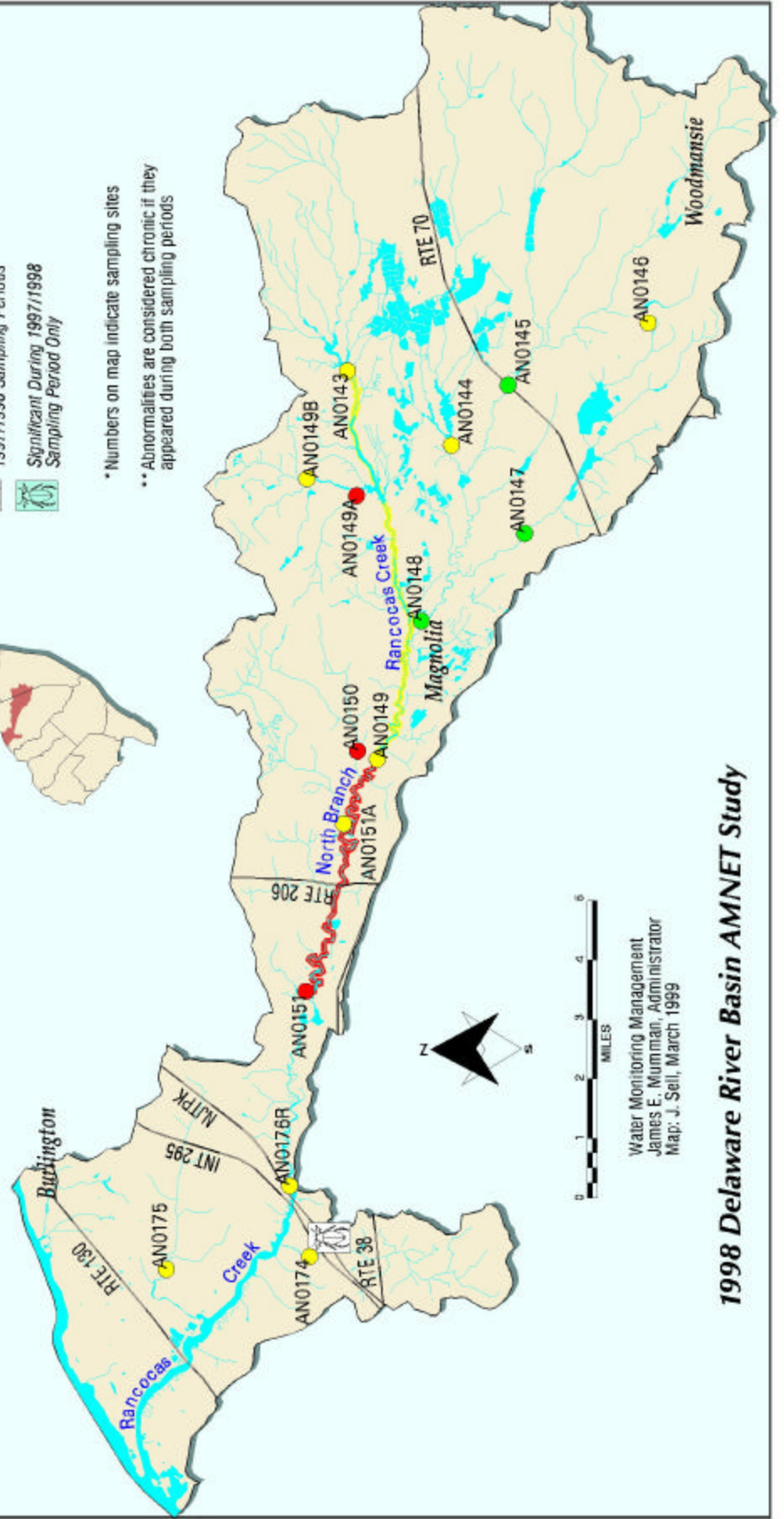
BIOASSESSMENT RATING *

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

MACROINVERTEBRATE CHRONIC ABNORMALITIES **

- Significant During 1992/1993 and 1997/1998 Sampling Periods
- Significant During 1997/1998 Sampling Period Only

* Numbers on map indicate sampling sites
 ** Abnormalities are considered chronic if they appeared during both sampling periods



Water Monitoring Management
 James E. Mumman, Administrator
 Map: J. Sell, March 1999

1998 Delaware River Basin AMNET Study

Map 4 South Branch Rancocas Creek Watershed Management Area 19 (Part)

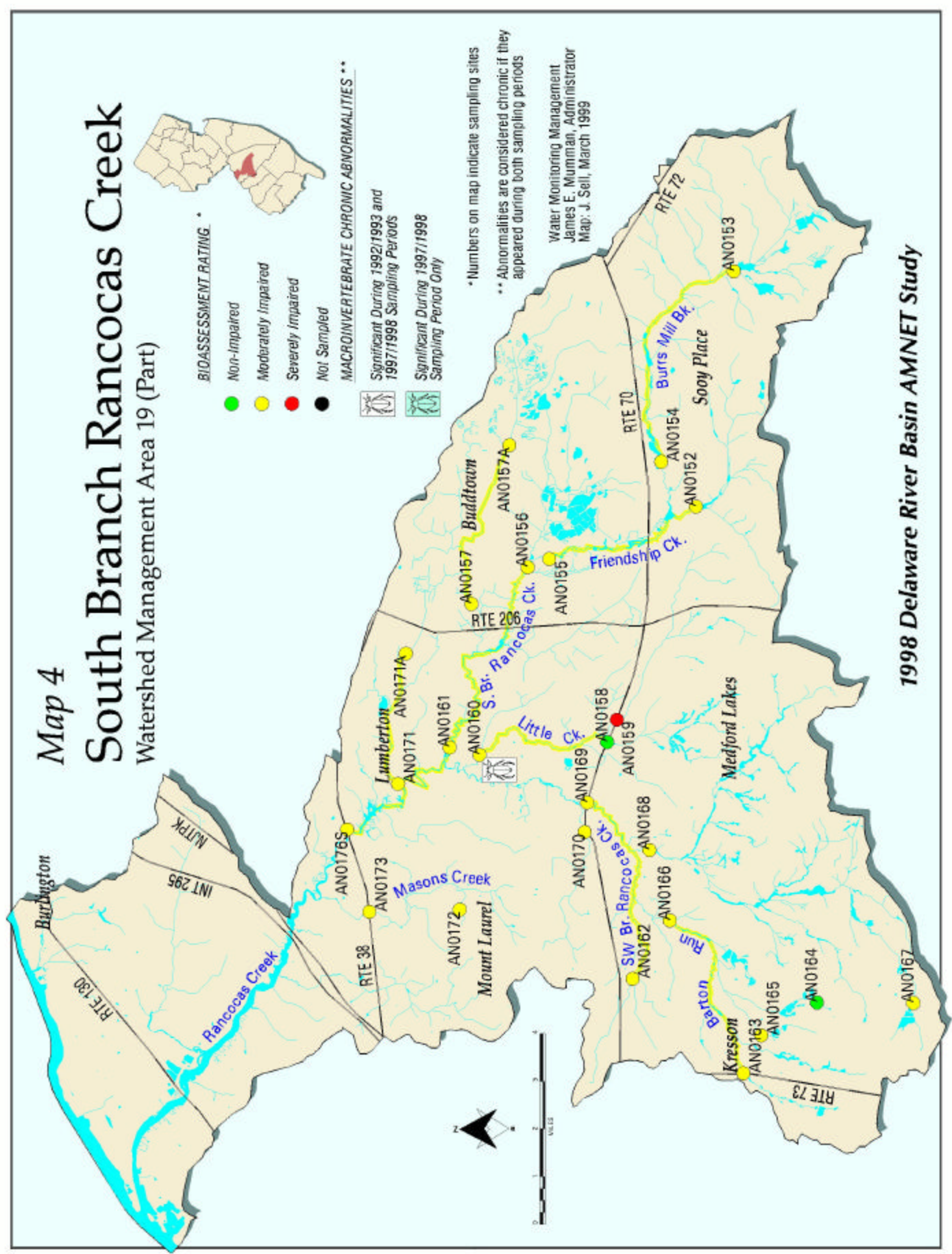


- BIOASSESSMENT RATING ***
- Non-Impaired
 - Moderately Impaired
 - Severely Impaired
 - Not Sampled

- MACROINVERTEBRATE CHRONIC ABNORMALITIES ****
- Significant During 1992/1993 and 1997/1998 Sampling Periods
 - Significant During 1997/1998 Sampling Period Only

* Numbers on map indicate sampling sites
 ** Abnormalities are considered chronic if they appeared during both sampling periods

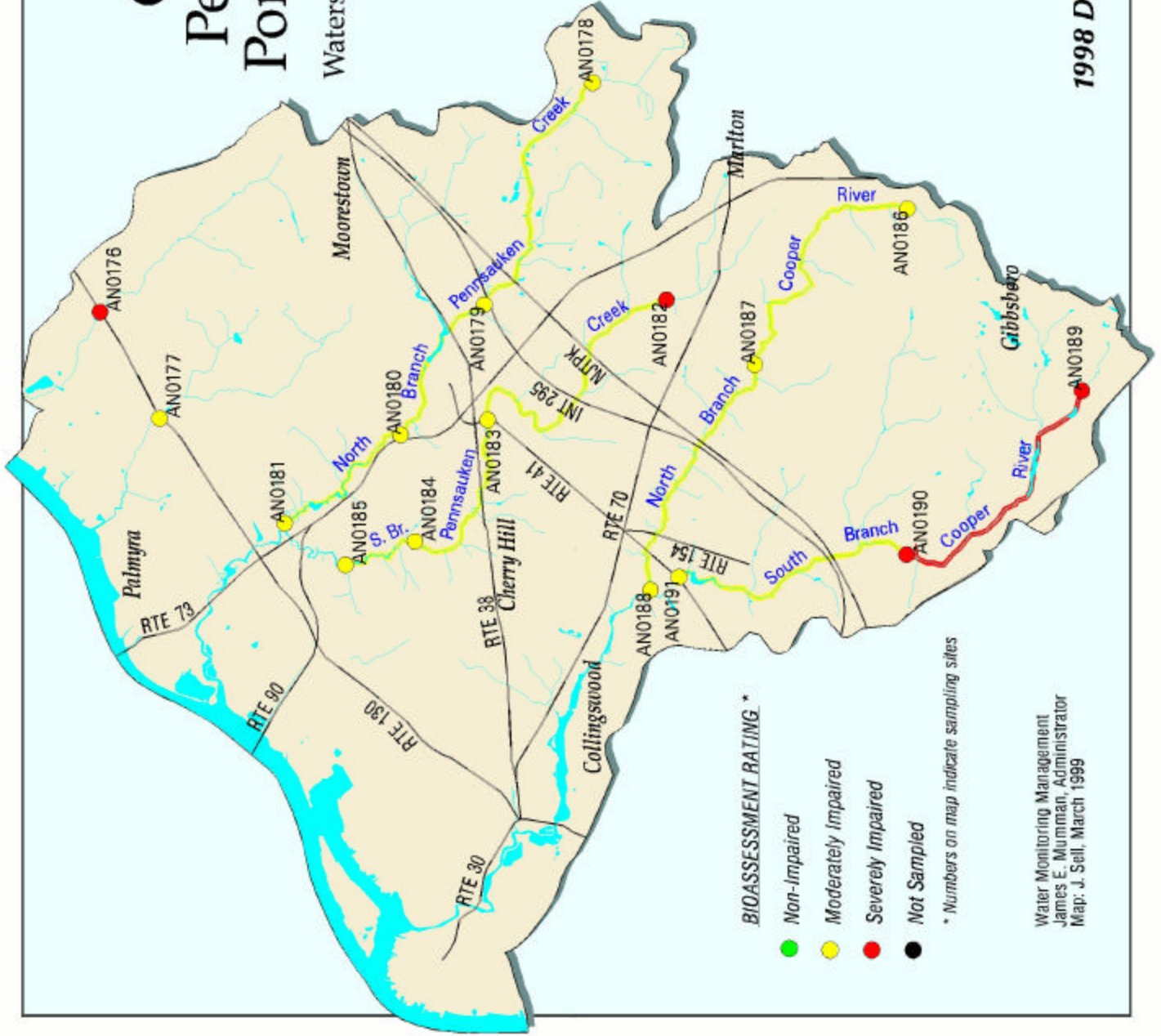
Water Monitoring Management
 James E. Mumman, Administrator
 Map: J. Sell, March 1999



Map 5

Cooper River, Pennsauken and Pompeston Creeks

Watershed Management Area 19 (Part)



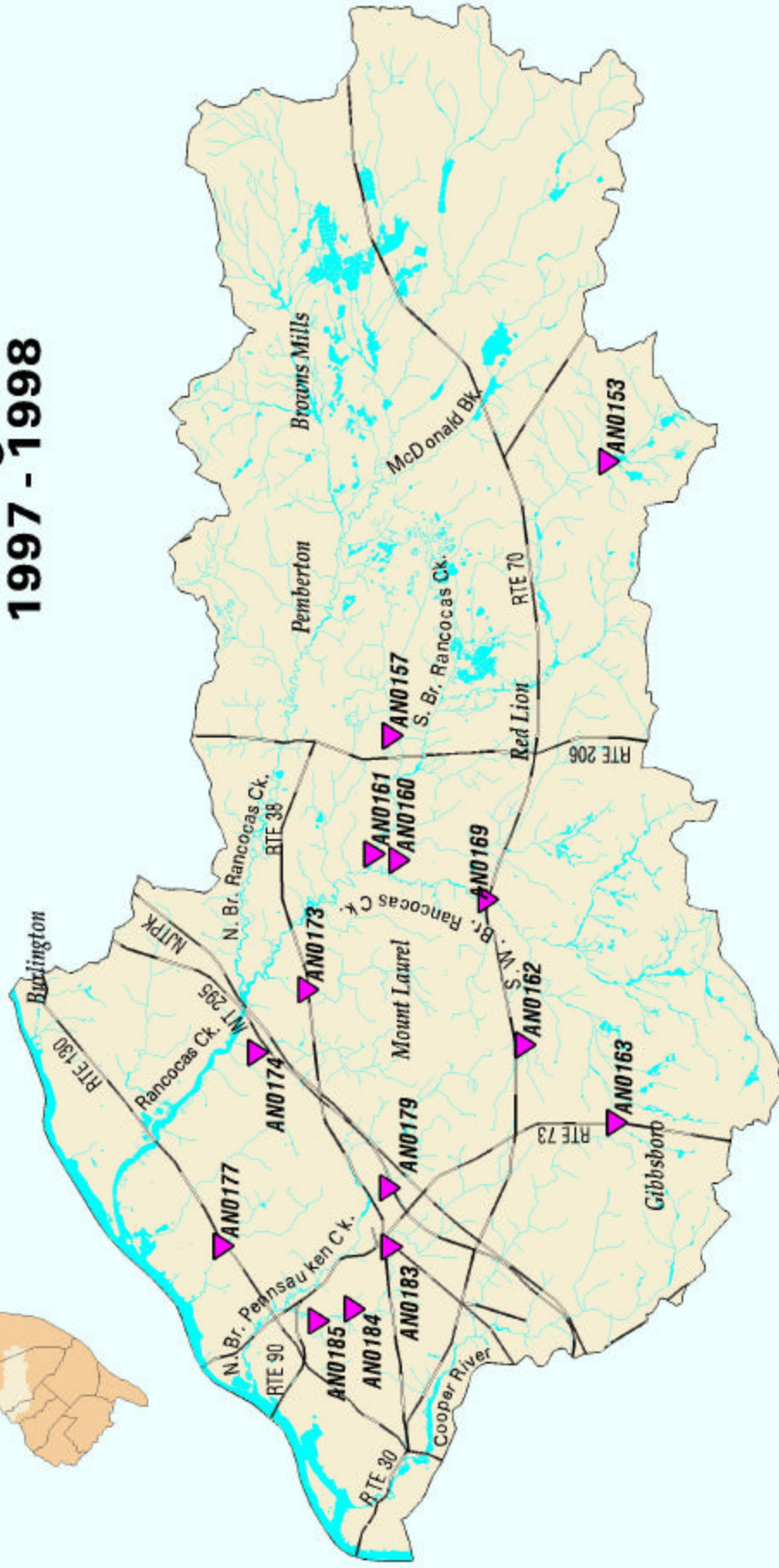
BIOASSESSMENT RATING *

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

* Numbers on map indicate sampling sites

Water Monitoring Management
James E. Mumman, Administrator
Map: J. Sell, March 1999

