State of New Jersey
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THE ESTABLISHMENT OF ECOREGION BIOLOGICAL REFERENCE SITES FOR NEW JERSEY STREAMS

Incorporating Habitat Quality and Benthic Macroinvertebrate Communities
1989 - 1993 Monitoring Data

New Jersey State Department of Environmental Protection
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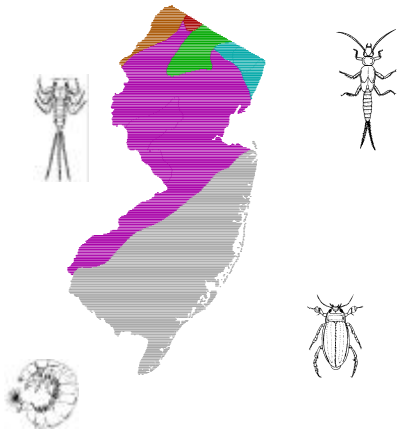

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The Establishment of Ecoregion Biological Reference Sites for New Jersey Streams

INTRODUCTION

Background

Water quality monitoring by the States became a requirement following institution of the Clean Water Act of 1972. Initially, the emphasis by the U.S. Environmental Protection Agency was on technology based point-source pollution control (USEPA 1977, 1985). Assessments of pollution abatement were largely made through "end-of-pipe" monitoring of physical-chemical parameters. Recently, however, the water quality-based approach to pollution assessment and control has gained prominence with USEPA and the States. The water-quality based approach concentrates on how water pollution, and its remediation, are reflected by instream water quality. As such, the approach requires varied types of data, both biological and chemical/physical.

Biosurvey data (monitoring of indigenous aquatic biota) are the best means for evaluating the health of instream aquatic life. If an impairment has been detected, additional chemical and toxicological testing can be conducted to identify causative agents, to locate the source(s) of that agent, and provide sufficient information for the formulation of a mitigation plan. Subsequent to mitigation, biosurveys can provide the investigator with an evaluation of the effectiveness of the control measures implemented. While not intended to replace the other components of a water quality monitoring program, the monitoring of aquatic biological communities is a much more cost-effective approach than chemical monitoring for screening instream water quality.

In New Jersey, "biomonitoring" programs were initiated in the mid-1970's by the Department of Environmental Protection, Division of Water Resources, in cooperation with the USEPA. From the existing Ambient Monitoring Network of the U.S. Geological Survey, a limited number of stations were adopted as routine biomonitoring sites, an important aspect of which was to establish baseline biological data for the state's waterways. This was supplemented by localized "intensive surveys" wherever priorities dictated. However, it was later found that due to the effects of new development, either point sources or non-point pollution sources, or both, many of the original 31 "fixed stations" were either inaccessible or in a degraded condition. An updated reference station database for use in conducting either site-specific or watershed-based intensive surveys, robust enough to be used throughout the State for an extended period of time, was needed. The Ecoregion concept, as promoted by USEPA, provided a likely framework for creating just such a biomonitoring reference station database.

The Ecoregion Concept

Habitat quality becomes a major factor contributing to biosurvey results. Where stations are physically comparable, detected impacts can be attributed to water quality factors. Conversely, habitat degradation (e.g. channelization, siltation, defoliation of surroundings, etc.) alone can account for biological impairment in a stream. Despite other sources of water quality degradation, variations in aquatic habitat can have a corresponding influence on biological community structure. The ecoregion concept assumes that waterbodies reflect the lands they drain and that similar lands should produce similar waterbodies. USEPA's application of their concept recognizes the innate differences that exist among geographical regions (e.g., forest/upland, agricultural, wetland, etc.). These regional differences have been delineated across the U.S. for the USEPA by Omernik (1987a) based on land-surface form, soil, potential natural vegetation, and land use. This approach is much more robust and ecologically relevant than maps generated from single variables, such as hydrologic conditions.

Indigenous stream habitats can thus be categorized according to their respective ecoregions. Biological communities, as components of the ecosystem, are expected to differ among ecoregions, but be similar within any given ecoregion. The ecoregion concept thus provides a geographic framework for the management of aquatic ecosystems. A major application of this concept is that several minimally-impacted sites within a region can serve as reference sites for the assessment of stream water quality for the entire region (Plafkin et al, 1989).

The NJDEP Bureau of Water Monitoring (BWM) has, since its inception, performed many original biomonitoring studies throughout the waters of the State (NJDEP/BWM, Unpublished reports). Reference stations in our surveys have, until recently, been utilized only on a watershed or site-specific basis. However, from 1989 through 1991 almost the entire State, including three major and four smaller ecoregions, was surveyed to find stream locations qualifying as ecoregion biological reference sites. Data from this initial survey will serve as the baseline for each reference site. As the opportunity arises, additional reference stations will be added based upon the monitoring results obtained from the Ambient Biomonitoring Network (AMNET).

The establishment of ecoregion sites will serve to complement current and future watershed biomonitoring and trend assessments. It will, therefore, serve as a basis for the statewide water quality inventory (305B) and planning/management decisions involving surface water quality standards and biocriteria.

NEW JERSEY ECOREGIONS

The USEPA ecoregions overlapping New Jersey from the surrounding states are shown by solid lines in Figures 1 and 2 (from Omernick [1987b]). New Jersey constitutes the northeastern boundaries of the Northern Piedmont and Middle Atlantic Coastal Plain (these two ecoregions comprising at least 90% of the state's area), while smaller segments of the southern boundaries of four upland ecoregions overlap the northernmost portion of the state. We would propose, however, certain modifications to this scheme, giving greater detail and resolution within New Jersey (Figure 1).

Geologically, New Jersey is comprised of portions of four major, "Provinces," (in Wolfe, 1977). The provinces are (north to south) the Appalachian Ridge and Valley, Highlands, Piedmont, and Atlantic Coastal Plain. The boundary between the Piedmont and the Coastal Plain provinces is known as the "Fall Line" (see Figure 1). The Fall Line delineates the hard consolidated and crystalline substrates to the north, from the more easily eroded sedimentary materials of the Coastal Plain. Streams to the north of the Fall Line are largely swift-flowing with rocky bottoms, often incorporating falls and rapids. Streams to the south of the Fall Line are slower-flowing with their bottoms composed of finer sediments, often sandy.

By comparison, the USEPA ecoregion mapping divides New Jersey into six regions (Middle Atlantic Coastal Plain, Northern Piedmont, Northeastern Coastal Zone, Northeastern Highlands, Northern Appalachian Plateau and Uplands, and the North Central Appalachians). The first two listed above cover the majority of the State's land surface.

New Jersey Modifications to the USEPA Design

A reevaluation of USEPA's ecoregion plan (from Omernick, 1987) using the traditional geological provinces and elevation above sea level as guides, suggests that three major ecoregions, rather than the two described by USEPA's ecoregion map, are in order. Essentially, New Jersey's modification would divide the Northern Piedmont ecoregion in two, with the upland sector encompassing most of New Jersey's northwestern quadrant where elevations are generally over 200 (to 1800) feet. This "Upper Piedmont" subregion incorporates portions of the Appalachian and Highlands geological provinces. The "Lower Piedmont" subregion would encompass most of central New Jersey, extending to the northeastern and southwestern portions of the State, with the Fall Line intersecting it in a roughly axial fashion (Figure 1). The Lower Piedmont subregion would thus include portions of the Piedmont and Coastal Plain geological provinces.

Within and adjacent to the Lower Piedmont ecoregion are large areas of substantially different geography or land use which should be considered as subregions. Foremost, this includes the urban/industrial areas of northeastern and (to a lesser degree) southwestern New Jersey, where human activity has drastically altered the natural land and water configurations. Secondly, the "red shale" outcroppings and stream bottoms of the Raritan River watershed, adjacent to and north of the Fall Line (Figure 1), vividly contrast with the substrates of the surrounding regions. Thirdly, for the Middle Atlantic Coastal Plain ecoregion, the Pinelands and its associated border areas should be delineated from the rest of the ecoregion (see Figure 1). The "Pinelands" subregion

would encompass that portion of the Middle Atlantic Coastal Plain ecoregion characterized by brown (cedar) water streams, sandy soil and oak/pine forest. This subregion comprises the major portion of the Middle Atlantic Coastal Plain ecoregion in New Jersey, and it is the largest of all our proposed, "subregions." An "Inner Coastal Plain" subregion could thus be defined as the area(s) intermediate between the Pinelands and the Lower Piedmont subregions. The Inner Coastal Plain subregion would include that portion of the Coastal Plain, widest at the southwestern and northeastern extremes, containing primarily farmland and hardwood forest (Figure 1).

Our design also roughly conforms with the major watershed (drainage-basin) boundaries (see Table 1). The Upper Piedmont subregion, with swift flowing streams, encompasses the northern Delaware River tributaries south to about the Fall Line at Trenton. It also encompasses the upper Passaic/Hackensack and Raritan River drainage's (where most of their respective ecoregion sites are located). The Lower Piedmont subregion encompasses the lower Passaic/Hackensack, Raritan and lower Delaware River drainages. The Assunpink Creek is unique in that its main branch originates in the Lower Piedmont and flows northwestward to the vicinity of the Fall Line, meeting some of its tributaries from the Upper Piedmont. Similarly, within the lower elevations, the Millstone River is the only major tributary to originate south of the Fall Line and flow northward across it (to the Raritan River). A few of the lower Delaware tributaries, especially the Rancocas Creek, originate in the adjacent Middle Atlantic Coastal Plain ecoregion but flow through the Lower Piedmont. The Pinelands subregion would include all of the Atlantic drainage basin from the Manasquan River to lower Delaware Bay and the Maurice River drainage.