Macroinvertebrate Abnormalities in Watershed Management Area 19 1997 - 1998



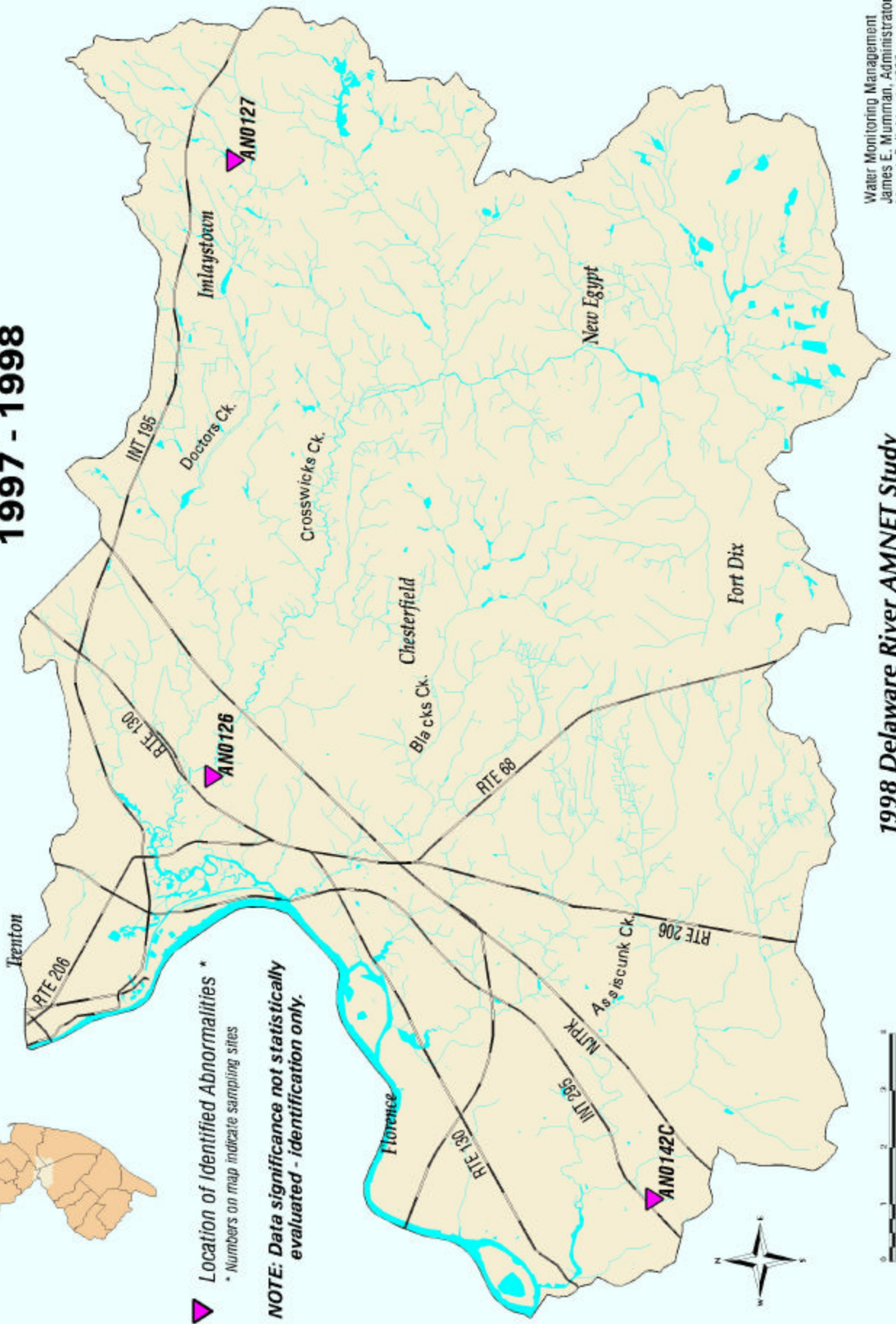
▲ Location of Identified Abnormalities *
 * Numbers on map indicate sampling sites

1998 Delaware River AMNET Study

Water Monitoring Management
 James E. Mummam, Administrator
 Map: J. Sell, March 1999

NOTE: Data significance not statistically evaluated - identification only.

Macroinvertebrate Abnormalities in Watershed Management Area 20 1997 - 1998



▲ Location of Identified Abnormalities *
 * Numbers on map indicate sampling sites

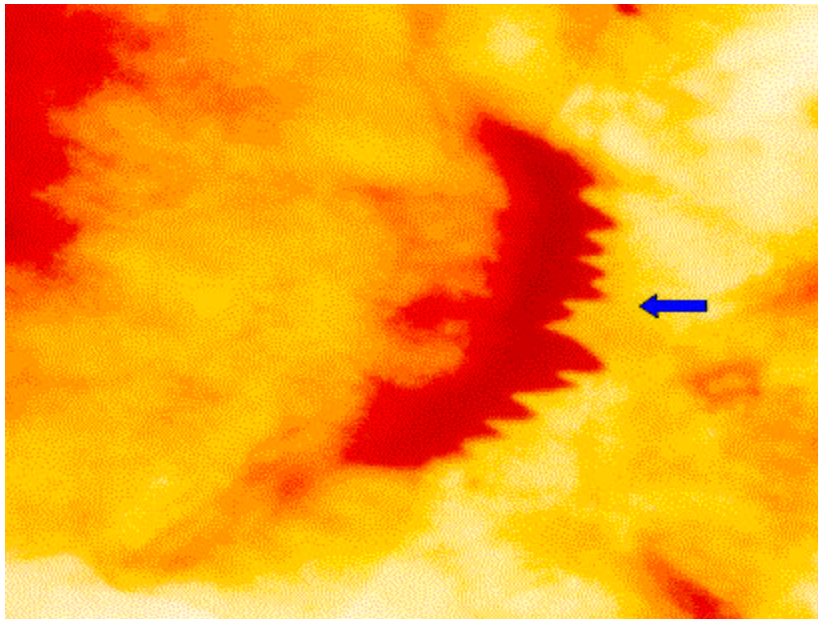
NOTE: Data significance not statistically evaluated - identification only.



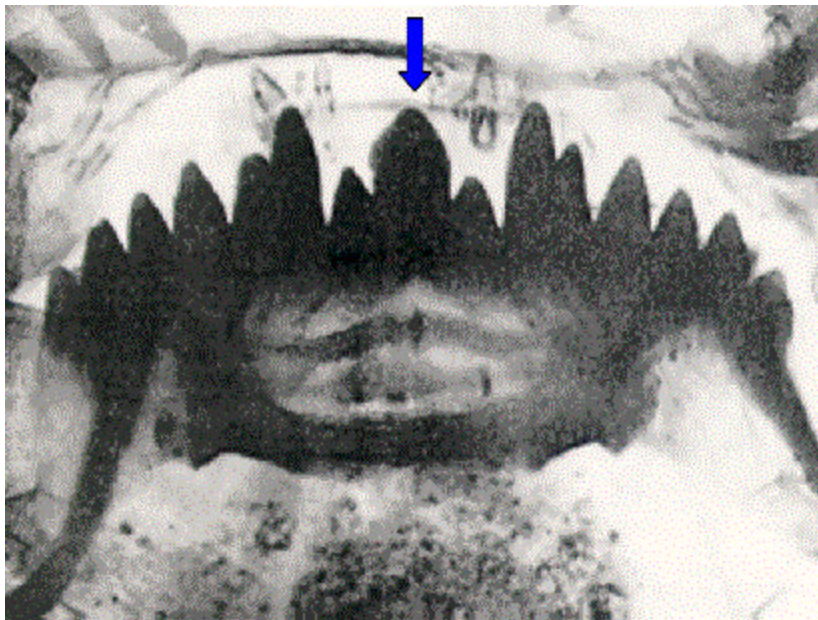
APPENDIX B

Pictures and Site Locations of Morphological Abnormalities in
Larval Chironomidae and Amphipoda Recovered in the 1998
Delaware Supplemental AMNET Study

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



ABNORMAL*

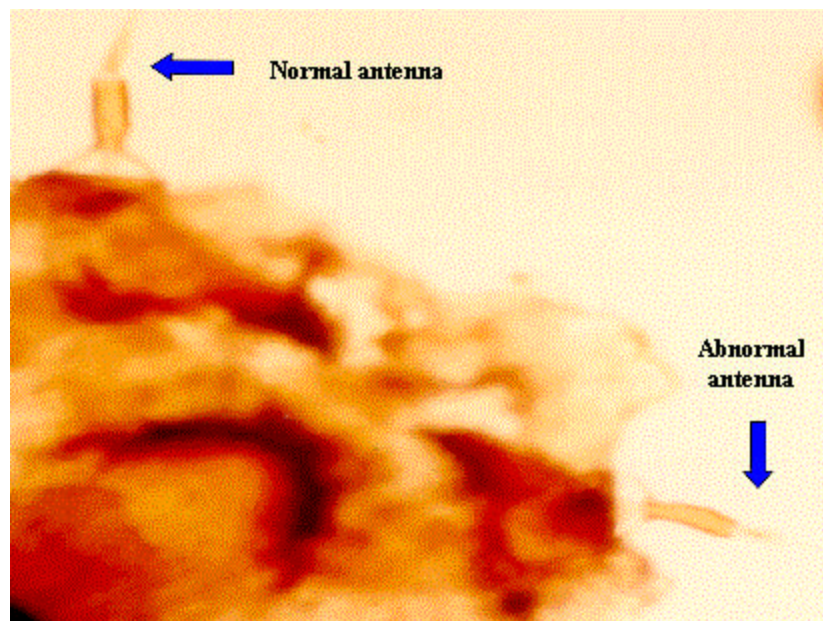


NORMAL**

* 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*

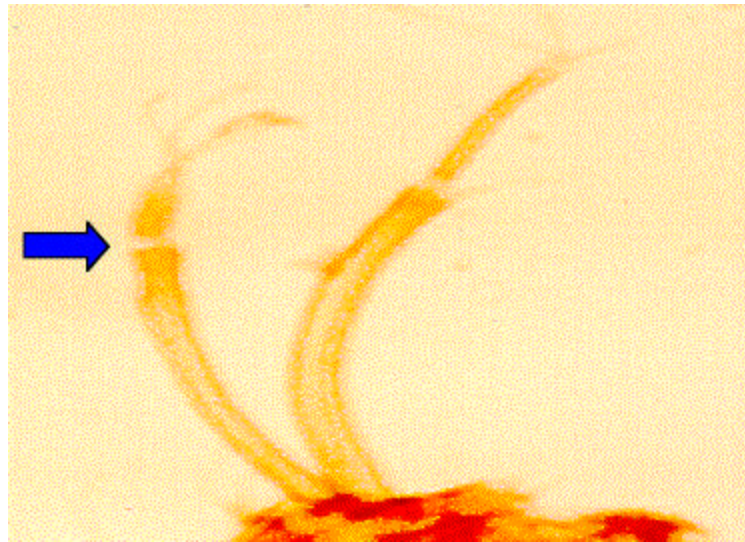


NORMAL antenna**

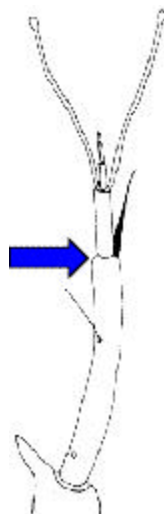
* Photograph taken by J. Kurtz, NJDEP.

** 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*

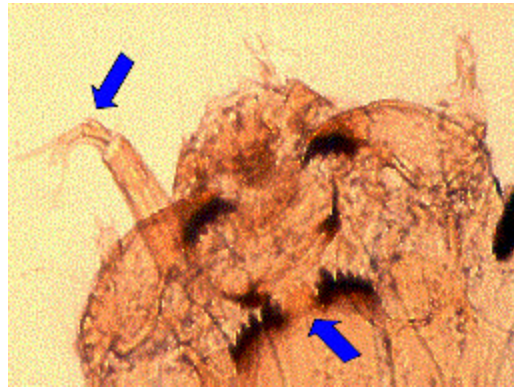


NORMAL**

* 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.

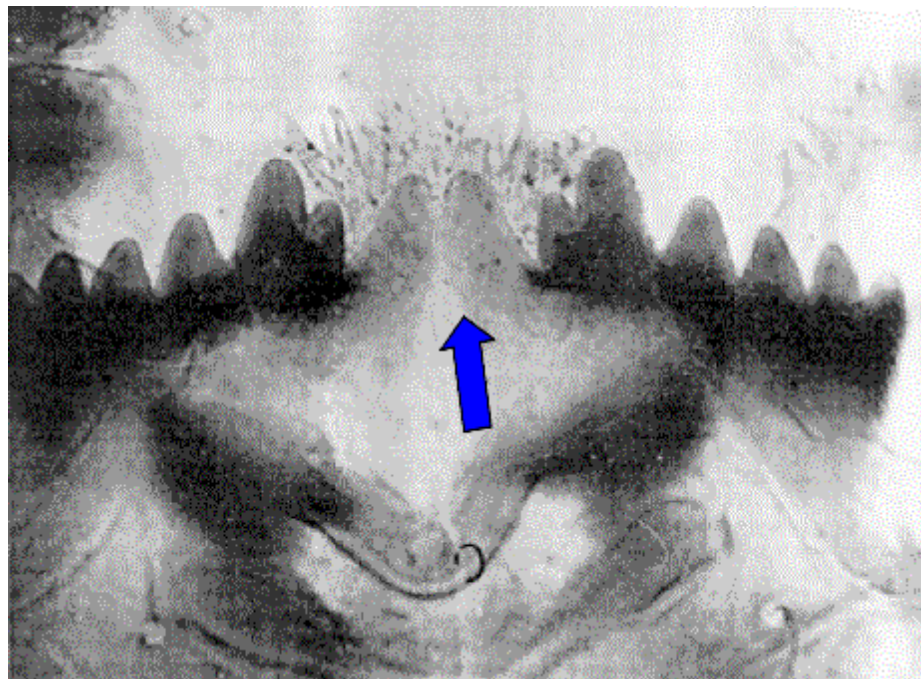
Microtendipes sp. — Note the abnormal teeth and antenna in the top picture compared to the bottom pictures, which depict normal antenna and teeth. The normal pictures on the bottom are magnified to show detail.



ABNORMAL*



NORMAL antenna**



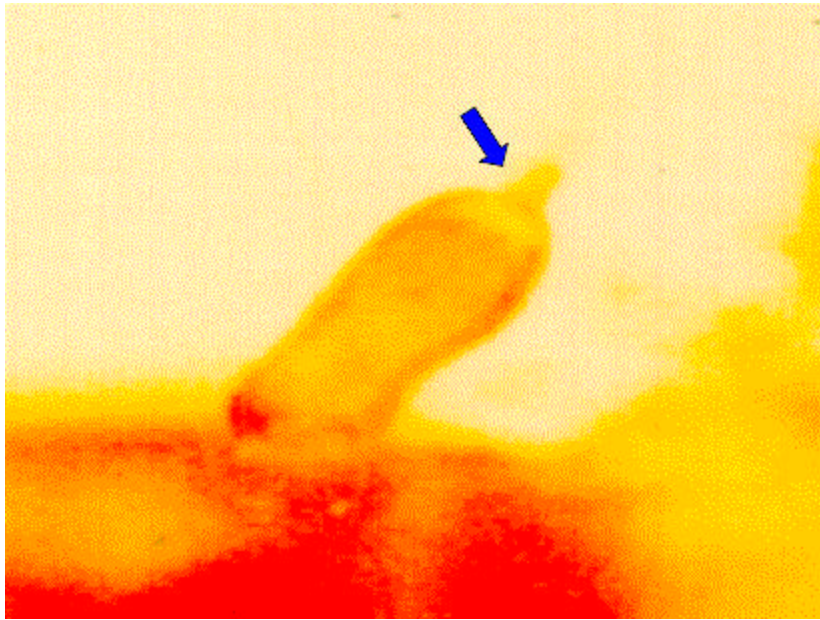
NORMAL teeth***

* Photograph taken by J. Kurtz, NJDEP.

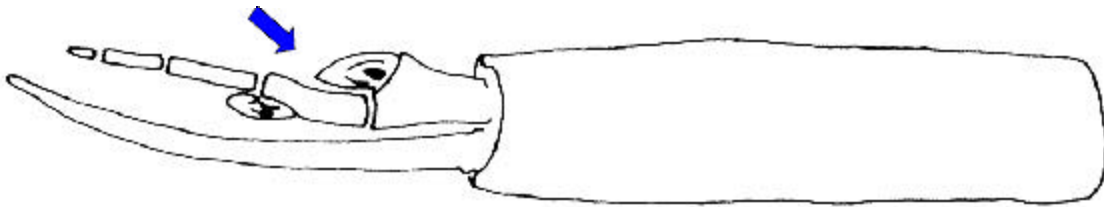
** From: *An Introduction to the Aquatic Insects of North America*, second edition, R.W. Merritt & K.W. Cummins, 1988, Kendall/Hunt Publ. Co.