METHODS

General Study Design

From October 1989 to August 1991, potential ecoregion biological reference sites were surveyed in central and southern New Jersey. From August 1991 to July of 1993, the northern Delaware River watershed south to Camden, the Hackensack-Passaic and upper Raritan River drainages, were sampled for ecoregion sites in conjunction with the Department's Ambient Biomonitoring Network (AMNET). During the initial phase of the survey (8/90-7/91) 303 sites were visibly screened; from these, a total of 81 biological samples were collected from 45 selected sites. Based on sample analysis, only sixteen of these sites proved to have a healthy biological condition and thus were accepted as ecoregion reference sites. During the second phase (8/91 - 7/93) about 345 sites were visited and sampled; of these only 27 sites were selected for ecoregion status. All ecoregion sites were sampled subsequently three times to determine seasonal variation in macroinvertebrate assemblages. Latitude and longitude were later determined using electronic satellite Global Positioning Units.

When being considered for ecoregion biological reference site status, individual sites were visibly screened before sampling to see that the following physical criteria for habitat assessment (in Plafkin et al, 1989) were met:

1. good apparent water quality (i.e. clarity)
2. good bank stability, with vegetation and streamside cover present
3. no channel alteration
4. no excessive siltation
5. no suspected point source discharges upstream
6. potential pollution from construction, urban or agricultural areas minimal

Accessibility of the site and the presence of a stream depth appropriate for wading were both factors considered during site selection.

Sample Collection and Analysis

For field and analytical methods, USEPA Rapid Bioassessment Protocols (following Plafkin et al., 1989) were employed. The protocols include both a qualitative and semi-quantitative assessment of benthic macroinvertebrate populations. RBP(II) protocols have been adopted as standard procedures by the BWM Biomonitoring Laboratory. While not intended to replace conventional methodologies, they have been developed expressly to assist planning and management efforts such as screening, site ranking, prioritization and trend monitoring. They are especially useful when doing biosurveys on a regional scale, of entire watersheds, and involving a large number of sampling locations such as we are conducting.

Field Methods

Within the scope of RBPII protocols, our field methods (also described in NJDEP, 1992) were modified as required by the physical attributes of typical sampling sites, and by our available laboratory resources. As opposed to sampling only the riffle/run habitat, our field collections were made using the multi-habitat approach. This samples the various types of substrate (e.g., fine sediment, gravel-rocks, woody debris, stream and bank vegetation, etc.) found at each site, thus minimizing substrate variation from station to station. Sampling several different locations at each site, a Surber net was used in very shallow streams (< 2 feet deep) while, in deeper wadeable streams, a kick net was used. In order to include a macroinvertebrate functional group (i.e., shredders) not found in other substrates, a separate sample of course particulate matter (CPOM), primarily decomposing leaf litter, was collected by hand. In the field all samples from a particular site were composited, sieved through #30 mesh and preserved with formalin to a 5-10 % final concentration.

Laboratory Methods

In the laboratory, subsamples of 100 individuals were taken by first evenly distributing the composited sample in a light colored gridded pan, then removing all organisms from randomly-selected grids until a total of 100 was obtained. The macroinvertebrates were identified to species (where possible) and counted using 7-30 x stereozoom and 40-400 x compound magnification.

Taxonomy

In the BWM Biomonitoring Laboratory, species level identification is considered standard procedure. A comprehensive and current reference collection with taxonomic keys is maintained; an indexed list of species found in New Jersey (J. Kurtz, unpublished report) includes the functional feeding group, or niche, designations (see Merritt and Cummins, 1984) and pollution tolerance classifications (from Hilsenhoff, 1982), for each species. Consultation with other scientists in the field, when necessary, provides added assistance and confirmation. The presence of "benchmark species," those that are considered pollution-intolerant or clean-water indicators, was a major factor in ecoregion site selection.

Data Analysis

The level of biological impairment (or lack of it), reflective of water or habitat quality, was also a major factor in ecoregion site selection. Biological impairment (most typically caused by organic enrichment) can be assessed using "biometrics" which measure different components of community structure, including population and functional parameters, and have different ranges of sensitivity to stress (Klemm et al., 1990). The use of more different metrics assures a more valid assessment; the results (based on 100-organism subsamples) are integrated through common scoring criteria, derived from an established comparable database, to give an overall numerical rating (see Appendix B). For RBP II protocols, scoring criteria have been adjusted and validated for family level taxonomy, with three final condition categories (non-impaired, moderately and severely impaired). The biometrics we employ (listed below) are modified from Plafkin et al.

(1989) and follow Kurtenbach (1990):

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

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

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

4. Percent EPT (to the total # families) - 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 (organic) pollution tolerance of the entire benthic macroinvertebrate community with a single value.

The individual biometrics and respective scoring criteria (above) have been statistically validated for New Jersey by Kurtenbach (1990) based on data from 200 sites throughout the state; these are shown in the Appendix of the present report. Our results are computerized and tabulated using Microsoft BASIC software.

* includes the family *Hydropsychidae* (deleted by Kurtenbach, 1990)

RESULTS AND DISCUSSION

Table 1 lists the ecoregion sites by major drainage system in general order north to south, east to west, with the Upper Delaware first and Atlantic Basin last. The corresponding ecoregion/subregion is shown to the right of each numbered site. Site locations ecoregions and subregions are delineated in Figure 1 with the USEPA ecoregions shown by solid lines. Of the 43 sites found in the present survey, 23 (slightly more than half) are located north of the Fall Line in the zone of hard rock and faster-gradient streams; these are situated largely in the Upper Piedmont and the North Central Appalachian (ridge and valley) ecoregion at the state's northern end. The other twenty ecoregion sites lie in the flatter, more easily eroded soils south of the Fall Line, which comprise more than half of the state's total area. Of these, about seventeen are situated in the Middle Atlantic Coastal Plain ecoregion, which includes the Inner Coastal plain subregion (Figure 1). The other few sites, intermediate between the Coastal Plain and Upper Piedmont, fall into the Lower Piedmont ecoregion; these are located in and near the farmlands of south-central New Jersey. Detailed descriptions and data for each site are given in the Appendix.

Spatial Distribution of Reference Sites

Clustering of ecoregion reference sites was noted in several areas of New Jersey. These included, most prominently, sites #2 to #8 within the North Central Appalachian ecoregion. These sites encompassed primarily the Big Flat Brook watershed in the northernmost corner, where elevation and gradient are greater than elsewhere in the state. A few other New Jersey streams had more than one ecoregion site situated along their main stem. These included the Nishisakawick Creek, (sites #12 to 14) also in the Upper Delaware, and the Great Egg Harbor River (sites #38 to 41) in the Atlantic Coastal basin (Figure 1). In north central New Jersey (Upper Piedmont ecoregion) sites #18-23 were clustered in adjacent portions of the Upper Passaic and North Branch Raritan River watersheds. In the southwestern portion of the state, several sites (#26,#29-30, and #38) were situated in relative proximity along the ridgeline which separates Lower Delaware and Atlantic Coastal watersheds; similarly, sites #32 to 34, and #24, in south-central New Jersey were grouped near the divide(s) between southern Raritan and Atlantic coastal tributaries. Statewide, many of the ecoregion reference sites (25 of 43) were located close to the headwaters of streams. All of the areas or watersheds mentioned above have been relatively undisturbed, at least in recent times, for various reasons (e.g. being on state-owned lands, marginal farmlands, wetland, or otherwise unsuited for development) which accounts in a large measure for their acceptability as reference sites.

Conversely, in several large portions of the State there appears to be a dearth of stream locations suitable for the establishment of ecoregion biological reference sites. Primary among these, in the Lower Piedmont ecoregion, are the highly impacted urban/industrial subregions of northeastern and southwestern N.J., and the "farm belt" which extends from central to southwestern New Jersey (Figure 1). In the central Pinelands, many of the stream segments, although minimally impacted, are not readily accessible. Also, the abundance of cedar and pine needles in some Pinelands stream locations (e.g. site #27) may preclude the availability of suitable food sources thus creating some degree of natural impairment. In addition, coastal and tidelands regions have not been included in the present survey, as RBP methodologies and criteria for these regions have

yet to be established.

Statewide, most of the ecoregion sites (#25 of 43) are situated on "first order" streams (see Hynes, 1976), or near headwaters (Table 1). This is most obvious in southern New Jersey where sites are grouped along the ridgeline separating the Atlantic coastal from the lower Delaware and southern Raritan drainages. Nine of the sites are on second order streams, seven or third order and two on fourth order streams (see Table 1). Inasmuch as the lower order sites tend to be farther removed from the influence of potential impact sources, more ecoregion sites are needed to serve as references on the higher order streams (those with a greater hierarchy of tributaries).

Rationale for Establishment of Reference Sites

A great majority of the ecoregion sites (#29 of 43) were selected primarily for having diverse populations of clean-water or benchmark species, reflecting minimal biological impairment, in relatively unimpacted areas (Table 1). Five of the sites (#16,24,25,26,32) had slight to moderate biological impairment in very impacted watersheds, but they exhibited "remnant" populations of several clean-water species; these were located largely in agricultural areas of the Lower Piedmont ecoregion of south-central New Jersey. Significantly, site #35 (Toms River headwaters), in a less impacted area, exhibited the most diverse population of benchmark species in central and southern N.J. deciduous woodlands associated with the agricultural areas. Elsewhere in the Inner Coastal Plain ecoregion, three sites (#31,33,42) retained diverse benchmark populations within highly impacted areas. Three other sites (#9,27,30) showed various degrees of biological impairment, but each possessed some unique feature for its particular ecoregion (see Table 1). Virtually all ecoregion sites had good bank stability with some degree of bank vegetation, and trees or streamside cover/canopy.

Benchmark Species

The pollution-sensitive species are largely the immature (nymph) stages of aquatic insects belonging to the orders Plecoptera (stoneflies), Ephemeroptera (mayflies) and Trichoptera (caddisflies), with a few belonging to the Coleoptera (beetles). Based on these results alone, the state could be separated arbitrarily into only two ecoregions with the Fall Line (Figure 1) as the division. Obvious habitat differences exist north to south of this line, and species composition shows distinct similarities within each region.