*** 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 *

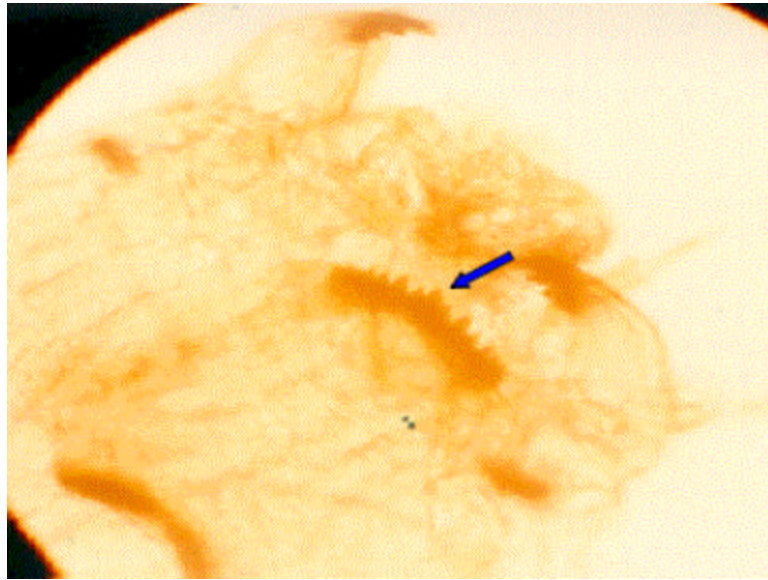


NORMAL antenna**

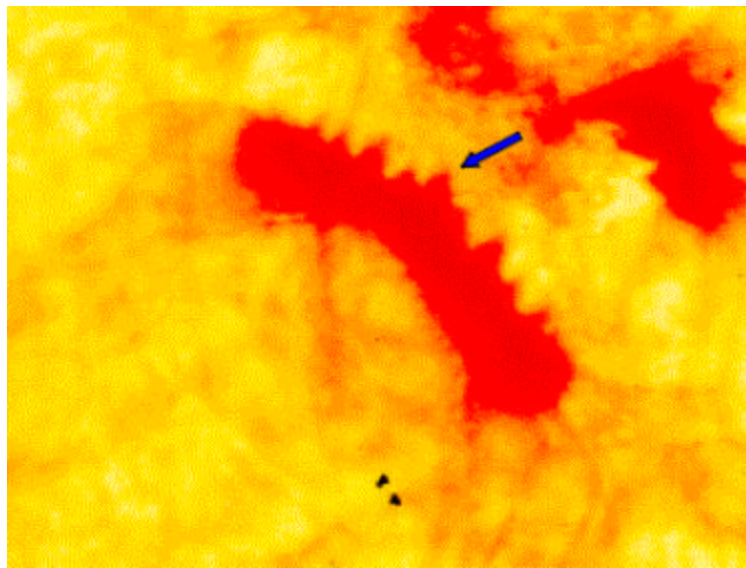
* Photograph taken by J. Kurtz, NJDEP.

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

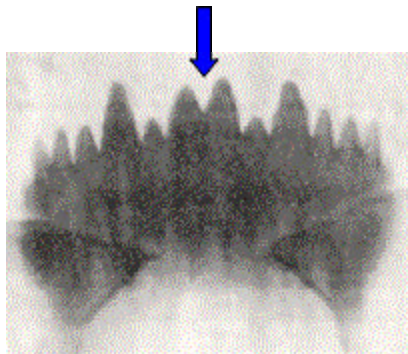
Polypedilum convictum — The first two pictures show abnormal teeth as compared to the normal teeth depicted in the picture below. The second picture is a higher magnification of the first one.



ABNORMAL*



ABNORMAL*

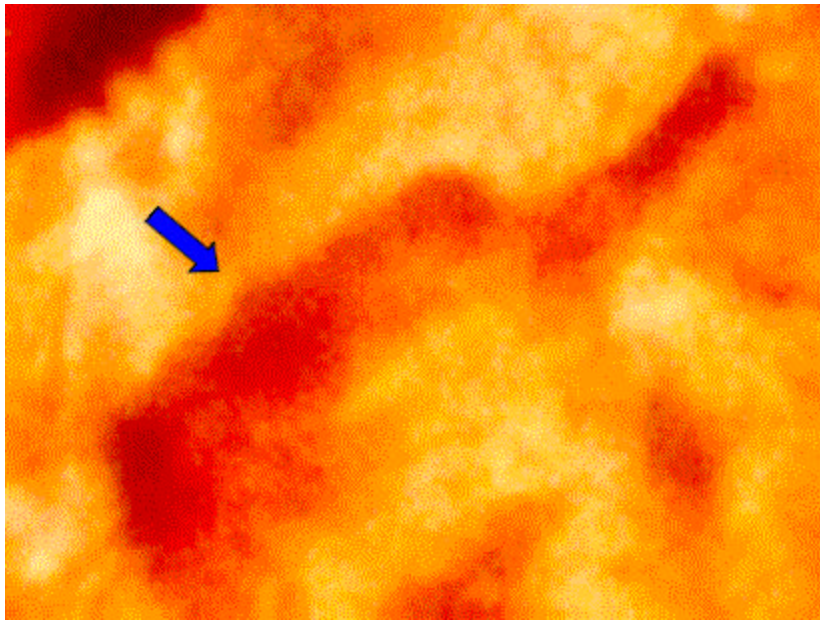


NORMAL**

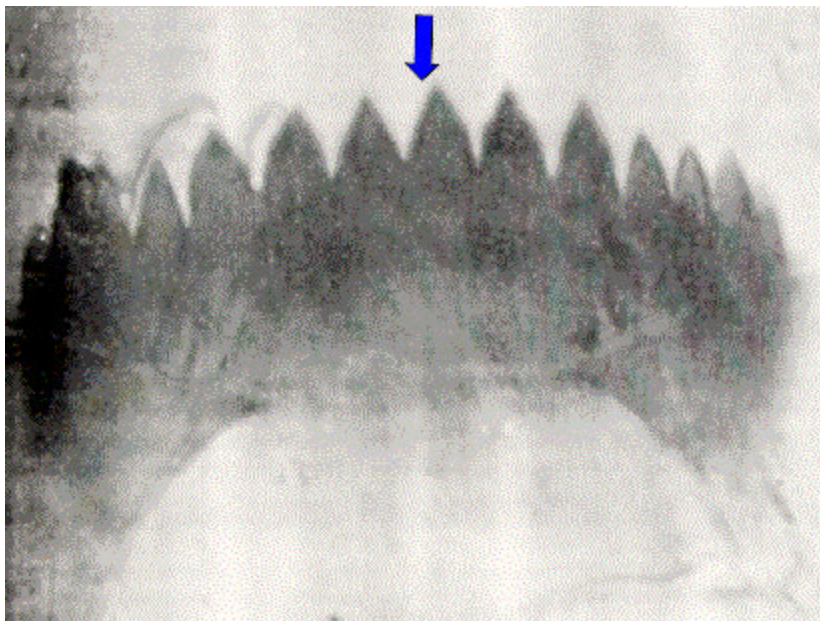
* Photograph taken by J. Kurtz, NJDEP.

** 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**

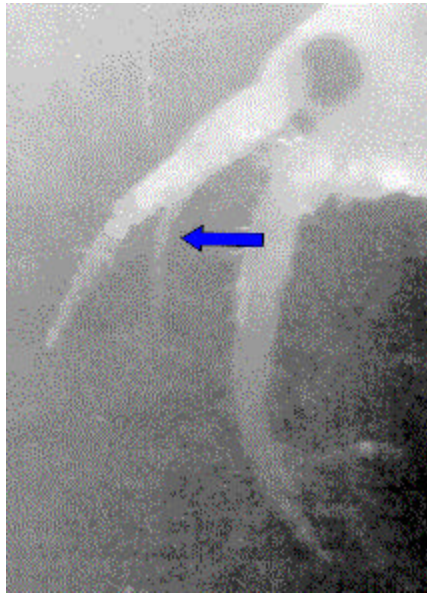
* Photograph taken by J. Kurtz, NJDEP.

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

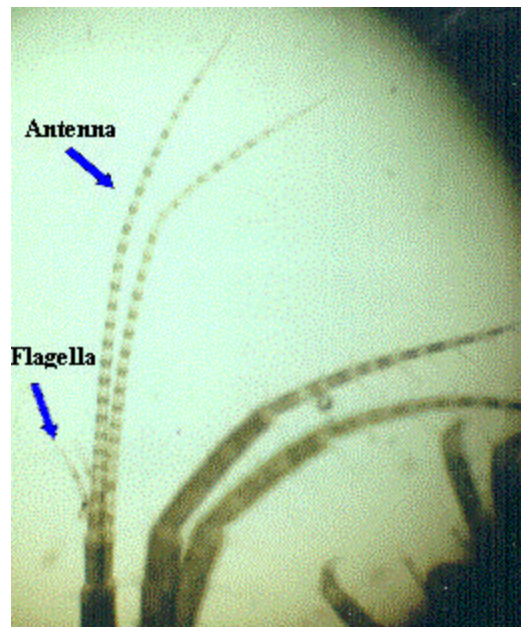
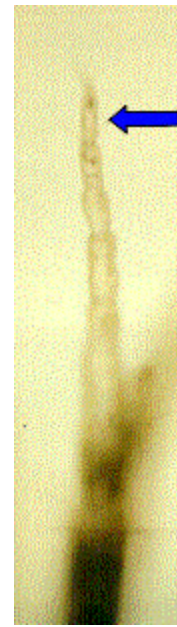
Gammarus fasciatus — Note in the first three pictures that the left 1st antenna and flagella are deformed and reduced. The right 1st antenna is broken. The fourth picture shows normal flagella and antennae.



Close-up of flagella on abnormal 1st antenna



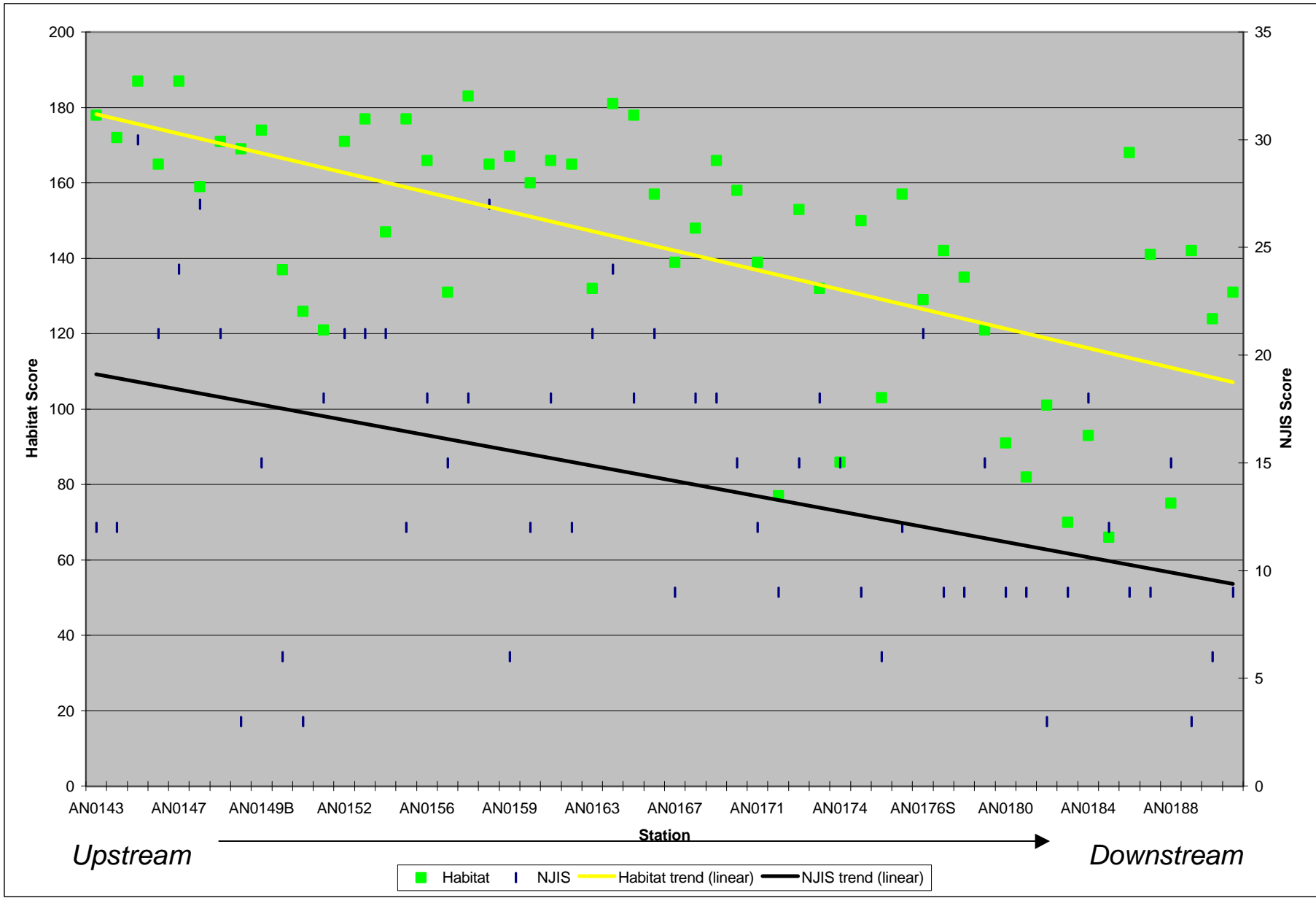
Close-up of last segment on abnormal 1st antenna with normal setae.