A total of 152 benchmark species were found statewide. About 130 of these species were found north of the Fall Line while, south of it, less than half that amount (about 60) were found. Individual station totals of almost 50 were found in the faster-gradient streams and more varied substrates to the north. Notably, three times as many ephemeropteran species were found north of the Fall Line as south of it while, for the other orders, the difference was not as great. We attribute these differences in part to varied water quality and habitat requirements among the separate taxa. In southern New Jersey, ecoregion reference sites in the vicinity of the Pine Barrens exhibited the greatest variety of benchmark species (up to 30+ in the Great Egg Harbor River), while those in agricultural areas had the fewest (3-10). A different species association (group of species) was found to be characteristic for each ecoregion or each cluster of ecoregion sites.

However, similarities in species composition were apparent between adjacent areas of two ecoregions, or between sites in relative proximity to each other. The extensive data and summaries for all sites are contained in the Appendix to this report.

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FIGURES

LEGEND

* NORTH CENTRAL APPALACHIANS
open high hills to low mountains; hardwood and evergreen forest

* NORTHERN APPALACHIAN PLATEAU
open hills and moderately high tableland; mix of farmland and hardwood forest

* NORTHEASTERN HIGHLANDS
low mountains; hardwood and evergreen forest

* NORTHEASTERN COASTAL ZONE
low to high hills; oak forest; some farmland and urban areas

* NORTHERN (UPPER) PIEDMONT
irregular plains with low to moderately high hills and tableland; mix of farmland and urban areas

LOWER PIEDMONT
irregular to flat plains with low hills; mix of farmland, oak/hardwood forest and urban areas

RED SHALE ZONE
primarily low farmland with outcroppings and stream beds of red shale

URBAN/INDUSTRIAL ZONE
situated in northeastern and southwestern New Jersey

* MIDDLE ATLANTIC COASTAL PLAIN
flat plains with some low hills in central areas; primarily oak/pine forest with some hardwoods and farms

INNER COASTAL PLAIN
flat plains to low hills; mix of farmland and hardwood forest

* From Omernick (1987). Ecoregions of the Northeast States.

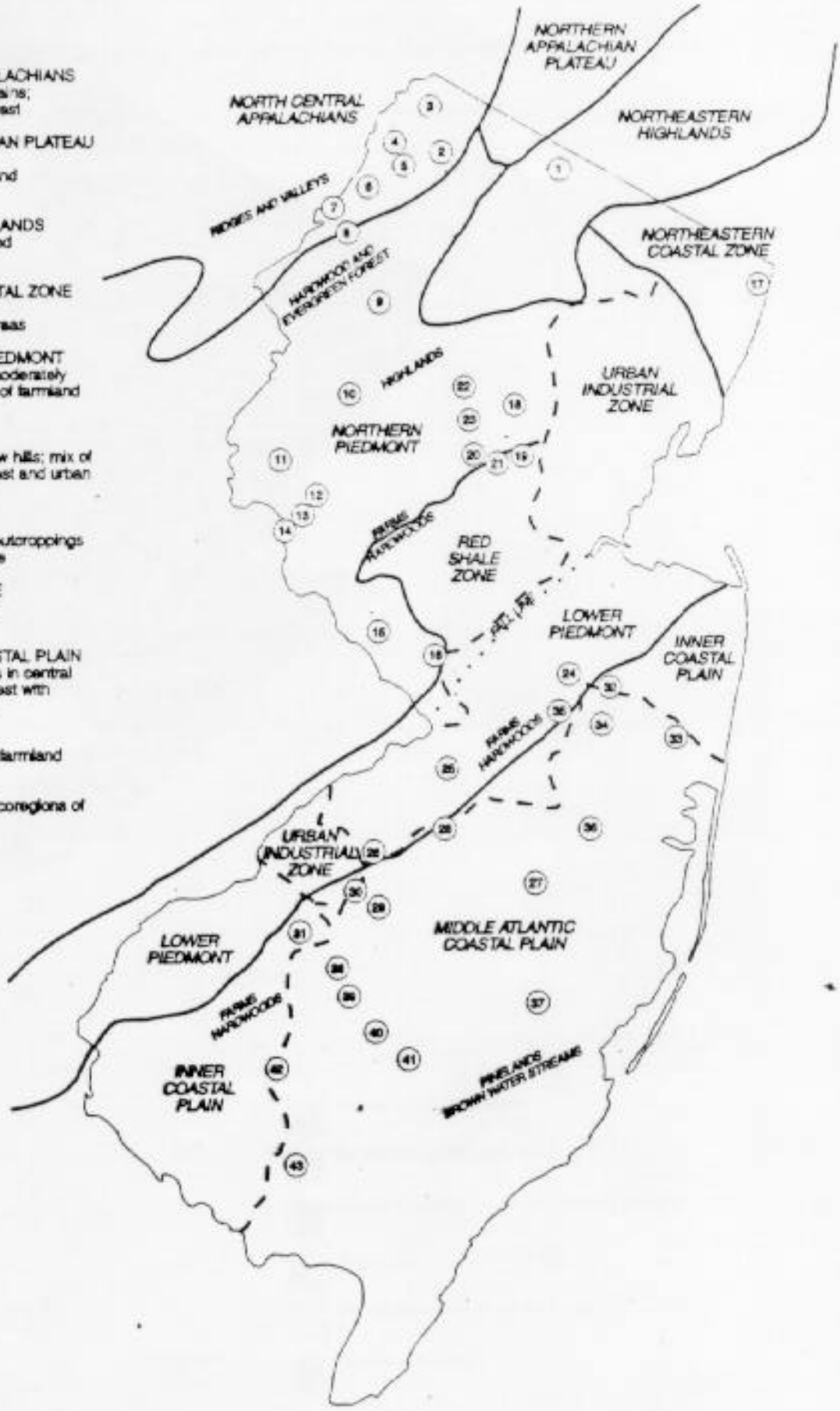
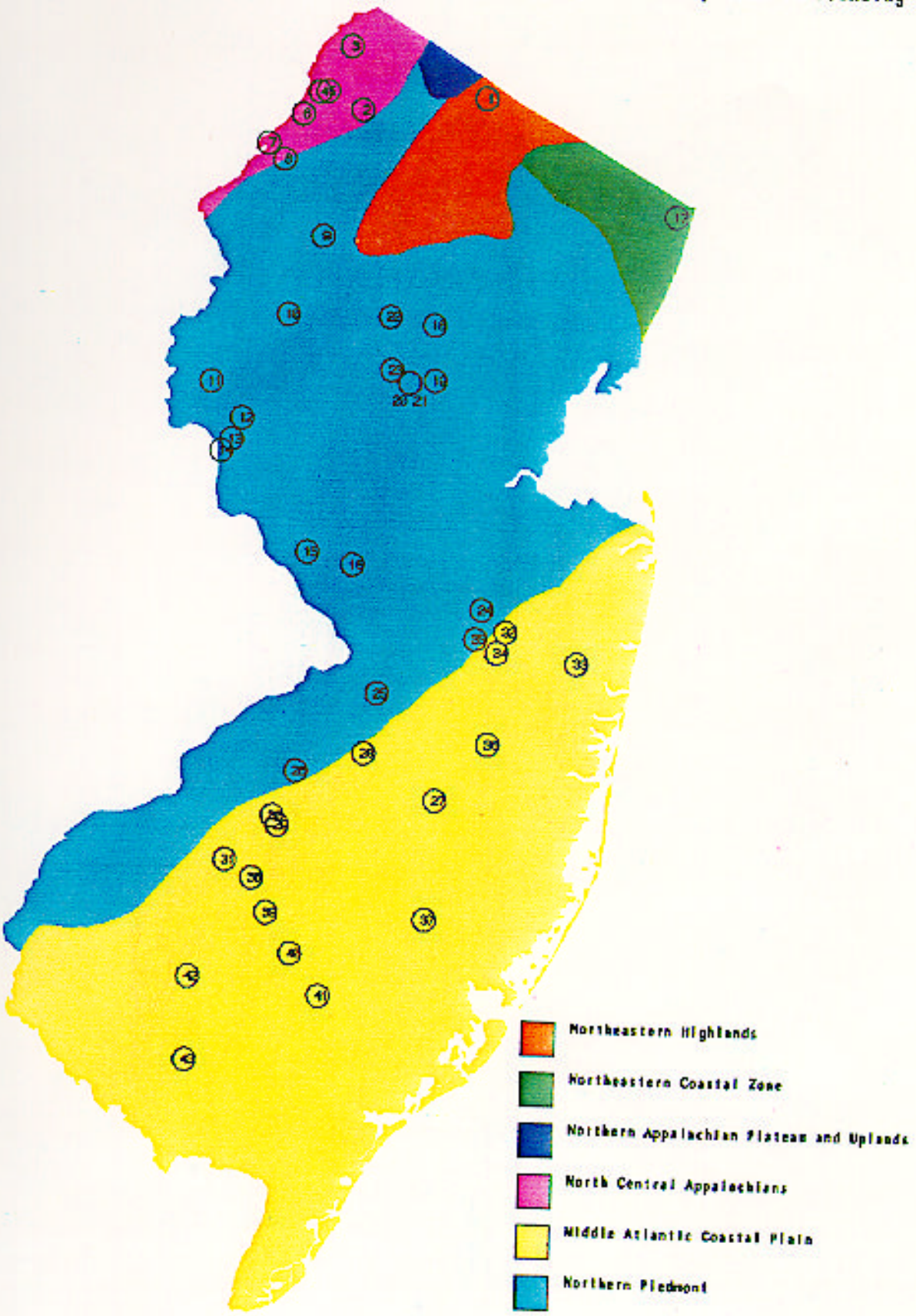


Figure 1. Map of New Jersey ecoregions (described) and ecoregion sites (numbered). Dotted lines delineate subregions within the Piedmont and Coastal Plain. Station locations and corresponding ecoregions are listed in Table 1.

Figure 2. Map of USEPA Ecoregions overlapping New Jersey from surrounding states.



TABLES

Table 1. New Jersey ecoregion sites in general order north to south with the corresponding ecoregion and subregion (where applicable) to the right. Notations on rationale for selection, overall level of impairment and stream order are given following each site; see Appendix C for detailed descriptions and data. Site locations are illustrated in Figure 1.

BASIN **Tributary**	**ECOREGION** **Subregion**
I. UPPER DELAWARE	
A. Wallkill River	
1. Cherry Ridge (a,1)	NORTHEASTERN HIGHLANDS*
appropriate site not found	NORTHERN APPALACHIAN PLATEAU*
2. Papakating Creek (a,1)	NORTH CENTRAL APPALACHIANS*
B. Big Flat Brook	
3. Little Flat Brook (a,1)	" " "
4. Little Flat Brook (a,2)	" " "
5. main stem (a,2)	" " "
6. main stem (a,3)	" " "
7. main stem (a,3)	" " "
C. Paulinskill River	
8. Fairview Lake outlet (Blair Creek) (b,1)	
D. Pequest River	
9. Trout Brook (c,1)	NORTHERN (UPPER) PIEDMONT*
E. Musconetcong River	
10. unnamed tributary (a,1)	" " "
11. main stem (a,3)	" " "
F. Nishisakawick Creek	
12. main stem (a,1)	" " "
13. main stem (a,2)	" " "
14. main stem (a,2)	" " "
G. Jacobs Creek	
15. main stem (a,1)	" " "
H. Assunpink Creek	
16. Shipetauken Creek (d,1)	" " "
II. HACKENSACK/PASSAIC/RARITAN	
A. Hackensack River	
17. Dwarskill (a,1)	NORTHEASTERN COASTAL ZONE*
B. Passaic River	
18. Primrose Brook (trib. Great Brook) (a,1)	NORTHERN (UPPER) PIEDMONT*
19. main stem (a,3)	" " "
20. tributary to Dead River (a,1)	" " "
21. Dead River (a,2)	" " "
C. Raritan River	
22. Burnetts Brook (trib. N. Branch) (a, 2)	" " "
23. North Branch (a,3)	" " "
	LOWER PIEDMONT
appropriate site not found	Red Shale Zone
appropriate site not found	Urban/Industrial Zones
24. Millstone River (e,1)	LOWER PIEDMONT

Table 1. (cont.)

III. LOWER DELAWARE	
A. Black Creek	LOWER PIEDMONT
25. Bacon Run (e,1)	" "
B. Rancocas Creek	
26. Mason's Creek (e,1)	" "
27. McDonald's Branch (trib. Greenwood Br.) (f,1)	COASTAL PLAIN
28. North Branch (a,4)	Inner Coastal Plain
29. Black Run (trib. Haynes Creek) (a,1)	" " "
30. north tributary to Black Run (g,1)	" " "
C. Big Timber Creek	
31. tributary to Stone Bridge Branch (h,1)	" " "
IV. ATLANTIC COASTAL	COASTAL PLAIN
A. Manasquan River	
32. main stem (upper) (e,1)	Inner Coastal Plain
33. Stan Brook (trib. Squankum Brook) (h,1)	" " "
B. Metedeconk River	
34. South Branch (a,1)	" " "
C. Toms River	
35. main stem (upper) (i,1)	" " "
36. Old Hurricane Brook (trib. Union Brook) (a,2)	COASTAL PLAIN
D. MULLICA/WADING RIVER	
37. Harrisville Lake outlet (Oswego R.) (b,2)	" "
E. Great Egg Harbor River	
38. main stem (upper) (a,2)	" "
39. main stem (a,3)	" "
40. main stem (a,3)	" "
41. main stem (a,4)	" "
F. MAURICE RIVER	
42. Green Branch (h,1)	" "
43. Whitemarsh Run (a,1)	" "

Table 1. (cont.)

NOTES

Reason for ecoregion site selection:

a - minimal biological impairment, diverse population of clean-water species

b - outlet of a lake with no obvious sources of pollution; slight to moderate impairment; can be used to gauge other lakes in the region

c - site/stream uniquely atypical of the surrounding region; slight impairment

d - least impacted site in the Assunpink watershed; moderate impairment

e - limited or remnant population of clean-water species near headwaters of a very impacted watershed; moderately impaired

f - situated in an unimpacted area of relative wilderness (cedar swamp); moderately-impacted status probably due to lack of food supply

g - in a relatively remote area but showing some impact (moderate to severe impairment) from a distinct source, in this case cranberry bog operations; can be compared to less impacted site(s) upstream

h - diverse clean-water population in a highly impacted area; an important site from this standpoint; slightly to moderately impaired

i - great diversity and abundance of clean-water species in a relatively pristine area, but with encroaching development; no impairment; this is a very important site and can be used to gauge other ecoregion sites in central and southern NJ deciduous forested areas

Stream order, or position of a stream in its heirarchy of tributaries (see Leopold et al, 1964, Fluvial Processes in Geomorphology):

1 (= first order) - no tributaries, usually closest to headwaters

2 (= second order) - with only first order streams as tributaries

3 (= third order) - only second and first order streams as tributaries

4 (= fourth order) - only third, second and first order streams as tributaries; the highest order on which ecoregion sites were found in the present study

* from Omernick (1987), Ecoregions of the Northeast States

Scoring criteria for rapid bioassessments
in New Jersey streams[1,2]

	6	3	0
1. Taxa Richness (total families)	>10	10-15	4-0
2. E+P+T Index (EPT)[3]	>5	5-3	2-0
3. Percent Dominance (%CDF)[4]	<40	40-60	>60
4. Percent EPT (%EPT)	>35	35-10	<10
5. Modified Family Biotic Index (FBI)[5]	0-4	4-6	6-10

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; characterized by a maximal taxa richness, balanced taxa groups and good representation of intolerant individuals

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

Severely Impaired: benthic community dramatically different from that of undisturbed streams; macroinvertebrates dominated by a few taxa which are very abundant; tolerant taxa overwhelmingly dominant

[1] taken from Kurtenbach (1990), modified from Plakfin *et al* (1989);
[2] based on 100 organism subsamples
[3] EPT = Ephemeroptera, Plecoptera, Trichoptera (including Hydropsychidae, deleted by Kurtenbach, 1990)
[4] %CDF = % contribution of the dominant family
[5] also known as the Hilsenhoff Biotic Index

List of major macroinvertebrate taxa found at the New Jersey ecoregion sites

```
phylum PORIFERA (sponges)
        class DEMOSPONGEA
                order HAPLOSCLERINA
                        family Spongillidae

phylum COELENTERATA
        class HYDROZOA (hydras)
                order HYDROIDA
                        family Hydridae

phylum PLATHELMINTHES
        class TURBELLARIA (flatworms)
                order TRICLADIDA
                        family Planariidae
                order ALLOEOCOELA
                        family Plagiostomidae

phylum NEMERTEA (proboscis worms)
        class ENOPLA
                order HOPLONEMERTINI
                        family Prostomatidae

phylum NEMATODA (roundworms)
        class ADENOPHOREA
                order DORYLAIMIDA
                        family Dorylaimidae
                               Alaimidae
                               Nygolaimellidae

phylum BRYOZOA (moss animalcules)
        class CYMNOLAEMATA
                order CTENOSTOMATA
                        family Paludicellidae
        class PHYLACTOLAEMATA
                order PLUMATELLINA
                        family Fredericellidae
                               Plumatellidae

phylum ANNELIDA
        class OLIGOCHAETA (aquatic earthworms)
                order HAPLOTAXIDA
                         family Naididae
                               Haplotaxidae
                               Tubificidae
                               Lumbricidae
                order LUMBRICULIDA
                        family Lumbriculidae

        class HIRUDINAEA (leeches)
                order RHYNCHOBELLIDA
                        family (Glossiphoniidae)
```

order ARHYNCHOBDELLIDA
family Erpobdellidae

phylum ARTHROPODA
class CRUSTACEA
order ISOPODA (aquatic sow bugs)
family Asellidae
Porcellionidae
order AMPHIPODA (scuds, sideswimmers)
family Talitridae
Gammaridae
order DECAPODA
family Cambaridae (crayfish)
class ARACHNOIDEA
order ACARI (water mites)
family Hygrobatidae
Libertiidae
Sperchonidae
class DIPLOPODA (millipedes)
INSECTA
order COLLEMBOLA (springtails)
family Isotomidae
Entomobryidae
order PLECOPTERA (stone flies)
family Pteronarcidae
Peltoperlidae
Taeniopterygidae
Nemouridae
Leuctridae
Capniidae
Perlidae
Perlodidae
Chloroperlidae
order EPHEMEROPTERA (may flies)
family Baetiscidae
Ephemerellidae
Leptophlebiidae
Siphlonuridae
Tricorythidae
Caenidae
Heptageniidae
Baetidae
order ODONATA (dragonflies)
family Gomphidae
Aeshnidae
Cordulegastridae
Macromiidae
Corduliidae
Libellulidae
Agrionidae
order HEMIPTERA (true bugs)
family Gerridae
Veliidae
Corixidae

order MEGALOPTERA (dobsonflies)
family Sialidae
Corydalidae
order TRICHOPTERA (caddis flies)
family Hydroptilidae
Helicopsychidae
Hydropsychidae
Philopotamidae
Polycentropodidae
Psychomyiidae
Rhyacophilidae
Glossosomatidae
Phryganeidae
Goeridae
Brachycentridae
Limnephilidae
Sericostomatidae
Lepidostomatidae
Odontoceridae
Leptoceridae
Molannidae
order LEPIDOPTERA (aquatic caterpillars)
family Pyalidae
order COLEOPTERA (beetles)
family Haliplidae
Dytiscidae
Gyrinidae
Hydrophilidae
Psephenidae
Elmidae
Ptilodactylidae
order DIPTERA (flies, midges)
family Tipulidae
Ptychopteridae
Simuliidae
Chironomidae
Ceratopogonidae
Tabanidae
Rhagionidae
Anthomyiidae
Dolichopodidae
Phoridae
Empididae

phylum MOLLUSCA
class GASTROPODA (snails)
order BASOMMATOPHORA
family Physidae
Lymnaeidae
Planorbidae
Ancylidae
order MESOGASTROPODA
family Viviparidae
Hydrobiidae

Pleuroceridae
class PELECYPODA (clams, mussels)
order EULAMELLIBRANCHIA
family Unionidae
order HETERODONTA
family Sphaeriidae