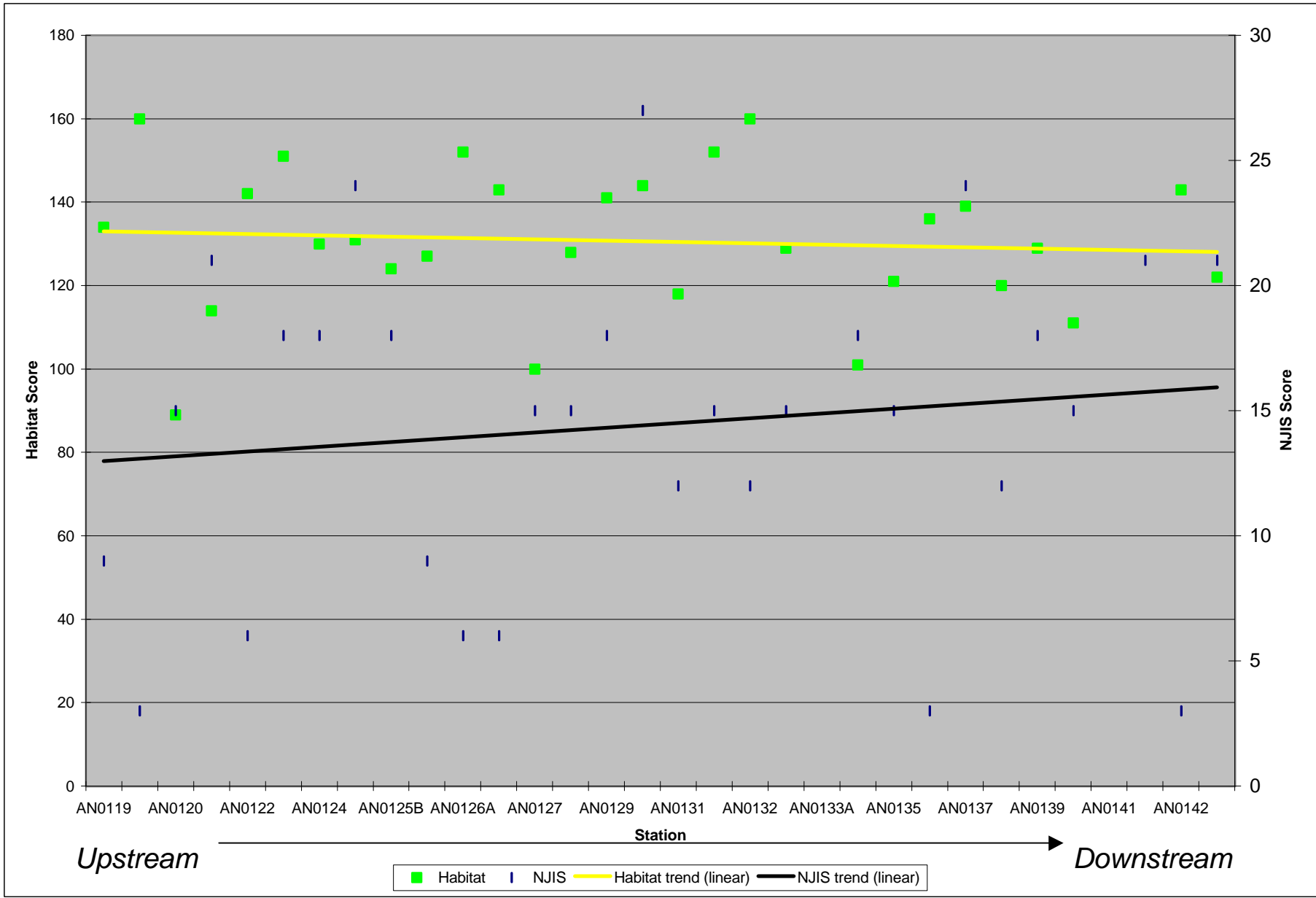


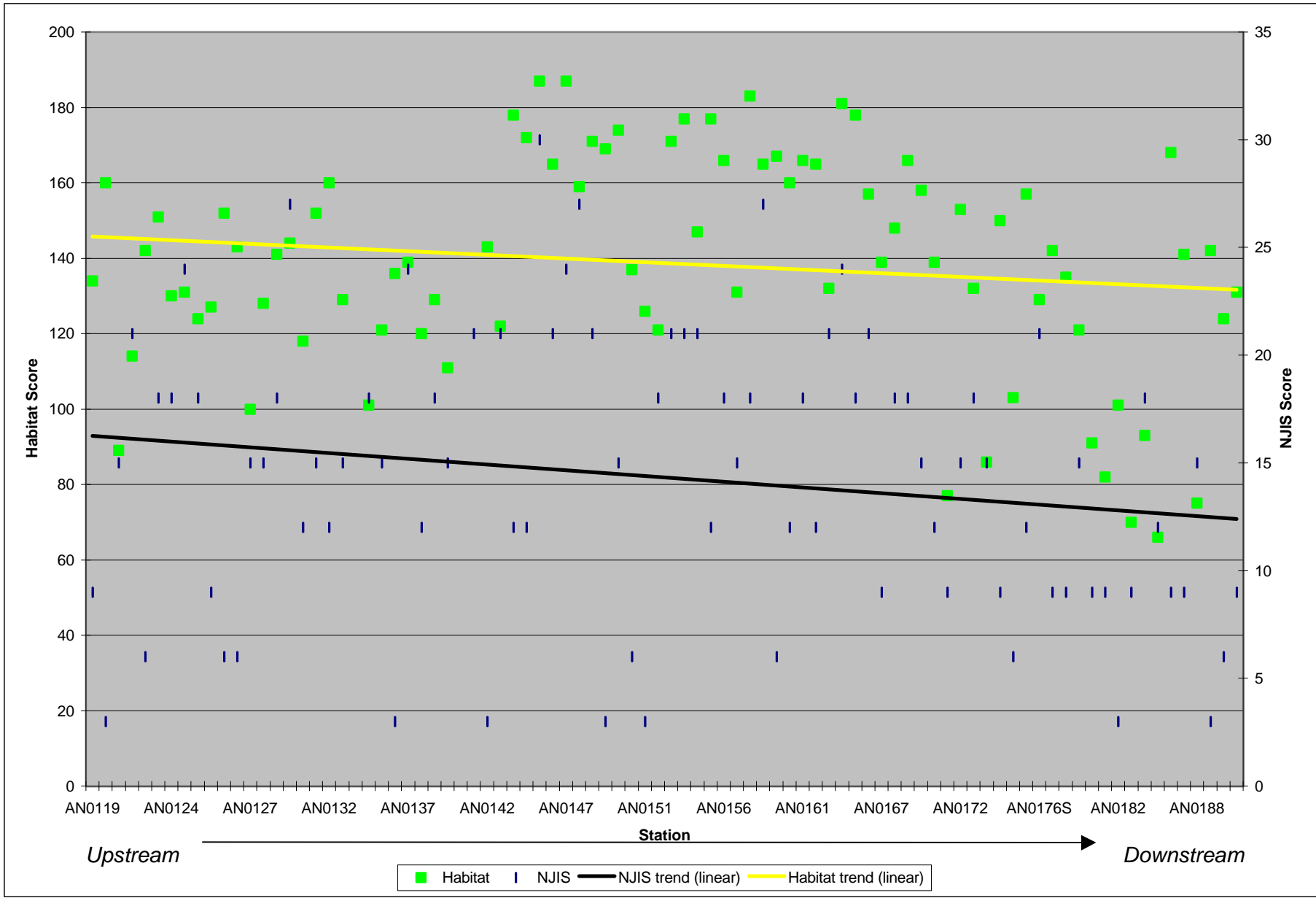
Normal 1st antennae and flagella

APPENDIX C

Graphical Comparison of Habitat Assessment Scores and New Jersey Impairment Scores from the 1998 Delaware Supplemental AMNET Study







APPENDIX D

Taxonomic and Statistical Data, NJIS Scores*, Habitat Assessment Scores and Observations from the 1998 Delaware Supplemental AMNET Study

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

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

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

Station: AN0119
Jumping Bk, Bunting Bridge Rd , Cookstown, Burlington County
New Egypt USGS Quadrangle
Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	19
Tetrastemmatidae	7	6
Chironomidae	6	4
Planariidae	4	2
Enchytraeidae	10	2
Entomobryidae	10	1
Hydrobiidae	8	1
Protoneuridae	9	1
Lumbricidae	10	1
Planorbidae	6	1
Veliidae	9	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 40
% Contribution of Dominant Family: 47.50 % (Sphaeriidae)
Family Biotic Index: 7.53
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 134
Deficiency(s) noted: Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 20/3
Substrate: Gravel,sand,mud,snags....StreamBank Vegetation/Stability:
Weeds,trees/Unstable
Canopy: Mostly Open....Other: Forested/Rural/Agricultural cropland and
livestock; Water temp.8.8 /pH 6.8 /DO 9.5 /Cond.102

Station: AN0119A
South Run, Cookstown Road , Hanover Twp, Burlington County
New Egypt USGS Quadrangle
Date Sampled: 02/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	2
Chironomidae	6	2

Statistical Analysis

Number of Taxa: 2
Total Number of Individuals: 4
% Contribution of Dominant Family: 50.0 % (Tubificidae & Chironomidae)
Family Biotic Index: 8.0
Scraper/Filterer Collector Ratio: 0.0
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.0
EPT/C: 0.0
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 160
Deficiency(s) noted: Significant Organic Pollution - Paucity of Clean Water Organisms
Low Diversity

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 20/2
Substrate: Cobbles....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Forested/AFB Upstream; Water temp. 8.9 /pH 7.3
/DO 9.3 /Cond.134

Station: AN0120
North Run, Main St , Cookstown, Burlington County
New Egypt USGS Quadrangle
Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	37
Tubificidae	10	34
Chironomidae	6	12
BloodRed Chironomidae	8	6
Corixidae	9	3
Gyrinidae	3	2
Calopterygidae	5	1
Aeshnidae	3	1
Hydropsychidae	4	1
Asellidae	8	1
Planorbidae	6	1
Sphaeriidae	8	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 101
% Contribution of Dominant Family: 36.63 % (Gammaridae)
Family Biotic Index: 6.74
Scraper/Filterer Collector Ratio: 0.33
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.99
EPT/C: 0.06
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 89
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid...Flow: Slow...Width/Depth (ft): 20/2
Substrate: Sand,mud,snags...StreamBank Vegetation/Stability:
Weeds,trees/Unstable
Canopy: Mostly Open...Other: Urban; Water temp.10.4 /pH 7.6 /DO 9.4 /Cond.233

Station: AN0121
 Crosswicks Ck, Rt 537 , New Egypt, Ocean County
 New Egypt USGS Quadrangle
 Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	21
Hydrobiidae	8	11
Tubificidae	10	10
Gammaridae	4	9
Naididae	7	9
Corbiculidae	8	7
BloodRed Chironomidae	8	7
Paludicellidae	7	5
Asellidae	8	2
Hydropsychidae	4	2
Daphnidae	4	2
Protoneuridae	9	1
Caenidae	7	1
Philopotamidae	3	1
Elmidae	4	1
Planariidae	4	1
Gyrinidae	3	1
Empididae	6	1
Lepidostomatidae	1	1
Belostomatidae	9	1
Nematoda	6	1
Lymnaeidae	6	1
Corixidae	9	1
Sphaeriidae	8	1
Heptageniidae	4	1
Taeniopterygidae	2	1

Statistical Analysis

Number of Taxa: 26
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 21.00 % (Chironomidae)
 Family Biotic Index: 6.81
 Scraper/Filterer Collector Ratio: 0.50
 Shredder/Total Ratio: 0.02
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 7.00
 EPT/C: 0.25
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 114
 Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 30/3
 Substrate: Sand,mud,snags....StreamBank Vegetation/Stability:
 Trees,shrubs/Stable
 Canopy: Mostly Open....Other: Forested/Rural; Water temp.8.8 /pH 6.9 /DO 9.5
 /Cond.133

Station: AN0122
Lahaway Ck, Rt 537 , Jackson Twp, Ocean County
Roosevelt USGS Quadrangle
Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	88
Chironomidae	6	6
Planariidae	4	1
Hydriidae	5	1
Protoneuridae	9	1
Planorbidae	6	1
Diplopoda	5	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 88.00 % (Simuliidae)
Family Biotic Index: 6.00
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 142
Deficiency(s) noted: Simuliidae Family Overwhelmingly Dominant
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/1
Substrate: Gravel,sand,snags....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Forested/Rural/Lake upstream;
Water temp. 6.5 /pH 6.8 /DO 12.7 /Cond.50

Station: AN0123
Ivanhoe Bk, Millers Mill Rd , Prospertown, Ocean County
Roosevelt USGS Quadrangle
Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	22
Simuliidae	6	19
Corixidae	9	4
Sphaeriidae	8	3
Protoneuridae	9	2
Taeniopterygidae	2	2
Tipulidae	3	2
Ptychopteridae	8	1
Hydropsychidae	4	1
Lepidostomatidae	1	1
Notonectidae	9	1
Sialidae	4	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 60
% Contribution of Dominant Family: 36.67 % (Chironomidae)
Family Biotic Index: 6.17
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.08
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 6.67
EPT/C: 0.30
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 151
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid...Flow: Slow...Width/Depth (ft): 10/1
Substrate: Gravel,sand,snags...StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open...Other: Forested/Rural; Water temp.11.9 /pH 6.3 /DO 8.7
/Cond.83

Station: AN0124
Lahaway Ck, New Egypt - Allentown Rd , Upper Freehold Twp, Monmouth County
New Egypt USGS Quadrangle
Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Taeniopterygidae	2	61
Chironomidae	6	36
Heptageniidae	4	3
Simuliidae	6	2
Tetrastemmatidae	7	2
Gammaridae	4	1
Tubificidae	10	1
Naididae	7	1
Talitridae	8	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 109
% Contribution of Dominant Family: 55.96 % (Taeniopterygidae)
Family Biotic Index: 3.74
Scraper/Filterer Collector Ratio: 1.50
Shredder/Total Ratio: 0.57
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 58.72
EPT/C: 1.63
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 130
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 20/1
Substrate: Sand,snags....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Forested/Rural; Water temp.9.2 /pH 6.9 /DO 10.0 /Cond.563

Station: AN0125
Crosswicks Ck, Extonville Rd , Extonville, Burlington/Mercer County
Allentown USGS Quadrangle
Date Sampled: 01/08/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Taeniopterygidae	2	21
Culicidae	8	8
Chironomidae	6	7
Gammaridae	4	6
Corbiculidae	8	2
Tubificidae	10	2
Caenidae	7	1
Asellidae	8	1
Enchytraeidae	10	1
Entomobryidae	10	1
Chilopoda	6	1
Hydrophilidae	5	1
Lumbricidae	10	1
Planorbidae	6	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 55
% Contribution of Dominant Family: 38.18 % (Taeniopterygidae)
Family Biotic Index: 4.98
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.40
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 40.00
EPT/C: 5.71
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 131
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 45/2
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Open....Other: Forested/Rural; Water temp.10.2 /pH 7.2 /DO 8.4
/Cond.123

Station: AN0125B
Miry Run, Holmes Mill Rd , Holmes Mills, Monmouth County
Allentown USGS Quadrangle
Date Sampled: 02/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	35
Simuliidae	6	27
Taeniopterygidae	2	5
Tubificidae	10	4
Hydropsychidae	4	3
Tipulidae	3	2
Nemouridae	2	2
Corydalidae	0	2
BloodRed Chironomidae	8	2
Calopterygidae	5	1
Aeshnidae	3	1
Hydrophilidae	5	1
Lumbriculidae	8	1
Phryganeidae	4	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 87
% Contribution of Dominant Family: 40.23 % (Chironomidae)
Family Biotic Index: 5.57
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.09
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 12.64
EPT/C: 0.34
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 124

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 11/1
Substrate: Sand,silt....StreamBank Vegetation/Stability: Trees,Shrubs/Unstable
Canopy: Mostly Open....Other: Rural/Agricultural cropland; Water temp.3.0 /pH
6.9 /DO 11.6 /Cond.230

Station: AN0126
Crosswicks Ck, Main St , Groveville, Burlington/Mercer County
Trenton E USGS Quadrangle
Date Sampled: 01/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	59
Chironomidae	6	13
Taeniopterygidae	2	13
BloodRed Chironomidae	8	4
Corbiculidae	8	4
Poduridae	10	3
Enchytraeidae	10	2
Hydropsychidae	4	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 59.00 % (Tubificidae)
Family Biotic Index: 8.19
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 14.00
EPT/C: 0.82
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 127
Deficiency(s) noted: Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Fast....Width/Depth (ft): 50/4
Substrate: Sand....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Forested/Suburban; Water temp.6.0 /pH 6.9 /DO 11.1 /Cond.172

Station: AN0126A
Crosswicks Ck trib, Irono Bridge Rd , Chesterfield Twp, Burlington County
Allentown USGS Quadrangle
Date Sampled: 02/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	2
BloodRed Chironomidae	8	2
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 3
Total Number of Individuals: 7
% Contribution of Dominant Family: 57.14 % (Chironomidae)
Family Biotic Index: 6.14
Scraper/Filterer Collector Ratio: 0.0
Shredder/Total Ratio: 0.14
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.0
EPT/C: 0.0
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 152
Deficiency(s) noted: Paucity of Clean Water Organisms
Low Diversity

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5/ <1
Substrate: Gravel/Sand....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Closed....Other: Forested/Rural/Agricultural cropland; Water
temp. 3.4 /pH 6.8 /DO 12.2 /Cond.167

Station: AN0126B
Pleasant Run, Extonville Rd , Extonville Twp, Burlington County
Allentown USGS Quadrangle
Date Sampled: 02/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	4
Chironomidae	6	2
Simuliidae	6	1
Lepidostomatidae	1	1

Statistical Analysis

Number of Taxa: 4
Total Number of Individuals: 8
% Contribution of Dominant Family: 50.0 % (Tubificidae)
Family Biotic Index: 7.38
Scraper/Filterer Collector Ratio: 0.0
Shredder/Total Ratio: 0.13
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 12.5
EPT/C: 6.25
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 143
Deficiency(s) noted: Significant Organic Pollution -
Paucity of Clean Water Organisms - Low Diversity

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 13/1
Substrate: Gravel/Sand/Silt....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Closed....Other: Forested/Rural/Agricultural cropland and
livestock; Water temp. 3.2 /pH 6.5 /DO 12.4 /Cond.225

Station: AN0127
Doctors Ck, Red Valley Rd , Upper Freehold Twp, Monmouth County
Roosevelt USGS Quadrangle
Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	21
Daphnidae	4	20
Chydoridae	4	13
Naididae	7	12
Sphaeriidae	8	7
Protoneuridae	9	6
Tipulidae	3	4
BloodRed Chironomidae	8	3
Elmidae	4	2
Hydridae	5	2
Cyclopidae	4	2
Planorbidae	6	2
Physidae	7	2
Gammaridae	4	1
Limnephilidae	4	1
Sialidae	4	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 21.00 % (Chironomidae)
Family Biotic Index: 5.62
Scraper/Filterer Collector Ratio: 1.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
EPT/C: 0.04
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 100
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 15/1
Substrate: Mud,snags....StreamBank Vegetation/Stability: Weeds/Unstable
Canopy: Open....Other: Forested/Rural/Agricultural livestock/Impoundment
upstream; Water temp.7.2 /pH 6.3 /DO 10.8 /Cond.61

Station: AN0128
Negro Run, Red Valley Rd , Allentown, Monmouth County
Allentown USGS Quadrangle
Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	21
Sphaeriidae	8	15
Plagiostomidae	4	12
Daphnidae	4	8
Naididae	7	8
Chydoridae	4	7
Protoneuridae	9	7
Hydrobiidae	8	5
Tubificidae	10	3
BloodRed Chironomidae	8	2
Planariidae	4	2
Planorbidae	6	2
Cyclopidae	4	2
Hydroptilidae	4	2
Baetidae	4	1
Elmidae	4	1
Talitridae	8	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 21.00 % (Chironomidae)
Family Biotic Index: 6.18
Scraper/Filterer Collector Ratio: 0.33
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 3.00
EPT/C: 0.13
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 128
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 10/3
Substrate: Mud....StreamBank Vegetation/Stability: Weeds/Stable
Canopy: Mostly Open....Other: Forested/Rural/Agricultural livestock/Impoundment
upstream; Water temp.10.1 /pH 6.4 /DO 9.8 /Cond.131

Station: AN0129
 Doctors Ck, Breza Rd , Allentown, Monmouth County
 Allentown USGS Quadrangle
 Date Sampled: 01/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	25
Tubificidae	10	17
Plagiostomidae	4	16
BloodRed Chironomidae	8	7
Planorbidae	6	7
Sphaeriidae	8	7
Hydrobiidae	8	4
Calopterygidae	5	3
Paludicellidae	7	3
Taeniopterygidae	2	3
Naididae	7	2
Glossiphoniidae	8	1
Viviparidae	6	1
Hydropsychidae	4	1
Elmidae	4	1
Gammaridae	4	1
Hydridae	5	1
Dytiscidae	5	1
Family	6	1
Psychodidae	10	1
Nemouridae	2	1
Physidae	7	1
Simulidae	6	1
Sialidae	4	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 25
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 23.15 % (Chironomidae)
 Family Biotic Index: 6.49
 Scraper/Filterer Collector Ratio: 1.22
 Shredder/Total Ratio: 0.04
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
 % EPT: 5.56
 EPT/C: 0.17
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 141
 Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 30/2
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
 Canopy: Mostly Open....Other: Forested/Suburban/STP upstream; Water temp.8.6
 /pH 6.6 /DO 11.0 /Cond.94

Station: AN0130
Doctors Ck, Rt 130 , Groveville, Mercer County
Trenton E USGS Quadrangle
Date Sampled: 01/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Taeniopterygidae	2	38
Chironomidae	6	33
BloodRed Chironomidae	8	7
Tubificidae	10	7
Corbiculidae	8	5
Elmidae	4	3
Hydropsychidae	4	3
Gammaridae	4	2
Gomphidae	1	1
Pleuroceridae	6	1
Hydrobiidae	8	1
Plagiostomidae	4	1
Protoneuridae	9	1
Nematoda	6	1
Physidae	7	1
Sphaeriidae	8	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 107
% Contribution of Dominant Family: 35.51 % (Taeniopterygidae)
Family Biotic Index: 4.90
Scraper/Filterer Collector Ratio: 3.00
Shredder/Total Ratio: 0.36
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 39.25
EPT/C: 0.98
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 144

Observations

Streamwater: Turbid...Flow: Moderate...Width/Depth (ft): 30/3
Substrate: Gravel,sand...StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Closed...Other: Forested/Suburban; Water temp.6.7 /pH 7.0 /DO
10.8 /Cond.228

Station: AN0131
Crosswicks Ck, Point Breeze , Bordentown Twp, Burlington/Mercer County
Trenton E USGS Quadrangle
Date Sampled: 01/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	34
BloodRed Chironomidae	8	22
Corbiculidae	8	18
Tubificidae	10	17
Corixidae	9	7
Gammaridae	4	4
Plagiostomidae	4	1
Nematoda	6	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 105
% Contribution of Dominant Family: 32.38 % (Chironomidae)
Family Biotic Index: 7.51
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.32
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 118
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 100/4
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Forested/Suburban; Water temp.5.9 /pH 6.9 /DO
10.3 /Cond.172

Station: AN0131A
Back Ck, Yardville - Hamilton Square Rd , Hamilton Twp, Mercer County
Trenton E USGS Quadrangle
Date Sampled: 02/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	8
Chironomidae	6	6
Sialidae	4	3
Corixidae	9	3
Capniidae	1	2
Elmidae	4	2
Tubificidae	10	1
Asellidae	8	1
Ephydriidae	6	1
Plagiostomidae	4	1
Nematoda	6	1
Leptoceridae	4	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 31
% Contribution of Dominant Family: 25.81 % (Sphaeriidae)
Family Biotic Index: 6.26
Scraper/Filterer Collector Ratio: 0.25
Shredder/Total Ratio: 0.10
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 9.68
EPT/C: 1.61
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 152
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 15/2
Substrate: Cobbles,snags,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Forested/Suburban; Water temp.6.7 /pH 6.8 /DO
12.2 /Cond.210

Station: AN0132
Blacks Ck, Chesterfield - Georgetown Rd , Chesterfield Twp, Burlington County
Columbus USGS Quadrangle
Date Sampled: 01/08/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	28
Tetrastemmatidae	7	17
Tubificidae	10	15
Sphaeriidae	8	14
BloodRed Chironomidae	8	9
Elmidae	4	6
Nematoda	6	4
Hydropsychidae	4	2
Planariidae	4	2
Simuliidae	6	2
Protoneuridae	9	1
Planorbidae	6	1
Daphnidae	4	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 102
% Contribution of Dominant Family: 27.45 % (Chironomidae)
Family Biotic Index: 7.02
Scraper/Filterer Collector Ratio: 0.89
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.96
EPT/C: 0.05
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 160
Deficiency(s) noted: Paucity of Clean Water Organisms
Significant Organic Pollution

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 17/1
Substrate: Sand....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Forested/Rural; Water temp.10.6 /pH 7.0 /DO 10.3 /Cond.145

Station: AN0133
Bacon Run, White Pine Rd , Chesterfield Twp, Burlington County
Columbus USGS Quadrangle
Date Sampled: 01/08/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tipulidae	3	5
Chironomidae	6	2
Tubificidae	10	2
Psychomyiidae	2	2
Asellidae	8	1
Plagiostomidae	4	1
Corixidae	9	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 15
% Contribution of Dominant Family: 33.33 % (Tipulidae)
Family Biotic Index: 5.20
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 13.33
EPT/C: 6.67
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 129
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 9/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Forested/Agricultural cropland; Water temp.11.5
/pH 6.6 /DO 9.4 /Cond.141

Station: AN0134
Blacks Ck, Rt 130 , Bordentown, Burlington County
Columbus USGS Quadrangle
Date Sampled: 01/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Corbiculidae	8	25
Gammaridae	4	13
BloodRed Chironomidae	8	10
Chironomidae	6	7
Tubificidae	10	6
Planorbidae	6	2
Tetrastemmatidae	7	2
Taeniopterygidae	2	2
Plagiostomidae	4	1
Lumbriculidae	8	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 70
% Contribution of Dominant Family: 35.71 % (Corbiculidae)
Family Biotic Index: 6.86
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.29
EPT/C: 0.25
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 101
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Fast....Width/Depth (ft): 30/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,weeds/Stable
Canopy: Mostly Open....Other: Forested; Water temp.6.5 /pH 6.9 /DO 10.8
/Cond.263

Station: AN0135
Crafts Ck, Gaunts Bridge Rd , Georgetown, Burlington County
Columbus USGS Quadrangle
Date Sampled: 01/08/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	39
Physidae	7	15
Sphaeriidae	8	13
Tubificidae	10	10
Gammaridae	4	8
Lymnaeidae	6	5
BloodRed Chironomidae	8	3
Protoneturidae	9	2
Simuliidae	6	2
Psychodidae	10	2
Tipulidae	3	2
Enchytraeidae	10	1
Erpobdellidae	8	1
Hydrophilidae	5	1
Naididae	7	1
Nepticulidae	5	1
Tetrastemmatidae	7	1
Phryganeidae	4	1
Corixidae	9	1

Statistical Analysis

Number of Taxa: 19
Total Number of Individuals: 109
% Contribution of Dominant Family: 35.78 % (Chironomidae)
Family Biotic Index: 6.79
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.92
EPT/C: 0.02
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 121
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 5/1
Substrate: Snags,mud....StreamBank Vegetation/Stability: Shrubs/Stable
Canopy: Mostly Open....Other: Suburban/Agricultural livestock; Water temp.12.6
/pH 6.6 /DO 6.8 /Cond.130

Station: AN0136
Crafts Ck, Island Rd , Columbus, Burlington County
Columbus USGS Quadrangle
Date Sampled: 01/08/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Corixidae	9	82
Chironomidae	6	7
Tubificidae	10	3
Baetidae	4	2
Haliplidae	5	2
Dytiscidae	5	1
Tetrastemmatidae	7	1
Sialidae	4	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 82.00 % (Corixidae)
Family Biotic Index: 8.54
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.00
EPT/C: 0.29
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 136
Deficiency(s) noted: Corixidae Family Overwhelmingly Dominant -
Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Turbid...Flow: Moderate...Width/Depth (ft): 13/2
Substrate: Mud...StreamBank Vegetation/Stability: Trees, Shrubs/Unstable
Canopy: Mostly Open...Other: Rural/Agricultural cropland; Water temp.13.3 /pH
6.0 /DO 5.5 /Cond.139

Station: AN0137
 Crafts Ck, Old York Rd , Nr Roebling, Burlington County
 Bristol USGS Quadrangle
 Date Sampled: 01/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	18
Hydrobiidae	8	13
Capniidae	1	12
Taeniopterygidae	2	8
Tetrastemmatidae	7	6
Hydropsychidae	4	5
Tubificidae	10	5
Corbiculidae	8	4
Heptageniidae	4	4
Gammaridae	4	3
Nematoda	6	3
Planariidae	4	2
Elmidae	4	2
Enchytraeidae	10	2
Planorbidae	6	2
Glossiphoniidae	8	1
Caenidae	7	1
Gomphidae	1	1
Ephemerellidae	1	1
Dryopidae	5	1
Talitridae	8	1
Plagiostomidae	4	1
Naididae	7	1
Simuliidae	6	1
Sphaeriidae	8	1
BloodRed Chironomidae	8	1

 Statistical Analysis

Number of Taxa: 26
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 18.00 % (Chironomidae)
 Family Biotic Index: 5.41
 Scraper/Filterer Collector Ratio: 1.00
 Shredder/Total Ratio: 0.21
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
 % EPT: 31.00
 EPT/C: 1.63
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 139

 Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30/2
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,vines/Unstable
 Canopy: Mostly Open....Other: Forested/Rural/Agricultural cropland and
 livestock; Water temp.2.3 /pH 8.1 /DO 12.4 /Cond.264

Station: AN0138
Assiscunk Ck, Columbus - Georgetown Rd , Nr Georgetown, Burlington County
Columbus USGS Quadrangle
Date Sampled: 01/08/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	80
Tubificidae	10	4
BloodRed Chironomidae	8	3
Hydropsychidae	4	2
Planorbidae	6	2
Simuliidae	6	2
Corixidae	9	2
Chironomidae	6	1
Tipulidae	3	1
Veliidae	9	1
Physidae	7	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 80.00 % (Gammaridae)
Family Biotic Index: 4.66
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.00
EPT/C: 0.50
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 120
Deficiency(s) noted: Gammaridae Family Overwhelmingly Dominant -
Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 5/1
Substrate: Gravel,mud....StreamBank Vegetation/Stability:
Shrubs,grasses/Unstable....Canopy: Mostly Open....Other: Agricultural cropland;
Water temp.13.2 /pH 6.2 /DO 8.0 /Cond.151

Station: AN0139
Anaricken Bk, Island Rd , Springfield Twp, Burlington County
Columbus USGS Quadrangle
Date Sampled: 01/08/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	56
Chironomidae	6	20
Hydropsychidae	4	14
Tetrastemmatidae	7	4
Elmidae	4	3
Tipulidae	3	2
Asellidae	8	1
Tubificidae	10	1
Planorbidae	6	1
Nematoda	6	1
Corydalidae	0	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 105
% Contribution of Dominant Family: 53.33 % (Gammaridae)
Family Biotic Index: 4.60
Scraper/Filterer Collector Ratio: 0.29
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 13.33
EPT/C: 0.67
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 129
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 7/1
Substrate: Sand,mud....StreamBank Vegetation/Stability: Weeds/Unstable
Canopy: Mostly Open....Other: Agricultural livestock; Water temp.12.9 /pH 6.2
/DO 7.0 /Cond.153

Station: AN0140
Barkers Bk N Br, Juliustown Rd , Springfield Twp, Burlington County
Columbus USGS Quadrangle
Date Sampled: 01/13/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	49
Elmidae	4	21
Simuliidae	6	13
Chironomidae	6	6
Hydropsychidae	4	3
Tubificidae	10	1
Nematoda	6	1
Corydalidae	0	1
Physidae	7	1
Sphaeriidae	8	1
Sialidae	4	1
Corixidae	9	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 49.00 % (Gammaridae)
Family Biotic Index: 4.53
Scraper/Filterer Collector Ratio: 1.24
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
EPT/C: 0.50
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): 10/2
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Mostly Open....Other: Forested/Agricultural cropland; Water temp.7.7
/pH 6.6 /DO 10.0 /Cond.163

Station: AN0141
Assiscunk Ck, Hedding Rd (Nr Jacksonville), Springfield Twp, Burlington County
Bristol USGS Quadrangle

Date Sampled: NOT SAMPLED

BRIDGE CONSTRUCTION

Station: AN01410
Barkers Bk, Jacksonville - Smithville Rd , Springfield Twp, Burlington County
Bristol USGS Quadrangle
Date Sampled: 02/26/97

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	26
Gammaridae	4	20
Elmidae	4	15
Hydropsychidae	4	9
Sphaeriidae	8	6
Simuliidae	6	5
Ephemerelellidae	1	4
Tubificidae	10	4
BloodRed Chironomidae	8	4
Tetrastemmatidae	7	2
Planariidae	4	1
Nematoda	6	1
Physidae	7	1
Heptageniidae	4	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Chironomidae)
Family Biotic Index: 5.24
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 14.00
EPT/C: 0.47
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: no data

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 20/<1
Substrate: Mud,gravel....StreamBank Vegetation/Stability: Trees,grasses/Unstable
Canopy: Open....Other: Agricultural cropland and livestock;

Station: AN0142
Assiscunk Ck, Neck Rd , Nr Sutton Chapel, Burlington County
Bristol USGS Quadrangle
Date Sampled: 01/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Corixidae	9	67
Tubificidae	10	13
Chironomidae	6	11
Plagiostomidae	4	7
BloodRed Chironomidae	8	4
Gammaridae	4	3
Corbiculidae	8	1

Statistical Analysis

Number of Taxa: 7
Total Number of Individuals: 106
% Contribution of Dominant Family: 63.21 % (Corixidae)
Family Biotic Index: 8.30
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 143
Deficiency(s) noted: Corixidae Family Overwhelmingly Dominant -
Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 40/4
Substrate: Gravel,mud....StreamBank Vegetation/Stability: Trees,grasses/Unstable
Canopy: Open....Other: Forested/Suburban; Water temp. 2.3 /pH 7.3 /DO 12.3
/Cond.180

Station: AN0142C
 Assiscunk Ck Trib, Oxmead Rd , Burlington Twp, Burlington County
 Bristol USGS Quadrangle
 Date Sampled: 02/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	21
Lumbriculidae	8	10
Sphaeriidae	8	10
Hydropsychidae	4	8
Ephemereleididae	1	8
Planorbidae	6	6
Elmidae	4	5
Baetidae	4	4
Tipulidae	3	4
Lumbricidae	10	4
Phryganeidae	4	4
Physidae	7	3
Calopterygidae	5	2
Protoneuridae	9	2
Plagiostomidae	4	2
BloodRed Chironomidae	8	2
Aeshnidae	3	1
Gyrinidae	3	1
Planariidae	4	1
Leptoceridae	4	1
Ceratopogonidae	6	1

Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 21.00 % (Chironomidae)
 Family Biotic Index: 5.59
 Scraper/Filterer Collector Ratio: 0.44
 Shredder/Total Ratio: 0.04
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 5
 % EPT: 25.00
 EPT/C: 1.09
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 122

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 8/<1
 Substrate: Gravel,sand....StreamBank Vegetation/Stability:
 Trees,weeds,vines/Unstable
 Canopy: Mostly Open....Other: Forested/Suburban; Water temp.7.5 /pH 6.6 /DO
 10.5 /Cond.158

Station: AN0143
Rancocas Ck N Br, Blw Hanover Lk , Hanover Furnace, Burlington County
Browns Mills USGS Quadrangle
Date Sampled: 02/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	78
Protoneuridae	9	6
Polycentropodidae	6	3
BloodRed Chironomidae	8	2
Hydropsychidae	4	2
Tubificidae	10	2
Tipulidae	3	2
Asellidae	8	1
Gomphidae	1	1
Molannidae	6	1
Limnephilidae	4	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 100
% Contribution of Dominant Family: 78.00 % (Chironomidae)
Family Biotic Index: 6.13
Scraper/Filterer Collector Ratio: 0.40
Shredder/Total Ratio: 0.82
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 7.00
EPT/C: 0.09
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 178
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant -
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 17/2
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Shrubs,trees/Stable
Canopy: Mostly Open....Other: Forested/Rural/Lake upstream; Water temp.4.4 /pH
4.3 /DO 11.9 /Cond.45

Station: AN0144
Pole Bridge Br, Split Rock Rd , Pemberton Twp, Burlington County
Browns Mills USGS Quadrangle
Date Sampled: 02/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simulidae	6	76
Hydropsychidae	4	8
Asellidae	8	5
Philopotamidae	3	4
Elmidae	4	3
Leptoceridae	4	2
Polycentropodidae	6	1
Chironomidae	6	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 76.00 % (Simulidae)
Family Biotic Index: 5.72
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 15.00
EPT/C: 15.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 172
Deficiency(s) noted: Simulidae Family Overwhelmingly Dominant -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 17/2
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Forested/Rural/Impoundment upstream; Water
temp.4.2 /pH 4.0 /DO 11.1 /Cond.76

Station: AN0145
 Mt Misery Bk, Rt 70 , Pemberton Twp, Burlington County
 Browns Mills USGS Quadrangle
 Date Sampled: 02/03/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	29
Limnephilidae	4	13
Capniidae	1	10
Asellidae	8	7
Lepidostomatidae	1	6
Leptophlebiidae	2	6
Philopotamidae	3	5
Ceratopogonidae	6	4
Enchytraeidae	10	3
Polycentropodidae	6	3
Heptageniidae	4	3
Taeniopterygidae	2	3
Hydropsychidae	4	2
Tipulidae	3	1
Perlodidae	2	1
Phryganeidae	4	1
Sialidae	4	1
Metretopodidae	2	1
Tabanidae	6	1

 Statistical Analysis

Number of Taxa: 19
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 29.00 % (Chironomidae)
 Family Biotic Index: 4.44
 Scraper/Filterer Collector Ratio: 0.30
 Shredder/Total Ratio: 0.40
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 12
 % EPT: 54.00
 EPT/C: 1.86
 NJIS Rating: 30
 Biological Condition: Nonimpaired
 Habitat Analysis: 187

 Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 11/1
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Closed....Other: Forested; Water temp.4.6 /pH 4.1 /DO 11.5
 /Cond.58

Station: AN0146
Mcdonalds Br, Usgs Gage Lebanon St Forest, Burlington County
Browns Mills USGS Quadrangle
Date Sampled: 12/16/97

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	51
Leuctridae	0	12
Polycentropodidae	6	9
Asellidae	8	6
Leptophlebiidae	2	6
Limnephilidae	4	6
Simuliidae	6	3
Phryganeidae	4	3
Naididae	7	3
Dytiscidae	5	2
Lumbriculidae	8	2
Taeniopterygidae	2	1
Tubificidae	10	1
Corydalidae	0	1
Sialidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 107
% Contribution of Dominant Family: 47.66 % (Chironomidae)
Family Biotic Index: 5.02
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.20
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 34.58
EPT/C: 0.68
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 165

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 5/1
Substrate: Sand....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Closed....Other: Forested; Water temp.7.1 /pH 4.0 /DO 4.3 /Cond.33

Station: AN0147
 Bisphams Mill Ck, Turkey Buzzard Br Rd , Pemberton Twp, Burlington County
 Browns Mills USGS Quadrangle
 Date Sampled: 02/03/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	52
Limnephilidae	4	8
Heptageniidae	4	4
Capniidae	1	3
Brachycentridae	1	3
Philopotamidae	3	3
Lepidostomatidae	1	3
Leptophlebiidae	2	3
Sphaeriidae	8	3
Asellidae	8	2
Corydalidae	0	2
Leptoceridae	4	2
Tabanidae	6	2
Perlidae	1	1
Aeshnidae	3	1
Gomphidae	1	1
Enchytraeidae	10	1
Ceratopogonidae	6	1
Polycentropodidae	6	1
Simuliidae	6	1
Elmidae	4	1
Hydropsychidae	4	1
Onychiuridae	10	1

Statistical Analysis

Number of Taxa: 23
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 52.00 % (Chironomidae)
 Family Biotic Index: 4.95
 Scraper/Filterer Collector Ratio: 0.42
 Shredder/Total Ratio: 0.14
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 11
 % EPT: 32.00
 EPT/C: 0.62
 NJIS Rating: 24
 Biological Condition: Nonimpaired
 Habitat Analysis: 187

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 11/2
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Closed....Other: Forested; Water temp.5.9 /pH 4.3 /DO 10.9
 /Cond.66

Station: AN0148
 Greenwood Br, New Lisbon Rd , New Lisbon, Burlington County
 Pemberton USGS Quadrangle
 Date Sampled: 02/03/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	48
Hydropsychidae	4	20
Philopotamidae	3	7
Corydalidae	0	5
Simuliidae	6	4
Asellidae	8	2
Ephemerellidae	1	2
Empididae	6	2
Hydroptilidae	4	2
Perlodidae	2	2
Naididae	7	2
Phryganeidae	4	2
Heptageniidae	4	2
Taeniopterygidae	2	2
Aeshnidae	3	1
Enchytraeidae	10	1
Limnephilidae	4	1
Ceratopogonidae	6	1
Sialidae	4	1
Elmidae	4	1
Tipulidae	3	1

 Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 109
 % Contribution of Dominant Family: 44.04 % (Chironomidae)
 Family Biotic Index: 4.80
 Scraper/Filterer Collector Ratio: 0.19
 Shredder/Total Ratio: 0.06
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 9
 % EPT: 36.70
 EPT/C: 0.76
 NJIS Rating: 27
 Biological Condition: Nonimpaired
 Habitat Analysis: 159

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 17/2
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
 Canopy: Mostly Open....Other: Forested/Rural; Water temp.4.3 /pH 4.1 /DO 11.6
 /Cond.61

Station: AN0149
Rancocas Ck N Br, Main St , Pemberton, Burlington County
Pemberton USGS Quadrangle
Date Sampled: 01/20/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Leptophlebiidae	2	63
BloodRed Chironomidae	8	6
Tipulidae	3	5
Enchytraeidae	10	3
Limnephilidae	4	3
Gammaridae	4	2
Onychiuridae	10	2
Tubificidae	10	2
Chironomidae	6	2
Corixidae	9	2
Asellidae	8	1
Belostomatidae	9	1
Dytiscidae	5	1
Lumbriculidae	8	1
Sphaeriidae	8	1
Tetrastemmatidae	7	1
Sialidae	4	1
Elmidae	4	1
Hydropsychidae	4	1
Taeniopterygidae	2	1

Statistical Analysis

Number of Taxa: 20
Total Number of Individuals: 100
% Contribution of Dominant Family: 63.00 % (Leptophlebiidae)
Family Biotic Index: 3.68
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.11
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 68.00
EPT/C: 8.50
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 171
Deficiency(s) noted: Leptophlebiidae Family Overwhelmingly Dominant -

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40/3
Substrate: Gravel,sand,snags....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Forested/Suburban; Water temp.4.3 /pH 4.8 /DO
11.2 /Cond.64

Station: AN0149A
Ong Run, W Lake Shore Dr , Browns Mills, Burlington County
Browns Mills USGS Quadrangle
Date Sampled: 02/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	63
Sphaeriidae	8	26
Chironomidae	6	6
Dytiscidae	5	1
Planorbidae	6	1
Nematoda	6	1
Lymnaeidae	6	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 63.00 % (Tubificidae)
Family Biotic Index: 9.03
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 169
Deficiency(s) noted: Tubificidae Family Overwhelmingly Dominant - Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/1
Substrate: Cobbles,sandsnags....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Forested/Suburban; Water temp.8.3 /pH 6.4 /DO 11.6 /Cond.105

Station: AN0149B
Jacks Run, Range Rd , New Hanover Twp, Burlington County
Browns Mills USGS Quadrangle
Date Sampled: 02/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydroptilidae	4	33
Chironomidae	6	30
Chydoridae	4	22
Naididae	7	9
Macrothricidae	4	5
Tubificidae	10	2
Haliplidae	5	2
BloodRed Chironomidae	8	1
Limnephilidae	4	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 106
% Contribution of Dominant Family: 31.13 % (Hydroptilidae)
Family Biotic Index: 5.03
Scraper/Filterer Collector Ratio: 5.50
Shredder/Total Ratio: 0.31
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 32.08
EPT/C: 1.03
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 174
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 15/3
Substrate: Sand,snags....StreamBank Vegetation/Stability: Weeds/Stable
Canopy: Open....Other: Forested; Water temp.7.5 /pH 5.3 /DO 11.9 /Cond.59

Station: AN0150
Budds Run, Hanover St , Pemberton, Burlington County
Pemberton USGS Quadrangle
Date Sampled: 02/03/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simulidae	6	87
Chironomidae	6	6
Hydropsychidae	4	2
Taeniopterygidae	2	2
Asellidae	8	1
Tubificidae	10	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 7
Total Number of Individuals: 100
% Contribution of Dominant Family: 87.00 % (Simulidae)
Family Biotic Index: 5.92
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 4.00
EPT/C: 0.67
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 137
Deficiency(s) noted: Simulidae Family Overwhelmingly Dominant -
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 11/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Urban; Water temp.4.2 /pH 7.3 /DO 11.4
/Cond.191

Station: AN0151
Rancocas Ck N Br, Pine St Park , Mt Holly, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 05/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	87
Chironomidae	6	6
BloodRed Chironomidae	8	5
Gammaridae	4	4
Corixidae	9	2
Enchytraeidae	10	1
Chydoridae	4	1
Lumbriculidae	8	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 107
% Contribution of Dominant Family: 81.31 % (Tubificidae)
Family Biotic Index: 9.36
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 126
Deficiency(s) noted: Tubificidae Family Overwhelmingly Dominant -
Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 40/5
Substrate: Sand,mud....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Open....Other: Forested; Water temp.11.6 /pH 6.2 /DO 8.9
/Cond.111

Station: AN0151A
Indian Run, Birmingham Rd , Pemberton Twp, Burlington County
Pemberton USGS Quadrangle
Date Sampled: 02/18/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	17
Tipulidae	3	4
Limnephilidae	4	2
Calopterygidae	5	1
Elmidae	4	1
Aeshnidae	3	1
Gammaridae	4	1
Hydropsychidae	4	1
Lumbriculidae	8	1
Psychomyiidae	2	1
Corydalidae	0	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 32
% Contribution of Dominant Family: 53.13 % (Chironomidae)
Family Biotic Index: 5.00
Scraper/Filterer Collector Ratio: 2.00
Shredder/Total Ratio: 0.63
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 12.50
EPT/C: 0.69
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 121

Observations

Streamwater: Turbid...Flow: Moderate...Width/Depth (ft): 10/1
Substrate: Gravel,sand,silt...StreamBank Vegetation/Stability:
Trees,weeds/Unstable
Canopy: Mostly Open...Other: Forested/Agricultural cropland; Water temp.7.8
/pH 7.0 /DO 11.0 /Cond.139

Station: AN0152
Friendship Ck, Friendship Rd , Friendship, Burlington County
Indian Mills USGS Quadrangle
Date Sampled: 03/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Enchytraeidae	10	21
Spongillidae	5	20
Hydropsychidae	4	15
Sphaeriidae	8	14
Tubificidae	10	7
Elmidae	4	7
Brachycentridae	1	4
Chironomidae	6	4
Lepidostomatidae	1	2
Asellidae	8	1
Diplopoda	5	1
Cordulegastridae	3	1
Gomphidae	1	1
Corydalidae	0	1
Tipulidae	3	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 16
Total Number of Individuals: 101
% Contribution of Dominant Family: 20.79 % (Enchytraeidae)
Family Biotic Index: 6.28
Scraper/Filterer Collector Ratio: 0.36
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 21.78
EPT/C: 5.45
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 171

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 9/2
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Forested/Channelized [historical]; Water
temp.6.5 /pH 4.6 /DO 11.1 /Cond.73

Station: AN0153
Burrs Mill Bk, Hedgerhouse Rd , Woodland Twp, Burlington County
Chatsworth USGS Quadrangle
Date Sampled: 03/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simulidae	6	35
Chironomidae	6	27
Hydropsychidae	4	8
Enchytraeidae	10	5
Ceratopogonidae	6	5
Limnephilidae	4	5
Asellidae	8	4
Tipulidae	3	3
Phryganeidae	4	2
BloodRed Chironomidae	8	2
Dytiscidae	5	2
Tabanidae	6	2
Chilopoda	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 101
% Contribution of Dominant Family: 34.65 % (Simulidae)
Family Biotic Index: 5.91
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.07
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 14.85
EPT/C: 0.51
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 177

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/3
Substrate: Sand,snags....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Forested/Rural/Agricultural cropland; Water
temp.5.3 /pH 4.2 /DO 9.9 /Cond.77

Station: AN0154
Burrs Mill Bk, Sooy Place Rd , Southampton Twp, Burlington County
Pemberton USGS Quadrangle
Date Sampled: 03/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	51
Simuliidae	6	21
Asellidae	8	10
Hydropsychidae	4	7
Leptophlebiidae	2	4
Limnephilidae	4	4
Elmidae	4	3
Leptoceridae	4	2
Nematoda	6	2
Protoneuridae	9	1
Philopotamidae	3	1
Planorbidae	6	1
Isotomidae	10	1
Molannidae	6	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 110
% Contribution of Dominant Family: 46.36 % (Chironomidae)
Family Biotic Index: 5.79
Scraper/Filterer Collector Ratio: 0.17
Shredder/Total Ratio: 0.50
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 17.27
EPT/C: 0.34
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 147

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/2
Substrate: Cobbles,sand....StreamBank Vegetation/Stability: Trees,shrubs
vines/Unstable
Canopy: Mostly Open....Other: Forested/Agricultural cropland; Water temp.6.7
/pH 4.0 /DO 11.2 /Cond.68

Station: AN0155
Friendship Ck , Retreat Rd , Retreat, Burlington County
Pemberton USGS Quadrangle
Date Sampled: 03/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	45
Asellidae	8	13
Enchytraeidae	10	11
Sphaeriidae	8	9
Tubificidae	10	7
Chironomidae	6	4
Hydropsychidae	4	3
Leptophlebiidae	2	2
Phryganeidae	4	2
Lumbricidae	10	1
Lumbriculidae	8	1
Naididae	7	1
Polycentropodidae	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Simuliidae)
Family Biotic Index: 7.05
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 8.00
EPT/C: 2.00
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 177
Deficiency(s) noted: Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 10/3
Substrate: Sand,snags....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Forested/Rural; Water temp.7.4 /pH 4.7 /DO 9.6 /Cond.--

Station: AN0156
Rancocas Ck S Br, Buddtown - Beaverville Rd , Nr Retreat, Burlington County
Pemberton USGS Quadrangle
Date Sampled: 03/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	29
Asellidae	8	25
Enchytraeidae	10	17
Chironomidae	6	10
Tubificidae	10	6
Lumbriculidae	8	6
Leptophlebiidae	2	5
Limnephilidae	4	4
Naididae	7	2
Nemouridae	2	2
Ceratopogonidae	6	1
Empididae	6	1
Hydropsychidae	4	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 110
% Contribution of Dominant Family: 26.36 % (Simuliidae)
Family Biotic Index: 7.05
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 10.91
EPT/C: 1.09
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 166
Deficiency(s) noted: Significant Organic Pollution

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 40/2
Substrate: Sand,silt....StreamBank Vegetation/Stability: Trees,vines/Stable
Canopy: Mostly Closed....Other: Forested/Suburban; Water temp.-- /pH 4.1 /DO --
/Cond.71

Station: AN0157
 Jade Run, Off Rt 206 , Nr Vincentown, Burlington County
 Pemberton USGS Quadrangle
 Date Sampled: 03/11/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	30
Chironomidae	6	28
Simuliidae	6	9
Sphaeriidae	8	8
BloodRed Chironomidae	8	3
Daphnidae	4	3
Planariidae	4	3
Hydrobiidae	8	3
Physidae	7	3
Asellidae	8	2
Hydropsychidae	4	2
Enchytraeidae	10	2
Planorbidae	6	2
Hygrobatidae	2	2
Limnephilidae	4	2
Elmidae	4	2
Nemouridae	2	1
Tipulidae	3	1
Tetrastemmatidae	7	1
Naididae	7	1

 Statistical Analysis

Number of Taxa: 20
 Total Number of Individuals: 108
 % Contribution of Dominant Family: 27.78 % (Tubificidae)
 Family Biotic Index: 7.17
 Scraper/Filterer Collector Ratio: 0.21
 Shredder/Total Ratio: 0.31
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 4.63
 EPT/C: 0.15
 NJIS Rating: 15
 Biological Condition: Moderately Impaired
 Habitat Analysis: 131
 Deficiency(s) noted: Significant Organic Pollution - Paucity of Clean Water Organisms

 Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 15/3
 Substrate: Gravel,sand....StreamBank Vegetation/Stability: Weeds/Unstable
 Canopy: Mostly Open....Other: Agricultural cropland; Water temp.4.7 /pH 5.6 /DO 10.8 /Cond. --

Station: AN0157A
Jade Run, Stockton Bridge Rd , Pemberton Twp, Burlington County
Pemberton USGS Quadrangle
Date Sampled: 02/03/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	53
Asellidae	8	22
Leptophlebiidae	2	13
Lumbriculidae	8	3
Polycentropodidae	6	2
Limnephilidae	4	2
Libellulidae	9	2
Coenagrionidae	9	1
Enchytraeidae	10	1
Dytiscidae	5	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 101
% Contribution of Dominant Family: 52.48 % (Chironomidae)
Family Biotic Index: 6.04
Scraper/Filterer Collector Ratio: 0.50
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 16.83
EPT/C: 0.32
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 183

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 10/2
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Forested/Wetlands; Water temp.4.9 /pH 4.2 /DO 8.7 /Cond.94

Station: AN0158
Little Ck, Rt 70 , Chairville, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 03/24/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	44
Leptophlebiidae	2	14
Nemouridae	2	13
Chironomidae	6	7
Heptageniidae	4	4
Metretopodidae	2	3
Asellidae	8	2
Enchytraeidae	10	2
Corydalidae	0	2
Calopterygidae	5	1
Dytiscidae	5	1
Lumbriculidae	8	1
Psychodidae	10	1
Molannidae	6	1
Gomphidae	1	1
Limnephilidae	4	1
Tabanidae	6	1
Entomobryidae	10	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 44.00 % (Simuliidae)
Family Biotic Index: 4.73
Scraper/Filterer Collector Ratio: 0.14
Shredder/Total Ratio: 0.16
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 6
% EPT: 36.00
EPT/C: 5.14
NJIS Rating: 27
Biological Condition: Nonimpaired
Habitat Analysis: 165

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/2
Substrate: Sand,snags....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Closed....Other: Forested/Suburban; Water temp.6.4 /pH 4.8 /DO 10.8
/Cond.70

Station: AN0159
Bear Swamp R, Rt 70 , Chairville, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 03/24/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	88
Asellidae	8	3
Chironomidae	6	3
Enchytraeidae	10	3
Leptophlebiidae	2	2
Nemouridae	2	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 100
% Contribution of Dominant Family: 88.00 % (Simuliidae)
Family Biotic Index: 6.06
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 3.00
EPT/C: 1.00
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 167
Deficiency(s) noted: Simuliidae Family Overwhelmingly Dominant
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 12/4
Substrate: Sand,snags....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Forested/Suburban; Water temp.5.9 /pH 4.1 /DO
10.0/Cond.83