1. Upper Delaware
    - A. Wallkill River
        1. Papakating Creek
        2. Cherry Ridge at Wawayanda State Park
    - B. Big Flat Brook
        3. Little Flat Brook at Four Corners
        4. Little Flat Brook at Rt. 615, Sandyston
        5. Big Flat Brook at Rt. 521, Tuttles Corner
        6. Big Flat Brook at Walpack Center
        7. Big Flat Brook at Rt. 615, Flatbrookville
    - C. Paulinskill River
        8. Fairview Lake (outlet) at Blair Creek
    - D. Pequest River
        9. Trout Brook
    - E. Musconetcong River
        10. unnamed tributary at Rt. 57, Penwell
        11. Musconetcong River at Rt. 579, Bloomsbury
    - F. Nishisakawick Creek
        12. Nishisakawick Creek at Airport Rd.
        13. Nishisakawick Creek off Creek Rd. (one mile from Everittstown)
        14. Nishisakawick Creek at Creek Rd., Frenchtown
    - G. Jacobs Creek
        15. Jacobs Creek at Woosamonsa Rd.
    - H. Assunpink Creek
        16. Shipetaukin Creek at Van Kirk Rd.
2. Hackensack/Passaic/Raritan
    - A. Hackensack River
        17. Dwarskill at Ruchman Rd., Closter
    - B. Passaic River
        18. Primrose Brook at Jockey Hollow
        19. Passaic River at Valley Rd., Somerset
        20. tributary to Dead River at Somerville Rd.
        21. Dead River at Somerville Rd.
    - C. Raritan River
        22. Burnetts Brook at Old Mill Rd.
        23. North Branch Raritan at Rt. 202
        24. Millstone River at Baird Rd.
3. Lower Delaware
    - A. Black Creek
        25. Bacon Run at Bordentown Georgetown Rd.
    - B. Rancocas Creek
        26. McDonald's Branch at Woodmansie Rd.
        27. North Branch Rancocas Creek at Main St., Pemberton
        28. Mason's Creek at Ark Rd.
        29. Black Run at Kettle Run Rd.
        30. north tributary to Black Run at Braddock Mill Rd.
    - C. Big Timber Creek
        31. tributary to Stone Bridge Branch at Waddell Farm, Garwood Rd.
4. Atlantic Coastal
    - A. Manasquan River
        32. Manasquan River at Turkey Swamp Rd.
        33. Stan Brook at Easy St.
    - B. Metedeconk River
        34. South Branch Metedeconk River at Leesville-Siloam Rd.

C. Toms River

35. Toms River at Paint Island Rd.
36. Old Hurricane Brook at Beckerville Rd.

D. Mullica/Wading Rivers

37. Oswego River at Harrisville Lake outlet

E. Great Egg Harbor River

38. Great Egg Harbor River at Williamstown-New Freedom Rd.
39. Great Egg Harbor R. at Winslow Rd.
40. Great Egg Harbor R. at Rt. 54
41. Great Egg Harbor R. at Rt. 559

F. Maurice River

42. Green Branch at Crow Pond Rd.
43. Whitemarsh Run at Hogbin Rd.

Ecoregion Site 1

Cherry Ridge Brook, Wawayanda State Park, Vernon Twp., Sussex Co.
Wallkill watershed/Northeastern Highlands Ecoregion

NJDEPE CLASSIFICATION
FW1

Important Species
PLECOPTERA
 Pteronarcys sp.
 Acroneuria carolinensis
 Acroneuria abnormis
 Amphinemura delosa

EPHEMEROPTERA
 Centroptilum sp.
 Baetis intercalaris
 Paraleptophlebia sp.
 Epeorus sp.

TRICHOPTERA
 Micrasema wataga
 Pycnopsyche sp.
 Rhyacophila fuscula
 Lype diversa
 Hydroptila sp.
 Triaenodes sp.
 Lepidostoma sp.
 Limnephilus sp.
 Neophylax sp.
 Symphitopsyche morosa
 Chimarra aterrima

COLEOPTERA
 Optioservus ovalis
 Microcylloepus pusillus pusillus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest, Wawayanda State Park; open canopy near road, closed canopy upstream; good streambank vegetation; stream width - 15 feet, stream depth - <1 foot; moderate flow

SUBSTRATE and GEOLOGY
rubble/sand; Rockaway-rock outcrop, Whitman Association stony loamy soils

WATER QUALITY
clear
Readings on 04-25-94
pH - 6.8 s.u.
dissolved oxygen - 11.6 ppm
conductivity - 115 umhos
water temperature - 14.5 øC

Ecoregion Site 1

Wallkill watershed

Cherry Ridge Brook, Wawayanda State Park, Vernon Twp.

Date Taxa(family)/no. per sample	Aug'93	Oct'93
Gammaridae	23	13
Brachycentridae	35	18
Tipulidae		2
Hydropsychidae	19	4
Nemertea		1
Chironomidae	10	31
Taeniopterygidae		15
Turbellaria		1
Elmidae	3	4
Lumbricidae		2
Pteronarcyidae	1	1
Baetidae	3	
Rhyacophilidae	1	
Perlidae	1	2
Philopotamidae		4
Sphaeriidae	1	1
Limnephilidae		1
Cambarinae	1	
Gastropoda	1	
Acariformes	1	
Dominant Family	Brachycentridae	Chironomidae
Family Biotic Index	3.13	3.79
Scraper/Filterer Collector	.04	0
Shredder/Total	.09	.05
E+P+T	6	7
%EPT	60	45
EPT/C	6	1.45
Impairment(rating)	none(30)	none(30)
Deficiency(s) noted	none	none

Ecoregion Site 2

Papakating Creek, Gunn Rd, Frankford Twp., Sussex Co.
Wallkill watershed/North Central Appalation Ecoregion

NJDEPE CLASSIFICATION
FW2-TM

Important Species

PLECOPTERA
- Acroneuria abnormis
- Leuctra truncata
- Neoperla clymene
- Perlesta placida
- Phasganophora capitata
- Paracapnia opis
- Nemoura trispinosa
- Brachyptera gracilis
- Allocapnia sp.

EPHEMEROPTERA
- Baetis vagans
- Drunella cornutella
- Epeorus sp.
- Heptagenia sp.
- Heterocloeon sp.
- Isonychia sp.
- Paraleptophlebia sp.
- Stenonema smithae
- Pseudocloeon carolina
- Eurylophella temporalis
- Ephemerella rotunda

TRICHOPTERA
- Chimarra aterrima
- Neophylax sp.
- Glossosoma sp.
- Psilotreta frontalis
- Rhyacophila fuscula
- Symphitopsyche slossonae
- Symphitopsyche sparna
- Hydroptila sp.
- Helicopsyche borealis
- Protoptila sp.
- Diplectrona modestus
- Dolophilodes sp.
- Pycnopsyche sp.
- Rhycophila sp. 5
- Lype diversa

COLEOPTERA
- Optioservus ovalis
- Oulimnus latiusculus
- Anchytarsus bicolor

Habitat Characteristics
RIPARIAN and INSTREAM
deciduos woods broken by farms and overgrown farm fields; canopy ranges from mostly open to mostly closed; good streambank vegetation; stream width - 6 ft., stream depth - <1 ft; slow flow (velocity ~ 1.5 ft/sec)

SUBSTRATE and GEOLOGY
bedrock/boulders/cobble/sand/silt; Nassau-Bath-Norwich Association, stony loamy soils; first order stream; Branchville USGS quadrangle

WATER QUALITY
clear water

Readings on 06-28-90	Readings on 12-07-92
pH - 7.6 s.u.	pH - 7.3 s.u.
dissolved oxygen - 9.2 ppm	dissolved oxygen - 15.0 ppm
conductivity - 191 umhos	conductivity - 157 umhos
water temperature - 22.5 øC	water temperature - -1.7 øC

Ecoregion Site 2

Wallkill watershed

Papakating Creek, Gunn Rd., Frankford Twp., Sussex Co.

Date Taxa(family)/no. per sample	Jun'90	Sep'92	Dec'92	Mar'93
Baetidae	6	3	1	
Naididae	3			
Heptageniidae	15	4	2	1
Odontoceridae		7	2	
Limnephilidae	2			
Psephenidae	8	8	1	
Elmidae	8	13	9	1
Chironomidae	15	20	13	26
Taeniopterygidae				2
Leuctridae	10			
Tipulidae	2	4	2	2
Tubificidae	1	1		
Glossosomatidae	4			
Ephemerellidae	1			1
Philopotamidae	2	1	2	
Leptophlebiidae	3	1	8	14
Rhyacophilidae			2	
Limnephilidae		2	1	
Hemiptera		1		
Polycentropidae		1		
Hydropsychidae	10	26	29	6
Perlidae	4	5	7	
Nematoda			1	
Capniidae		1	12	2
Simuliidae			5	41
Athericidae	1			
Siphlonuridae	3			
Sphaeriidae	1	2	1	1
Empididae				1
Nemouridae			2	2
Hydroptilidae	1			
Dominant Family	Chironomidae	Hydropsychidae	Hydropsychidae	Simuliidae
Family Biotic Index	3.75	4.07	3.45	4.93
Scraper/Filterer Collector	1.06	.59	.08	.04
Shredder/Total	.25	.18	.06	.07
E+P+T	12	10	11	7
%EPT	61	51	68	28
EPT/C	4.07	2.55	5.23	1.08
Impairment(rating)	none(30)	none(30)	none(30)	none(27)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 3

Little Flat Brook, Deckertown Tnpk., Four Corners, Sussex Co.
Flat Brook watershed/North Central Appalachian Ecoregion

NJDEPE CLASSIFICATION
FW2-TM(C1)

Important Species

PLECOPTERA
- Leuctra truncata
- Peltoperla sp.
- Isoperla transmarina
- Acroneuria abnormis
- Acroneuria carolinensis
- Hastaperla brevis
- Amphinemura delosa
- Pteronarcys sp.