Station: AN0160
Little Ck, Eayrestown Rd , Eayrestown, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 03/24/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	32
Simuliidae	6	24
Chironomidae	6	11
Tubificidae	10	6
Lumbriculidae	8	4
Physidae	7	4
Hydropsychidae	4	3
Planariidae	4	2
Enchytraeidae	10	2
Hydrobiidae	8	2
BloodRed Chironomidae	8	2
Lymnaeidae	6	2
Calopterygidae	5	1
Gammaridae	4	1
Chilopoda	6	1
Erpobdellidae	8	1
Corixidae	9	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 100
% Contribution of Dominant Family: 32.00 % (Sphaeriidae)
Family Biotic Index: 7.05
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 3.00
EPT/C: 0.23
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 160
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Fast....Width/Depth (ft): 16/4
Substrate: Sand,snags....StreamBank Vegetation/Stability:
Trees,shrubs,vines,grasses/Stable
Canopy: Mostly Closed....Other: Forested/Suburban; Water temp.-- /pH 5.8 /DO
11.1 /Cond.87

Station: AN0161
Rancocas Ck S Br, Mt Holly - Eayrestown Rd , Eayrestown, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	29
Sphaeriidae	8	12
Tubificidae	10	11
Naididae	7	9
Heptageniidae	4	8
Hydrobiidae	8	7
Simuliidae	6	7
Tetrastemmatidae	7	5
Hydropsychidae	4	4
Calopterygidae	5	3
Lumbriculidae	8	2
Enchytraeidae	10	1
Empididae	6	1
Protoneuridae	9	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Chironomidae)
Family Biotic Index: 6.80
Scraper/Filterer Collector Ratio: 0.15
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 12.00
EPT/C: 0.41
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 166
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 30/3
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Closed....Other: Forested/Rural/Agricultural cropland; Water
temp.12.7 /pH 5.8 /DO 9.2 /Cond.86

Station: AN0162
Rancocas Ck S W Br, Elmwood Rd , Evesham Twp, Burlington County
Moorestown USGS Quadrangle
Date Sampled: 04/02/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	50
Chironomidae	6	38
Tubificidae	10	5
Calopterygidae	5	3
Hydropsychidae	4	2
Sphaeriidae	8	2
Dytiscidae	5	1
Gerridae	8	1
Tipulidae	3	1
Lumbricidae	10	1
Pleidae	9	1
Physidae	7	1
BloodRed Chironomidae	8	1
Ceratopogonidae	6	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 109
% Contribution of Dominant Family: 45.87 % (Naididae)
Family Biotic Index: 6.69
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.36
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.83
EPT/C: 0.05
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 165
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 13/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: trees,shrubs/Stable
Canopy: Mostly Closed....Other: Forested/Suburban; Water temp.17.6 /pH 7.5 /DO 11.3 /Cond.271

Station: AN0163
 Barton Run, Braddock Mill Rd & Rt 73 , Kresson, Burlington County
 Clementon USGS Quadrangle
 Date Sampled: 04/02/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Paludicellidae	7	17
Naididae	7	17
Hydrobiidae	8	11
Chironomidae	6	8
Hydropsychidae	4	6
Tubificidae	10	5
Protoneuridae	9	4
Sphaeriidae	8	4
Spongillidae	5	3
Elmidae	4	3
Planorbidae	6	3
Leptoceridae	4	3
Caenidae	7	2
Haliplidae	5	2
Tetrastemmatidae	7	2
Calopterygidae	5	1
Diplopoda	5	1
Gomphidae	1	1
Enchytraeidae	10	1
Chydoridae	4	1
Talitridae	8	1
Corixidae	9	1
Physidae	7	1
Ceratopogonidae	6	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 25
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 17.00 % (Paludicellidae & Naididae)
 Family Biotic Index: 6.72
 Scraper/Filterer Collector Ratio: 0.55
 Shredder/Total Ratio: 0.13
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 11.00
 EPT/C: 1.38
 NJIS Rating: 21
 Biological Condition: Moderately Impaired
 Habitat Analysis: 132

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 5/1
 Substrate: Gravel,sand,snags....StreamBank Vegetation/Stability:
 trees,shrubs/Unstable
 Canopy: Mostly Open....Other: Urban/Lake upstream; Water temp.20.4 /pH 7.1 /DO
 8.7 /Cond.99

Station: AN0164
Black Run, Kettle Run Rd , Evesham Twp, Burlington County
Clementon USGS Quadrangle
Date Sampled: 04/02/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	42
Simuliidae	6	15
Leuctridae	0	13
Lepidostomatidae	1	6
Ephemerelellidae	1	4
Polycentropodidae	6	4
Philopotamidae	3	3
Calopterygidae	5	2
Hydropsychidae	4	2
Ceratopogonidae	6	2
Enchytraeidae	10	1
Empididae	6	1
Tubificidae	10	1
Psychodidae	10	1
Molannidae	6	1
Hydroptilidae	4	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 17
Total Number of Individuals: 100
% Contribution of Dominant Family: 42.00 % (Chironomidae)
Family Biotic Index: 4.68
Scraper/Filterer Collector Ratio: 1.88
Shredder/Total Ratio: 0.19
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 8
% EPT: 34.00
EPT/C: 0.81
NJIS Rating: 24
Biological Condition: Nonimpaired
Habitat Analysis: 181

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 4/1
Substrate: Sand....StreamBank Vegetation/Stability: trees,shrubs/Stable
Canopy: Mostly Closed....Other: Forested; Water temp.19.0 /pH 4.4 /DO 7.6
/Cond.44

Station: AN0165
Black Run Trib, Braddock Mill Rd , Evesham Twp, Burlington County
Clementon USGS Quadrangle
Date Sampled: 04/02/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	45
Simuliidae	6	16
Enchytraeidae	10	11
Asellidae	8	8
Nemouridae	2	8
Sialidae	4	4
Lumbriculidae	8	2
Limnephilidae	4	1
Polycentropodidae	6	1
Ceratopogonidae	6	1
Staphylinidae	4	1
BloodRed Chironomidae	8	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 45.00 % (Chironomidae)
Family Biotic Index: 6.22
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.10
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
% EPT: 10.00
EPT/C: 0.22
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 178

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 4/1
Substrate: Sand....StreamBank Vegetation/Stability: trees,shrubs/Stable
Canopy: Mostly Closed....Other: Forested; Water temp.20.6 /pH 3.8 /DO 6.7
/Cond.70

Station: AN0166
Barton Run, Tuckerton Rd , Hoot Owl Estates, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/28/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	38
Elmidae	4	15
Chironomidae	6	9
Corbiculidae	8	6
Sphaeriidae	8	6
Hydrobiidae	8	5
Haliplidae	5	5
Caenidae	7	4
Ephemerellidae	1	3
Tubificidae	10	3
Leptoceridae	4	3
Protoneuridae	9	1
Asellidae	8	1
Baetidae	4	1
Glossiphoniidae	8	1
Gammaridae	4	1
Planariidae	4	1
Macromiidae	3	1
Physidae	7	1
Tetrastemmatidae	7	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 107
% Contribution of Dominant Family: 35.51 % (Naididae)
Family Biotic Index: 6.30
Scraper/Filterer Collector Ratio: 2.50
Shredder/Total Ratio: 0.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 10.28
EPT/C: 1.14
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 157

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 19/2
Substrate: Sand,mud....StreamBank Vegetation/Stability:
Trees,shrubs,grasses/Unstable
Canopy: Mostly Closed....Other: Forested/Rural/Agricultural tree farm; Water
temp.14.3 /pH 6.5 /DO 8.3 /Cond.113

Station: AN0167
Kettle Run, Hopewell Rd , Evesham Twp, Burlington County
Clementon USGS Quadrangle
Date Sampled: 04/02/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Sphaeriidae	8	64
Chironomidae	6	6
Protoneuridae	9	5
Hydrobiidae	8	4
Tubificidae	10	4
Naididae	7	4
Hydropsychidae	4	2
Simuliidae	6	2
Planariidae	4	2
Tetrastemmatidae	7	2
Gomphidae	1	1
Enchytraeidae	10	1
Talitridae	8	1
Erpobdellidae	8	1
Leptoceridae	4	1
Hydroptilidae	4	1
Physidae	7	1
Heptageniidae	4	1

Statistical Analysis

Number of Taxa: 18
Total Number of Individuals: 103
% Contribution of Dominant Family: 62.14 % (Sphaeriidae)
Family Biotic Index: 7.58
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 4.85
EPT/C: 0.81
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 139
Deficiency(s) noted: Sphaeriidae Family Overwhelmingly Dominant - Significant
Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 7/1
Substrate: Sand....StreamBank Vegetation/Stability: Grasses/Stable
Canopy: Open....Other: Rural/Lake upstream; Water temp.22.1 /pH 6.5 /DO 8.1
/Cond.84

Station: AN0168
 Haynes Ck, Himmelein Rd , Oliphant Mills, Burlington County
 Mt Holly USGS Quadrangle
 Date Sampled: 04/28/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	22
Chironomidae	6	18
Sphaeriidae	8	16
Elmidae	4	9
Tubificidae	10	6
Asellidae	8	4
Hydropsychidae	4	4
Caenidae	7	3
BloodRed Chironomidae	8	3
Talitridae	8	3
Planorbidae	6	2
Sididae	3	2
Heptageniidae	4	2
Simuliidae	6	1
Gyrinidae	3	1
Enchytraeidae	10	1
Glossiphoniidae	8	1
Hydriidae	5	1
Plagiostomidae	4	1
Dytiscidae	5	1
Daphnidae	4	1

 Statistical Analysis

Number of Taxa: 21
 Total Number of Individuals: 102
 % Contribution of Dominant Family: 21.57 % (Naididae)
 Family Biotic Index: 6.61
 Scraper/Filterer Collector Ratio: 0.19
 Shredder/Total Ratio: 0.04
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 3
 % EPT: 8.82
 EPT/C: 0.42
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 148
 Deficiency(s) noted: Paucity of Clean Water Organisms

 Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 19/2
 Substrate: Gravel,sand....StreamBank Vegetation/Stability:
 Trees,shrubs,grass/Unstable
 Canopy: Mostly Open....Other: Forested/Suburban/Lake upstream; Water temp.15.0
 /pH 6.2 /DO 9.5 /Cond.82

Station: AN0169
Rancocas Ck S W Br, Rt 70 , Medford, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/28/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	27
Naididae	7	14
Elmidae	4	10
BloodRed Chironomidae	8	10
Tubificidae	10	7
Sphaeriidae	8	7
Asellidae	8	5
Corixidae	9	5
Chydoridae	4	4
Gammaridae	4	3
Leptoceridae	4	3
Ceratopogonidae	6	3
Heptageniidae	4	3
Baetidae	4	2
Corbiculidae	8	1
Ephemerellidae	1	1
Hydrobiidae	8	1
Empididae	6	1
Tipulidae	3	1
Haliplidae	5	1
Physidae	7	1

Statistical Analysis

Number of Taxa: 21
Total Number of Individuals: 110
% Contribution of Dominant Family: 24.55 % (Chironomidae)
Family Biotic Index: 6.42
Scraper/Filterer Collector Ratio: 1.86
Shredder/Total Ratio: 0.05
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4
% EPT: 8.18
EPT/C: 0.22
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 166
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 45/3
Substrate: Sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Open....Other: Forested/Rural; Water temp.13.5 /pH 6.7 /DO 8.5
/Cond.120

Station: AN0170
Sharps Run, Rt 541 , Medford, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/28/98

Family	Family Tolerance Value (FTV)	Number of Individuals
BloodRed Chironomidae	8	27
Gammaridae	4	23
Chironomidae	6	17
Naididae	7	8
Asellidae	8	6
Paludicellidae	7	4
Corixidae	9	3
Physidae	7	3
Talitridae	8	2
Sphaeriidae	8	2
Elmidae	4	1
Dytiscidae	5	1
Tubificidae	10	1
Ceratopogonidae	6	1
Daphnidae	4	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 100
% Contribution of Dominant Family: 27.00 % (BloodRed Chironomidae)
Family Biotic Index: 6.51
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.06
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 158
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 11/1
Substrate: Mud....StreamBank Vegetation/Stability: Trees,shrubs,grasses/Unstable
Canopy: Mostly Open....Other: Forested/Suburban; Water temp.11.7 /pH 7.1 /DO
8.1 /Cond.218

Station: AN0171
Bobbys Run, Newbolds Corner Rd , Lumberton, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	31
Tubificidae	10	15
BloodRed Chironomidae	8	13
Chironomidae	6	11
Dytiscidae	5	7
Psychomyiidae	2	5
Sphaeriidae	8	4
Corixidae	9	4
Talitridae	8	3
Plagiostomidae	4	2
Tetrastemmatidae	7	2
Simuliidae	6	1
Gammaridae	4	1
Elmidae	4	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 31.00 % (Asellidae)
Family Biotic Index: 7.41
Scraper/Filterer Collector Ratio: 3.80
Shredder/Total Ratio: 0.42
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 5.00
EPT/C: 0.21
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 139
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 20/2
Substrate: Cobbles,sand,mud....StreamBank Vegetation/Stability: Trees/Stable
Canopy: Mostly Open....Other: Forested/Suburban; Water temp.10.4 /pH 7.9 /DO
9.2 /Cond.210

Station: AN0171A
Bobbys Run, Smithville Rd , Lumberton Twp, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Asellidae	8	57
Daphnidae	4	11
Gammaridae	4	10
Tubificidae	10	8
Sphaeriidae	8	7
Chironomidae	6	2
Cyclopidae	4	1
Dytiscidae	5	1
Lumbriculidae	8	1
Lymnaeidae	6	1
Psychodidae	10	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 57.00 % (Asellidae)
Family Biotic Index: 7.21
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 77
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid...Flow: Slow...Width/Depth (ft): 8/<1
Substrate: Cobbles,mud...StreamBank Vegetation/Stability: Weeds/Unstable
Canopy: Open...Other: Agricultural cropland and livestock; Water temp.22.5 /pH
8.3 /DO 11.7 /Cond.327

Station: AN0172
Masons Ck, Ark Rd , Lumberton Twp, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/28/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Simuliidae	6	34
Asellidae	8	21
Chironomidae	6	16
Sphaeriidae	8	10
Naididae	7	5
Enchytraeidae	10	3
Dytiscidae	5	2
Pyralidae	5	2
Tubificidae	10	2
Gammaridae	4	1
Hydridae	5	1
Cyclopidae	4	1
Nematoda	6	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 34.00 % (Simuliidae)
Family Biotic Index: 6.78
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: 153
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 5/1
Substrate: Sand,mud....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Mostly Closed....Other: Forested/Agricultural cropland ; Water temp.8.4
/pH 5.3 /DO 9.0 /Cond.75

Station: AN0173
 Masons Ck, Rt 38 , Union Mills, Burlington County
 Mt Holly USGS Quadrangle
 Date Sampled: 04/07/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	23
Hydrobiidae	8	16
Ephemereididae	1	12
Simuliidae	6	7
Elmidae	4	6
Pyralidae	5	5
BloodRed Chironomidae	8	4
Sphaeriidae	8	4
Gammaridae	4	3
Planorbidae	6	3
Tetrastemmatidae	7	3
Leptoceridae	4	2
Plagiostomidae	4	2
Physidae	7	2
Calopterygidae	5	1
Asellidae	8	1
Cypridae	6	1
Protoneuridae	9	1
Tubificidae	10	1
Lumbriculidae	8	1
Nematoda	6	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 22
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 23.00 % (Chironomidae)
 Family Biotic Index: 5.72
 Scraper/Filterer Collector Ratio: 0.76
 Shredder/Total Ratio: 0.06
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
 % EPT: 14.00
 EPT/C: 0.52
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 132
 Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 25/2
 Substrate: Sand,mud,silt....StreamBank Vegetation/Stability: Weeds/Stable
 Canopy: Mostly Open....Other: Forested/Urban; Water temp.12.7 /pH 8.1 /DO 10.6
 /Cond.187

Station: AN0174
Parkers Ck, Creek Rd , Centerton, Burlington County
Moorestown/Mt Holly USGS Quadrangle
Date Sampled: 04/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	30
Corbiculidae	8	28
Chironomidae	6	19
BloodRed Chironomidae	8	10
Gammaridae	4	6
Sphaeriidae	8	4
Paludicellidae	7	3
Cypridae	6	2
Leptoceridae	4	2
Asellidae	8	1
Enchytraeidae	10	1
Ephydriidae	6	1
Piscicolidae	7	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 109
% Contribution of Dominant Family: 27.52 % (Tubificidae)
Family Biotic Index: 7.82
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.04
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.83
EPT/C: 0.06
NJIS Rating: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 86
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 30/4
Substrate: Sand,mud....StreamBank Vegetation/Stability: Weeds/Unstable
Canopy: Open....Other: Forested/Suburban; Water temp.17.8 /pH 6.3 /DO 9.4
/Cond.242