EPHEMEROPTERA
- Paraleptophlebia sp.
- Eurylophella temporalis
- Ephemerella dorothea
- Ephemerella rotunda
- Centroptilum sp.
- Baetis vagans
- Stenonema smithae
- Stenacron interpunctatum

TRICHOPTERA
- Goera sp.
- Glossosoma sp.
- Neophylax sp.
- Diplectrona modestus
- Dolophiloides sp.
- Pycnopsyche sp.
- Psilotreta frontalis
- Hydroptila sp.
- Rhyacophila sp.
- Bracycentrus sp.
- Micrasema sp.
- Theliopsyche sp.
- Molanna sp.

COLEOPTERA
- Oulimnius latiusculus
- Promoresia elegans

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest (Stokes St. Forest & Del. water gap nat'l rec. area); mostly closed canopy; stream width - 6 ft., stream depth - <1 ft.; moderate flow; good streambank vegetation; mosses

SUBSTRATE and GEOLOGY
cobbles/gravel; rock outcrop-Oquaga-Swartswood association, stony soils; first order stream; Port Jervis South USGS quadrangle

WATER QUALITY
clear
Readings on 04-19-94
pH - 6.4 s.u.
dissolved oxygen - 14.0 ppm
conductivity - 41 umhos
water temperature - 10.0 øC

Ecoregion Site 3

Flat Brook watershed

Little Flat Brook, Deckertown Tnpk., Four Corners, Sussex Co.

Date Taxa(family)/no. per sample	Jan'93	Jul'93	Oct'93
Hydropsychidae	20	11	22
Limnephilidae	13	16	12
Chloroperlidae	6	2	4
Ceratopogonidae			2
Peltoperlidae	6	2	
Philopotamidae	3	1	
Elmidae		7	4
Leuctridae		2	1
Hydroptilidae			8
Ephemerellidae	4	11	13
Perlidae			1
Sialidae	1		
Siphlonuridae	1		
Perlodidae	2	3	
Simuliidae	2		
Rhyacophilidae	2		1
Heptageniidae	5	1	2
Gomphidae			2
Leptophlebiidae	11	1	
Sphaeriidae		1	1
Chironomidae	4	4	8
Pteronarcyidae	1		
Hydrophilidae	2		
Glossosomatidae	4	20	
Lumbriculidae	1		2
Molannidae			1
Psephenidae	1	5	4
Tabanidae	1		
Tipulidae	5	1	4
Baetidae		4	
Psychodidae		1	
Cordulegastridae		2	
Tubificidae		1	3
Goeridae	1	1	1
Nemouridae		2	
Asellidae	2		
Lepidostomatidae	1		1
Odontoceridae	1	1	3
Dominant Family	Hydropsychidae	Glossosomatidae	Hydropsychidae
Family Biotic Index	3.10	2.67	3.61
Scraper/Filterer Collector	.69	3.08	.66
Shredder/Total	.28	.22	.31
E+P+T	15	14	13
%EPT	75	76	70
EPT/C	18.75	19	8.75
Impairment(rating)	none(30)	none(30)	none(30)
Deficiency(s) noted	none	none	none

Ecoregion Site 4

Little Flat Brook, Rt. 615, Sandyston Twp., Sussex Co.
Flat Brook watershed/North Central Appalachian Ecoregion

NJDEPE CLASSIFICATION
FW2-TM(C1)

Important Species

PLECOPTERA
- Acroneuria abnormis
- Leuctra truncata
- Paragnetina media
- Perlesta placida
- Brachyptera gracilis
- Nemoura truncata

EPHEMEROPTERA
- Tricorythodes sp.
- Eurylophella temporalis
- Serratella serrata
- Isonychia sayi
- Baetis vagans
- Heptagenia sp.
- Ephemerella rotunda
- Isonychia arida
- Paraleptophlebia sp.
- Centroptilum sp.
- Ephemerella invaria
- Epeorus sp.
- Stenonema ithaca

TRICHOPTERA
- Helicopsyche borealis
- Pycnopsyche sp.
- Neophylax sp.

TRICHOPTERA (cont.)
- Glossosoma sp.
- Rhyacophila fuscula
- Symphitopsyche sp.
- Symphitopsyche morosa
- Symphitopsyche bifida
- Micrasema wataga
- Protoptila sp.
- Chimarra aterrima
- Goerita sp.
- Hydroptila sp.
- Rhyacophila sp. 5
- Apatania sp.
- Lepidostoma sp.
- Mystacides sp.
- Ptilostomis sp.
- Rhyacophila melita
- Limnephilus sp.
- Psilotreta frontalis

COLEOPTERA
- Optioservus ovalis
- Promoresia tardella
- Psephenus herricki

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest (Blewitt tract & Del. water gap nat'l rec. area); open canopy; stream width - 15 ft., stream depth - <1 ft.; moderate flow; good streambank vegetation

SUBSTRATE and GEOLOGY
rubble/cobbles/sand; Chenango-Atherton-Braceville association, loamy soils; second order stream; Culvers Gap USGS quadrangle

WATER QUALITY
clear
Readings on 04-20-94
pH - 7.8 s.u.
dissolved oxygen - 18.0 ppm
conductivity - 190 umhos
water temperature - 12.0 øC

Ecoregion Site 4

Flat Brook watershed

Little Flat Brook, Rt. 615, Sandyston, Sussex Co.

Date Taxa(family)/no. per sample	Jul'93	Oct'93	Feb'94
Glossosomatidae	12		
Hydropsychidae	24	41	6
Limnephilidae	13	4	1
Lumbriculidae			3
Tipulidae	10		1
Chironomidae	11	15	3
Baetidae	10	1	
Brachycentridae		2	2
Leptophlebiidae		1	
Siphlonuridae	1	3	1
Sphaeriidae			1
Ephemerellidae	8	7	29
Nemouridae			12
Rhyacophilidae		6	1
Hydroptilidae			1
Turbellaria			4
Philopotamidae		5	7
Helicopsychidae	2	6	3
Gomphidae			1
Leptoceridae		1	
Anthomyiidae		1	1
Athericidae			1
Elmidae	1	1	9
Gastropoda		1	2
Tubificidae		1	
Lepidostomatidae		1	
Perlidae	4		3
Taeniopterygidae			8
Heptageniidae	1	1	
Gyrinidae	2		
Caenidae	1	2	
Dominant Family	Hydropsychidae	Hydropsychidae	Ephemerellidae
Family Biotic Index	3.30	3.89	2.71
Scraper/Filterer Collector	.86	.20	.73
Shredder/Total	.30	.10	.42
E+P+T	10	14	12
%EPT	76	81	74
EPT/C	6.91	5.40	24.67
Impairment(rating)	none(30)	none(27)	none(30)
Deficiency(s) noted	none	none	

Ecoregion Site 5

Big Flat Brook, Rt. 521, Tuttles Corner, Sussex Co.
Flat Brook watershed/North Central Appalachian Ecoregion

NJDEPE CLASSIFICATION
FW2-TP(C1)

Important Species

PLECOPTERA
- Perlesta placida
- Leuctra truncata
- Paragnetina immarginata
- Pteronarcys sp.
- Peltoperla sp.
- Hastaperla brevis
- Acroneuria abnormis

EPHEMEROPTERA
- Tricorythodes sp.
- Stenacron interpunctatum
- Centroptilum sp.
- Eurylophella temporalis
- Paraleptophlebia sp.
- Serratella serrata
- Isonychia arida
- Heptagenia sp.
- Epeorus sp.
- Pseudocloeon carolina
- Stenonema fuscum
- Ephemerella rotundum

TRICHOPTERA
- Pycnopsyche sp.
- Goerita sp.
- Micrasema wataga

TRICHOPTERA (cont.)
- Hydroptila sp.
- Psilotreta frontalis
- Symphitopsyche sparna
- Symphitopsyche slossonae
- Symphitopsyche bifida
- Neophylax sp.
- Helicopsyche borealis
- Symphitopsyche morosa
- Goera sp.
- Lepidostoma sp.
- Apatania sp.
- Brachycentrus numerosus
- Diplectrona modestus
- Mystacides sp.

COLEOPTERA
- Psephenus herricki
- Oulimnius latiusculus
- Optioservus ovalis

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest (within Stokes St. Forest & Del. water gap nat'l rec. area); open canopy; stream width - 10 ft., stream depth - 1 ft.; fast flow; good streambank vegetation; 100% periphyton coverage

SUBSTRATE and GEOLOGY
boulders/cobbles/gravel; Chenango-Atherton-Braceville association, loamy soils; second order stream; Culvers Gap USGS quadrangle

WATER QUALITY
clear
Readings on 04-19-94
pH - 6.3 s.u.
dissolved oxygen - 17.0 ppm
conductivity - 59 umhos
water temperature - 11.0 øC

Ecoregion Site 5

Flat Brook watershed

Big Flat Brook, Rt 521, Tuttles Corner, Sussex Co.

Date Taxa(family)/no. per sample	Jan'93	Jul'93	Oct'93
Limnephilidae	7	3	6
Chironomidae		24	2
Brachycentridae			1
Siphlonuridae	8	1	13
Polycentropodidae	1	1	2
Leptophlebiidae	15		17
Baetidae	1	4	
Tipulidae		8	2
Elmidae		1	3
Sphaeriidae	1		
Helicopsychidae	1		4
Simuliidae	1		
Taeniopterygidae	9		7
Perlidae	3	3	
Corydalidae		1	
Aeshnidae	1		
Heptageniidae	10		7
Ephemerellidae	7	6	21
Psephenidae	2	5	2
Hydroptilidae		3	2
Lumbricidae		1	
Tricorythidae		2	
Lumbriculidae	7	3	3
Goeridae	10		
Capniidae	4		
Gastropoda	2	5	3
Caenidae		21	
Leuctridae		5	
Athericidae	1		
Hydropsychidae	3	3	3
Rhyacophilidae	1		
Gomphidae	2		1
Sialidae			1
Lepidostomatidae	2		
Odontoceridae	1		
Dominant Family	Leptophlebiidae	Chironomidae	Ephemerellidae
Family Biotic Index	3.12	4.90	3.45
Scraper/Filterer Collector	1.85	1.07	.94
Shredder/Total	.19	.45	.23
E+P+T	16	11	11
%EPT	83	52	83
EPT/C	0	2.17	41.50
Impairment(rating)	none(30)	none(30)	none(30)
Deficiency(s) noted	none	none	none

Ecoregion Site 6

Big Flat Brook, Rt. 615, Walpack Center, Sussex Co.
Flat Brook watershed/North Central Appalachian Ecoregion

NJDEPE CLASSIFICATION
FW2-TM(C1)

Important Species

PLECOPTERA
- Pteronarcys sp.
- Paragnetina media
- Paragnetina immarginata
- Acroneuria abnormis
- Peltoperla sp.
- Paracapnia opis

EPHEMEROPTERA
- Isonychia sayi
- Isonychia arida
- Epeorus sp.
- Serratella serrata
- Heptagenia sp.
- Baetis flavistriga
- Baetis vagans
- Stenonema smithae
- Drunella lata
- Stenacron pallidum
- Ephemerella rotunda
- Stenonema nepotellum
- Paraleptophlebia sp.

TRICHOPTERA
- Micrasema wataga
- Glossosoma sp.

TRICHOPTERA (cont.)
- Symphitopsyche bifida
- Symphitopsyche morosa
- Symphitopsyche sparna
- Brachycentrus numerosus
- Rhyacophila fuscula
- Rhyacophila amicis
- Psychomyia nomada
- Neophylax sp.
- Hydroptila sp.
- Lepidostoma sp.
- Chimarra aterrima
- Protoptila sp.
- Goerita sp.
- Leucotrichia pictipes
- Apatania sp.
- Helicopsyche borealis
- Hydropsyche venularis

COLEOPTERA
- Psephenus herricki
- Optioservus ovalis
- Promoresia tardella
- Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest (Walpack WMA and Del. water gap nat'l rec. area); open canopy; stream width - 40 ft., stream depth - 1 ft.; fast flow; good streambank vegetation

SUBSTRATE and GEOLOGY
gravel/boulders; Chenango-Atherton-Braceville association, loamy soils; third order stream; Lake Maskenozha USGS quadrangle

WATER QUALITY
clear
Readings on 04-20-94
pH - 7.4. s.u.
dissolved oxygen - 20.0 ppm
conductivity - 125 umhos
water temperature - 11.5 øC

Ecoregion Site 6

Flat Brook watershed

Big Flat Brook, Rt. 615, Walpack Center, Sussex Co.

Date Taxa(family)/no. per sample	Jan'93	Jul'93	Oct'93
Limnephilidae	14		10
Taeniopterygidae	31		1
Gastropoda			1
Capniidae	14		
Chironomidae	12	12	2
Pteronarcyidae		1	
Leptophlebiidae	2		
Siphlonuridae	5	4	2
Gyrinidae			1
Empididae			1
Brachycentridae		5	
Caenidae		1	
Baetidae		8	
Hydropsychidae	2	40	50
Perlidae	2	1	2
Glossosomatidae		5	
Heptageniidae	4	6	2
Psephenidae		1	
Corydalidae		1	
Philopotamidae		1	6
Lumbriculidae	2		
Lumbricidae	2		
Simuliidae	2		
Gammaridae	1		
Asellidae	2		
Rhyacophilidae	1		3
Gomphidae	1		
Tipulidae	1	1	
Sisyridae		1	
Sphaeriidae	1		
Elmidae	1	5	8
Ephemerellidae		7	3
Helicopsychidae			6
Talitridae			2
Dominant Family	Hydropsychidae	Hydropsychidae	Hydropsychidae
Family Biotic Index	3.53	3.69	3.81
Scraper/Filterer Collector	.60	.13	.28
Shredder/Total	.30	.24	.05
E+P+T	9	11	10
%EPT	75	79	85
EPT/C	6.25	6.58	42.50
Impairment(rating)	none(30)	none(27)	none(27)
Deficiency(s) noted	none	none	none

Ecoregion Site 7

Big Flat Brook, Rt. 615, Flatbrookville, Sussex Co.
Flat Brook watershed/North Central Appalachian Ecoregion

NJDEPE CLASSIFICATION
FW2-TM

Important Species

PLECOPTERA
- Paragnetina media
- Acroneuria abnormis
- Perlesta placida
- Phasganophora capitata

EPHEMEROPTERA
- Epeorus sp.
- Isonychia sayi
- Isonychia arida
- Serratella serrata
- Serratella spiculosa
- Tricorythodes sp.
- Heptagenia sp.
- Stenonema nepotellum
- Stenonema smithae
- Baetis vagans
- Stenonema fuscum
- Ephemerella rotunda

TRICHOPTERA
- Agraylea sp.
- Helicopsyche borealis
- Glossosoma sp.
- Neophylax sp.

TRICHOPTERA (cont.)
- Rhyacophila fuscula
- Symphitopsyche sparna
- Symphitopsyche morosa
- Symphitopsyche bifida
- Chimarra aterrima
- Micrasema wataga
- Brachycentrus numerosus
- Leucotrichia pictipes
- Goerita sp.
- Hydroptila sp.
- Lepidostoma sp.
- Apatania sp.
- Brachycentrus lateralus
- Mystacides sp.
- Athripsodes sp.
- Hydropsyche venularis
- Pycnopsyche sp.

COLEOPTERA
- Promoresia tardella
- Optioservus ovalis
- Microcylloepus pusillus
- Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth mixed forest, mostly deciduous (Del. water gap nat'l rec. area); mostly open canopy; stream width - 40 ft., stream depth - 2 ft.; fast flow; good streambank vegetation

SUBSTRATE and GEOLOGY
gravel/boulders; Chenango-Atherton-Braceville association, loamy soils; third order stream; Flatbrookville USGS quadrangle

WATER QUALITY
clear
Readings on 04-20-94
pH - 7.5 s.u.
dissolved oxygen - 17.5 ppm
conductivity - 118 umhos
water temperature - 11.5 øC

Ecoregion Site 7

Flat Brook watershed

Big Flat Brook, Rt. 615, Flatbrookville, Sussex Co.

Date Taxa(family)/no. per sample	Jul'93	Oct'93
Philopotamidae	7	6
Leptoceridae		4
Lumbricidae	1	1
Rhyacophilidae		1
Psephenidae		1
Ephemerellidae	10	6
Chironomidae	15	6
Hydropsychidae	30	12
Simuliidae	7	
Glossosomatidae	5	
Baetidae	7	
Limnephilidae	3	7
Perlidae	3	2
Hydroptilidae	1	
Brachycentridae	3	
Heptageniidae		6
Polycentropodidae		5
Helicopsychidae	1	2
Siphlonuridae	4	5
Hemiptera		1
Lepidostomatidae		2
Corydalidae		2
Elmidae	1	2
Taeniopterygidae		23
Tipulidae	1	3
Gastropoda	1	3
Dominant Family	Hydropsychidae	Taeniopterygidae
Family Biotic Index	3.88	3.57
Scraper/Filterer Collector	.31	.46
Shredder/Total	.17	.18
E+P+T	11	13
%EPT	74	81
EPT/C	4.93	13.50
Impairment(rating)	none(30)	none(30)
Deficiency(s) noted	none	none

Ecoregion Site 8

Blair Creek below Fairview Lake outlet, Hardwick Twp., Sussex Co.
Paulins Kill watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Allocapnia sp.
- Amphinemura delosa
- Nemoura trispinosa

COLEOPTERA
- Oulimnius latiusculus

EPHEMEROPTERA
- Stenonema smithae
- Ephemerella dorothea
- Isonychia sp.
- Eurylophella temporalis

TRICHOPTERA
- Neophylax sp.
- Chimarra sp.
- Diplectrona modestus
- Hydropsyche demora
- Oxyethira sp.
- Pycnopsyche sp.
- Oligostomis sp.
- Symphitopsyche alhedra
- Limnephilus sp.
- Hesperophylax sp.
- Lype diversa
- Ptilostomis sp.
- Symphitopsyche sparna

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest in highlands area; partly open canopy; stream width - 4 ft.; stream depth - <1 ft.; slow-moderate flow; mosses with tufts of filamentous green algae; Fairview Lake is spring-fed from a bog; it is ~110 acres, 1 mile long, 1/4 mile wide and 20 ft. deep.

SUBSTRATE and GEOLOGY
rocks/cobbles/gravel/sand; Swartswood-Nassau Association loamy soils; first order stream; Flatbrook USGS quadrangle

WATER QUALITY
clear water
Readings on 4-07-92
pH - 6.5 s.u.
dissolved oxygen - 9.8 ppm
conductivity - 68 umhos
water temperature - -- øC

Ecoregion Site 8

Paulins Kill watershed

Blair Creek below Fairview Lake outlet, Hardwick Twp., Sussex Co.

Date Taxa(family)/no. per sample	Aug'91	Oct'91	Jan'92	Apr'92
Leptoceridae		1		
Ephemerellidae			24	15
Simuliidae			42	84
Hydropsychidae	35	7	5	1
Phryganeidae		2		
Baetidae	2			
Heptageniidae	4			
Sphaeriidae	23	35	3	
Nemertea	3	5		
Philopotamidae	1			
Limnephilidae	9	2	4	
Corydalidae			1	
Asellidae				
Psephenidae				
Coenagrionidae	4	2		
Aeshnidae	1			
Chironomidae	5	2	11	
Siphlonuridae				
Anthomyiidae				
Tipulidae		2		
Heptageniidae		11		
Capniidae			8	
Elmidae	5			
Cambarinae	1			
Naididae	2	3		
Hydroptilidae	3	1		
Tubificidae		19		
Libellulidae	1	1		
Bryozoa		1		
Hirudinea		1		
Gastropoda	1	3	2	
Dominant Family	Hydropsychidae	Sphaeriidae	Simuliidae	Simuliidae
Family Biotic Index	5.39	7.03	4.24	5.23
Scraper/Filterer Collector	.21	.07	.06	0
Shredder/Total	.06	.16	.36	.15
E+P+T	6	6	4	2
%EPT	54	24	41	16
EPT/C	10.80	12	3.73	0
Impairment(rating)	none(27)	slight(24)	slight(21)	severe(6)
Deficiency(s) noted*	none	SOP	none	LD ODT PCWO

* SOD - Significant Organic Pollution
* LD - Low Diversity
* ODT - Overwhelmingly Dominant Taxon
* PCWO - Paucity of Clean Water Organisms

Ecoregion Site 9

Trout Brook, Rt. 612, Allamuchy, Warren Co.
Pequest River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
EPHEMEROPTERA
 Ephemerella rotunda
 Pseudocloeon punctiventris
 Centroptilum sp.
 Paraleptophlebia sp.