Station: AN0175
Mill Ck, Levitt Pkwy , Willingboro, Burlington County
Beverly USGS Quadrangle
Date Sampled: 01/15/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	33
Chironomidae	6	23
Asellidae	8	13
Gammaridae	4	13
Sphaeriidae	8	7
Planariidae	4	3
BloodRed Chironomidae	8	3
Corbiculidae	8	2
Elmidae	4	2
Protoneuridae	9	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 33.00 % (Tubificidae)
Family Biotic Index: 7.49
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 150
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 40/2
Substrate: Sand....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
Canopy: Mostly Closed....Other: Suburban; Water temp.2.7 /pH 7.5 /DO 11.2
/Cond.294

Station: AN0176
Swedes Run, Rt 130 , Delran, Burlington County
Beverly USGS Quadrangle
Date Sampled: 04/30/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	48
Naididae	7	37
Chironomidae	6	6
BloodRed Chironomidae	8	5
Planariidae	4	3
Daphnidae	4	3
Elmidae	4	2
Protoneuridae	9	2
Cyclopidae	4	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 107
% Contribution of Dominant Family: 44.86 % (Tubificidae)
Family Biotic Index: 8.12
Scraper/Filterer Collector Ratio: 1.17
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: 103
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 30/4
Substrate: Mud,silt....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Mostly Closed....Other: Urban/Channelized; Water temp.14.5 /pH 7.3 /DO 6.4 /Cond.260

Station: AN0176R
Rancocas Ck, Njtpk Bridge , Rancocas Woods, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/21/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	28
Tipulidae	3	19
Ceratopogonidae	6	18
Enchytraeidae	10	8
Nematoda	6	7
Glossiphoniidae	8	5
Chironomidae	6	4
BloodRed Chironomidae	8	3
Lumbriculidae	8	3
Gammaridae	4	1
Lampyridae	6	1
Psychodidae	10	1
Tabanidae	6	1
Corixidae	9	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 28.00 % (Tubificidae)
Family Biotic Index: 7.14
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: 12
Biological Condition: Moderately Impaired
Habitat Analysis: 157
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 1200/4
Substrate: Sand....StreamBank Vegetation/Stability: Trees,shrubs/Stable
Canopy: Open....Other: Forested/Suburban; Water temp.14.9 /pH 6.6 /DO 7.6
/Cond.122

Station: AN0176S
Rancocas Ck S Br, Rt 38 , Hainesport, Burlington County
Mt Holly USGS Quadrangle
Date Sampled: 04/28/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	46
Leptoceridae	4	41
Chironomidae	6	6
Corbiculidae	8	2
Hydrobiidae	8	1
Tubificidae	10	1
Elmidae	4	1
Naididae	7	1
Palaemonidae	6	1
Corixidae	9	1
Unionicolidae	3	1
Hypogastruridae	10	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 103
% Contribution of Dominant Family: 44.66 % (Gammaridae)
Family Biotic Index: 4.44
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.41
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 39.81
EPT/C: 6.63
NJIS Rating: 21
Biological Condition: Moderately Impaired
Habitat Analysis: 129
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 100/3
Substrate: Gravel,sand,mud....StreamBank Vegetation/Stability:
Trees,shrubs/Stable
Canopy: Mostly Open....Other: Forested/Urban commercial area Rt 38; Water
temp.14.4 /pH 6.5 /DO 8.8 /Cond.116

Station: AN0177
Pompeston Ck, Rt 130 , Cinnaminson, Burlington County
Beverly USGS Quadrangle
Date Sampled: 04/30/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	48
Chironomidae	6	19
Tubificidae	10	13
BloodRed Chironomidae	8	7
Chydoridae	4	2
Fredericellidae	2	2
Nematoda	6	2
Baetidae	4	2
Planariidae	4	1
Enchytraeidae	10	1
Protoneuridae	9	1
Physidae	7	1
Simuliidae	6	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 48.00 % (Naididae)
Family Biotic Index: 7.04
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 2.00
EPT/C: 0.08
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 142
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 8/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Trees/Unstable
Canopy: Mostly Closed....Other: Forested/Lake upstream; Water temp.15.9 /pH 7.3
/DO 6.4 /Cond.210

Station: AN0178
Pennsauken Ck N Br, Church Rd , Mt Laurel, Burlington County
Moorestown USGS Quadrangle
Date Sampled: 03/24/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	34
Gammaridae	4	14
Tipulidae	3	6
Asellidae	8	5
Simuliidae	6	2
Tetrastemmatidae	7	2
BloodRed Chironomidae	8	1
Gerridae	8	1
Lumbricidae	10	1
Chironomidae	6	1
Talitridae	8	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 68
% Contribution of Dominant Family: 50.00 % (Tubificidae)
Family Biotic Index: 7.65
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.09
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 135
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Moderate....Width/Depth (ft): 10/1
Substrate: Cobbles, gravel, snags....StreamBank Vegetation/Stability:
Trees, vines, weeds/Unstable
Canopy: Mostly Closed....Other: Suburban; Water temp.7.8 /pH 6.8 /DO 10.8
/Cond.175

Station: AN0179
Pennsauken Ck N Br, Fellowship Rd , Mt Laurel, Burlington County
Moorestown USGS Quadrangle
Date Sampled: 03/24/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	29
Chironomidae	6	17
Plagiostomidae	4	15
BloodRed Chironomidae	8	8
Tubificidae	10	7
Hydrobiidae	8	6
Sphaeriidae	8	5
Physidae	7	4
Protoneturidae	9	3
Asellidae	8	2
Nematoda	6	2
Planariidae	4	1
Glossiphoniidae	8	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 100
% Contribution of Dominant Family: 29.00 % (Gammaridae)
Family Biotic Index: 5.95
Scraper/Filterer Collector Ratio: 1.60
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 121
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 20/4
Substrate: Mud,snags....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Closed....Other: Urban; Water temp.5.8 /pH 8.4 /DO 7.0 /Cond.256

Station: AN0180
Pennsauken Ck N Br, Rt 537, Maple Shade, Burlington County
Moorestown USGS Quadrangle
Date Sampled: 03/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	54
Chironomidae	6	15
Gammaridae	4	13
Glossiphoniidae	8	6
Sphaeriidae	8	4
Hydridae	5	3
BloodRed Chironomidae	8	2
Cyclopidae	4	1
Planorbidae	6	1
Nematoda	6	1
Palaemonidae	6	1
Physidae	7	1
Lymnaeidae	6	1
Limnesiidae	6	1
Entomobryidae	10	1

Statistical Analysis

Number of Taxa: 15
Total Number of Individuals: 105
% Contribution of Dominant Family: 51.43 % (Tubificidae)
Family Biotic Index: 8.04
Scraper/Filterer Collector Ratio: 0.25
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: 91
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Fast....Width/Depth (ft): 30/3
Substrate: Cobbles,sand,mud....StreamBank Vegetation/Stability:
Trees,vines,grasses/Unstable
Canopy: Open....Other: Urban; Water temp.10.2 /pH 7.2 /DO 10.6 /Cond.276

Station: AN0181
Pennsauken Ck N Br, Fork Landing Rd , Maple Shade, Burlington County
Camden USGS Quadrangle
Date Sampled: 03/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Fredericellidae	2	81
Gammaridae	4	8
Tubificidae	10	5
BloodRed Chironomidae	8	3
Piscicolidae	7	2
Chironomidae	6	1

Statistical Analysis

Number of Taxa: 6
Total Number of Individuals: 100
% Contribution of Dominant Family: 81.00 % (Fredericellidae)
Family Biotic Index: 2.88
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: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 82
Deficiency(s) noted: Fredericellidae Family Overwhelmingly Dominant
Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 40/5
Substrate: Sand,mud,silt....StreamBank Vegetation/Stability: Trees,weeds
/Unstable....Canopy: Open....Other: Urban; Water temp.7.9 /pH 6.9 /DO 9.7
/Cond.303

Station: AN0182
Pennsauken Ck S Br, Greentree Rd , Cherry Hill, Burlington - Camden County
Moorestown USGS Quadrangle
Date Sampled: 03/24/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	90
Chironomidae	6	4
Asellidae	8	3
BloodRed Chironomidae	8	3
Hydropsychidae	4	2
Enchytraeidae	10	1
Naididae	7	1
Stratiomyidae	10	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 105
% Contribution of Dominant Family: 85.71 % (Tubificidae)
Family Biotic Index: 9.59
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.03
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.90
EPT/C: 0.27
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 101
Deficiency(s) noted: Tubificidae Family Overwhelmingly Dominant - Significant
Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 12/1
Substrate: Sand,snags....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Mostly Closed....Other: Suburban; Water temp.8.3 /pH 7.1 /DO 9.2 /Cond.
261

Station: AN0183
Pennsauken Ck S Br, Rt 41, Maple Shade, Burlington - Camden County
Moorestown USGS Quadrangle
Date Sampled: 03/24/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	41
Chironomidae	6	24
Paludicellidae	7	9
Asellidae	8	7
Hydropsychidae	4	5
BloodRed Chironomidae	8	5
Sphaeriidae	8	2
Enchytraeidae	10	1
Glossiphoniidae	8	1
Limnephilidae	4	1
Lumbriculidae	8	1
Nematoda	6	1
Naididae	7	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 41.00 % (Tubificidae)
Family Biotic Index: 7.95
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 2
% EPT: 6.00
EPT/C: 0.21
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 70
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Moderate....Width/Depth (ft): 15/2
Substrate: Sand....StreamBank Vegetation/Stability: Trees,weeds/Unstable
Canopy: Mostly Closed....Other: Urban; Water temp.6.9 /pH 8.3 /DO 10.9
/Cond.278

Station: AN0184
Pennsauken Ck S Br, Rt 537, Maple Shade, Burlington - Camden County
Camden USGS Quadrangle
Date Sampled: 03/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	26
Tubificidae	10	22
BloodRed Chironomidae	8	15
Hydropsychidae	4	13
Gammaridae	4	12
Corbiculidae	8	4
Empididae	6	3
Asellidae	8	2
Planariidae	4	1
Naididae	7	1
Nematoda	6	1

Statistical Analysis

Number of Taxa: 11
Total Number of Individuals: 100
% Contribution of Dominant Family: 26.00 % (Chironomidae)
Family Biotic Index: 6.79
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 13.00
EPT/C: 0.32
NJIS Rating: 18
Biological Condition: Moderately Impaired
Habitat Analysis: 93
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 30/2
Substrate: Sand,mud....StreamBank Vegetation/Stability:
Trees,weeds,vines/Unstable
Canopy: Mostly Open....Other: Urban; Water temp.9.5 /pH 7.5 /DO 12.4 /Cond.325

Station: AN0185
Pennsauken Ck S Br, Park Ave , E Pennsauken, Burlington - Camden County
Camden USGS Quadrangle
Date Sampled: 03/17/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	23
Gammaridae	4	20
Chironomidae	6	12
BloodRed Chironomidae	8	7
Corbiculidae	8	3
Tipulidae	3	2
Planariidae	4	1
Enchytraeidae	10	1
Naididae	7	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 70
% Contribution of Dominant Family: 32.86 % (Tubificidae)
Family Biotic Index: 6.98
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: 66
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 50/2
Substrate: Sand,mud....StreamBank Vegetation/Stability:
Trees,shrubs,weeds/Unstable
Canopy: Open....Other: Urban; Water temp.12.0 /pH 6.7 /DO 10.4 /Cond.471

Station: AN0186
Cooper R N Br, Kresson Rd Kresson, Camden County
Clementon USGS Quadrangle
Date Sampled: 04/02/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	62
Sphaeriidae	8	19
Chironomidae	6	8
Viviparidae	6	4
Calopterygidae	5	2
Enchytraeidae	10	2
Glossiphoniidae	8	2
Lumbriculidae	8	2
Dytiscidae	5	1
Planorbidae	6	1
Physidae	7	1
Tetrastemmatidae	7	1
Corixidae	9	1

Statistical Analysis

Number of Taxa: 13
Total Number of Individuals: 106
% Contribution of Dominant Family: 58.49 % (Tubificidae)
Family Biotic Index: 8.87
Scraper/Filterer Collector Ratio: 0.26
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: 168
Deficiency(s) noted: Significant Organic Pollution
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 5/1
Substrate: Gravel,sand....StreamBank Vegetation/Stability: trees,shrubs/Stable
Canopy: Mostly Open....Other: Forested/Suburban; Water temp.17.1 /pH 6.9 /DO
8.1 /Cond.106

Station: AN0187
Cooper R N Br, Springdale Rd , Cherry Hill Twp, Camden County
Moorestown USGS Quadrangle
Date Sampled: 04/02/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	6
Planorbidae	6	3
Asellidae	8	1
Hydropsychidae	4	1
Tubificidae	10	1
Tipulidae	3	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 7
Total Number of Individuals: 14
% Contribution of Dominant Family: 42.86 % (Chironomidae)
Family Biotic Index: 6.21
Scraper/Filterer Collector Ratio: 3.00
Shredder/Total Ratio: 0.57
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 7.14
EPT/C: 1.02
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 141
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Moderate....Width/Depth (ft): 17/2
Substrate: Cobbles,gravel,sand....StreamBank Vegetation/Stability:
Trees,shrubs/Unstable
Canopy: Mostly Open....Other: Forested/Suburban/Agricultural cropland; Water
temp.15.2 /pH 6.9 /DO 9.1 /Cond.183

Station: AN0188
Cooper R N Br, River Dr , Erlton, Camden County
Camden USGS Quadrangle
Date Sampled: 04/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Fredericellidae	2	30
Naididae	7	21
Chironomidae	6	18
Tubificidae	10	10
Hydropsychidae	4	6
Sphaeriidae	8	3
Lumbricidae	10	2
Planorbidae	6	2
Tetrastemmatidae	7	2
BloodRed Chironomidae	8	2
Calopterygidae	5	1
Lumbriculidae	8	1
Veliidae	9	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 14
Total Number of Individuals: 100
% Contribution of Dominant Family: 30.00 % (Fredericellidae)
Family Biotic Index: 5.50
Scraper/Filterer Collector Ratio: 0.22
Shredder/Total Ratio: 0.18
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 6.00
EPT/C: 0.30
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 75
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 25/2
Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability:
Trees,weeds/Unstable
Canopy: Mostly Closed....Other: Forested/Urban/County park; Water temp.11.9 /pH
7.1 /DO 9.5 /Cond.230

Station: AN0189
Cooper R S Br, Gibbsboro Rd , Gibbsboro, Camden County
Clementon USGS Quadrangle
Date Sampled: 04/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	69
Sphaeriidae	8	20
Dytiscidae	5	3
Lumbriculidae	8	2
Tetrastemmatidae	7	2
Chironomidae	6	2
Planariidae	4	1
Limnephilidae	4	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 69.00 % (Tubificidae)
Family Biotic Index: 9.15
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.01
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
EPT/C: 0.50
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 142
Deficiency(s) noted: Tubificidae Family Overwhelmingly Dominant - Significant
Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 8/2
Substrate: Sand,silt....StreamBank Vegetation/Stability:
Trees,shrubs,vines,weeds/Stable....Canopy: Mostly Closed....Other: Forested/Pond
upstream/New construction adjacent; Water temp.12.6 /pH 5.2 /DO 8.1 /Cond.125

Station: AN0190
Cooper R S Br, Evesham Rd , Magnolia, Camden County
Runnemedde USGS Quadrangle
Date Sampled: 04/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	70
Enchytraeidae	10	7
Naididae	7	7
Tubificidae	10	6
Hydropsychidae	4	4
Tetrastemmatidae	7	4
Empididae	6	1
Lymnaeidae	6	1

Statistical Analysis

Number of Taxa: 8
Total Number of Individuals: 100
% Contribution of Dominant Family: 70.00 % (Chironomidae)
Family Biotic Index: 6.55
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 4.00
EPT/C: 0.06
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 124
Deficiency(s) noted: Chironomidae Family Overwhelmingly Dominant
Paucity of Clean Water Organisms

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 12/1
Substrate: Cobble,gravel,sand....StreamBank Vegetation/Stability:
Trees,vines,weeds/Unstable....Canopy: Mostly Closed....Other: Suburban; Water
temp.14.5 /pH 7.2 /DO 9.3 /Cond.156

Station: AN0191
Cooper R S Br, Rt 41 , Haddonfield, Camden County
Camden USGS Quadrangle
Date Sampled: 04/14/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Paludicellidae	7	50
Chironomidae	6	24
Naididae	7	16
Tubificidae	10	3
Elmidae	4	2
Glossiphoniidae	8	1
Hydropsychidae	4	1
Lumbriculidae	8	1
Tetrastemmatidae	7	1
Sphaeriidae	8	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 100
% Contribution of Dominant Family: 50.00 % (Paludicellidae)
Family Biotic Index: 6.79
Scraper/Filterer Collector Ratio: 1.00
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 1.00
EPT/C: 0.04
NJIS Rating: 9
Biological Condition: Moderately Impaired
Habitat Analysis: 131
Deficiency(s) noted: Paucity of Clean Water Organisms

Observations

Streamwater: Slightly Turbid....Flow: Fast....Width/Depth (ft): 35/3
Substrate: Cobbles,sand....StreamBank Vegetation/Stability:
Trees,shrubs,vines/Stable
Canopy: Mostly Open....Other: Urban/County park; Water temp.14.1 /pH 6.6 /DO
8.9 /Cond.190