TRICHOPTERA
 Pycnopsyche sp.
 Lepidostoma sp.
 Frenesia sp.
 Neophylax sp.
 Oligostomis sp.
 Brachycentrus numerosus
 Lype diversa
 Limnephilus sp.
 Goerita sp.

COLEOPTERA
 Optioservus ovalis

Habitat Characteristics
RIPARIAN and INSTREAM
relatively young growth deciduous forest; closed canopy; good streambank vegetation;
stream width - 10 ft., stream depth - 1 ft.; slow flow

SUBSTRATE and GEOLOGY
white sand/mud; Wayland-Middlebury loamy soils on flood plain; upstream are Hazen-Hero-Fredon
Association loamy soils on river terraces, outwash terraces and kames; first order stream;
Tranquility USGS quadrangle

WATER QUALITY
clear water
Readings on 12-07-92
pH - 7.4 s.u.
dissolved oxygen - 13.7 ppm
conductivity - 184 umhos
water temperature - 5 øC

Ecoregion Site 9

Pequest River watershed

Trout Brook, Rt. 612, Allamuchy, Warren Co.

Date Taxa(family)/no. per sample	Sep'92	Dec'92	Mar'93	Jun'93
Ephemerellidae		24	48	2
Gammaridae	59	12	7	46
Elmidae	6	6	5	3
Asellidae	12	8	2	16
Tabanidae	1	1	2	
Tipulidae			2	6
Caenidae				1
Simuliidae			1	
Limnephilidae	1	13	4	4
Chironomidae	1	18	19	7
Brachycentridae			1	
Turbellaria	7	8	1	3
Diplopoda	1			
Gastropoda			1	1
Haplotaxidae			1	
Nematoda			1	
Lepidostomatidae			1	5
Sphaeriidae	3	4	2	4
Tubificidae	2	2	2	1
Hydropsychidae	1	3		
Lumbriculidae		1		1
Dominant Family	Gammaridae	Ephemerellidae	Ephemerellida	Gammaridae
Family Biotic Index	4.77	4.30	3.29	4.83
Scraper/Filterer Collector	0	0	0	0
Shredder/Total	.02	.47	.62	.14
E+P+T	2	3	4	4
%EPT	8	40	54	12
EPT/C	8	2.22	2.84	1.71
Impairment(rating)*	moderate(18)	none(27)	slight(24)	slight(21)
Deficiency(s) noted	PCWO	none	none	none

* PCWO - Paucity of Clean Water Organisms

Ecoregion Site 10

Musconetcong River unnamed tributary, Rt. 57, Penwell, Warren Co.
Musconetcong River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-TP C1

Important Species

PLECOPTERA
- Peltoperla sp.
- Leuctra truncata
- Perlesta placida
- Acroneuria abnormis
- Allocapnia sp.
- Paracapnia opis
- Hastaperla brevis
- Nemora trispinosa
- Brachyptera gracilis
- Isoperla transmarina
- Amphinenura delosa

EPHEMEROPTERA
- Epeorus sp.
- Pseudocloeon carolina
- Baetis vagans
- Ephemerella invaria
- Ephemerella subvaria
- Drunella lata
- Isonychia sp.
- Baetis brunneicolor
- Centroptilum sp.
- Ephemerella dorothea

EPHEMEROPTERA (cont.)
- Ephemerella rotunda
- Drunella cornutella

TRICHOPTERA
- Diplectrona modestus
- Symphitopsyche slossonae
- Symphitopsyche sparna
- Glossosoma sp.
- Neophylax sp.
- Dolophilodes sp.
- Rhyacophila fuscula
- Apatania sp.
- Pycnopsyche sp.
- Protoptila sp.
- Goera sp.
- Agapetus sp.
- Rhyacophila sp. 5
- Wormalia sp.

COLEOPTERA
- Optioservus ovalis
- Oulimnus latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
some trees, mostly shrub vegetation (i.e., silky dogwood); mostly open canopy; farms up[stream; good streambank vegetation; stream width - 6 ft., stream depth - <1 ft.; moderate flow; several fish

SUBSTRATE and GEOLOGY
rubble; Washington-Bartley Formation, loamy soils; first order stream; Washington USGS quadrangle

WATER QUALITY
clear water
Readings on 05-12-93
pH - 7.7 s.u.
dissolved oxygen - 8.8 ppm
conductivity - 200 umhos
water temperature - 15.0 øC

Ecoregion Site 10

Musconetcong River watershed

Musconetcong River unnamed tributary, Rt. 57, Penwell, Warren Co.

Date Taxa(family)/no. per sample	Aug'92	Nov'92	Feb'93	May'93
Gammaridae	10	4	5	
Corydalidae	2			
Hydropsychidae	21	16	5	4
Taeniopterygidae		1	1	
Chloroperlidae		1	6	
Glossosomatidae	3	1		1
Perlodidae				1
Lumbricidae	2	4	1	3
Lumbriculidae	26		2	29
Siphlonuridae			1	
Perlidae	7	6		1
Chironomidae	8	7	16	13
Capniidae		40		
Leuctridae	2			
Baetidae	3	1	19	26
Goeridae	3			
Psephenidae	2			
Simuliidae	3		1	
Tipulidae	4	1	1	
Rhyacophilidae			2	
Limnephilidae		7	1	
Ephemerellidae		5	19	17
Heptageniidae		3	16	2
Philopotamidae	2	1		1
Nemouridae				1
Peltoperlidae	1	2	1	
Elmidae	1		3	1
Dominant Family	Lumbriculidae	Capniidae	Baetidae	Lumbriculidae
Family Biotic Index	4.68	2.68	3.62	4.97
Scraper/Filterer Collector	.31	.47	.29	.20
Shredder/Total	.11	.55	.39	.47
E+P+T	7	11	9	9
%EPT	41	82	70	54
EPT/C	5.13	11.71	4.38	4.15
Impairment(rating)	none(30)	none(27)	none(30)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 11

Musconetcong River, Rt. 579, Bloomsbury, Warren Co.
Musconetcong River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-TM

Important Species

PLECOPTERA
- Paragentina media
- Acroneuria abnormis

EPHEMEROPTERA
- Ephemerella invaria
- Ephemerella aurivillii
- Ephemerella rotunda
- Baetis vagans
- Stenonema smithae
- Isonychia sp.
- Stenonema bipunctatum
- Stenonema nepotellum
- Eurylophella temporalis
- Epeorus sp.
- Stenonema ithaca
- Ephemerella dorothea
- Pseudocloeon carolina
- Drunella walkeri
- Stenacron pallidum

TRICHOPTERA
- Brachycentrus lateralis
- Chimarra aterrima

TRICHOPTERA (cont.)
- Symphitopsyche morosa
- Symphitopsyche sparna
- Symphitopsyche bifida
- Neophylax sp.
- Micrasema wataga
- Protoptila sp.
- Mystacides sp.
- Lepidostoma sp.
- Glossosoma sp.
- Pycnopsyche sp.
- Hydropsyche demora
- Leucotrichia pictipes
- Psychomyia nomada
- Brachycentrus numerosus
- Helicopsyche borealis
- Apatania sp.

COLEOPTERA
- Optioservus ovalis
- Microcylloepus pusillus pusillus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth trees along bank; open canopy; stream width - 75 ft., stream depth - 1 ft.
fast flow; farms upstream; periphyton; macrophytes; fish

SUBSTRATE and GEOLOGY
cobbles/gravel/coarse sand; Washington-Bartley Formation, loamy soils; first order stream; Bloomsbury USGS quadrangle

WATER QUALITY
clear water
Readings on 05-12-93
pH - 8.1 s.u.
dissolved oxygen - 8.6 ppm
conductivity - 260 umhos
water temperature - 13.0 øC

Ecoregion Site 11

Musconetcong River watershed

Musconetcong River, Rt. 579, Bloomsbury, Warren Co.

Date Taxa(family)/no. per sample	Aug'92	Nov'92	Feb'93	May'93
Psephenidae	1			1
Hydropsychidae	25	20	12	8
Baetidae	14			10
Heptageniidae	1	1	1	
Gastropoda		1	1	
Chironomidae	16	5	18	37
Ephemerellidae	17	41	44	26
Turbellaria	3	4	3	
Tipulidae	4	5	1	7
Lepidostomatidae		2		
Simuliidae		1	3	1
Siphlonuridae	4	2		
Glossosomatidae		1		1
Philopotamidae		8	4	
Corydalidae	2			
Gammaridae	3		4	1
Brachycentridae	4			1
Elmidae	4	8	6	3
Lumbriculidae	1	1	2	3
Perlidae	1		1	1
Dominant Family	Hydropsychidae	Ephemerellidae	Ephemerellidae	Chironomidae
Family Biotic Index	3.70	2.79	3.13	3.93
Scraper/Filterer Collector	.03	.03	0	.20
Shredder/Total	.36	.50	.50	.44
E+P+T	7	7	5	6
%EPT	66	75	62	47
EPT/C	4.13	15	3.44	1.27
Impairment(rating)	none(30)	none(27)	slight(24)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 12

Nishisakawick Creek, Airport Rd., Alexandria, Hunterdon Co.
Nishisakawick Creek watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Acroneuria abnormis
- Leuctra truncata
- Phasganophora capitata
- Brachyptera gracilis
- Allocapnia sp.
- Isoperla transmarina
- Amphinemura delosa

EPHEMEROPTERA
- Isonychia sp.
- Ephemerella dorothea
- Ephemerella invaria
- Baetis sp.
- Stenonema smithae

TRICHOPTERA
- Glossosoma sp.
- Neophylax sp.
- Symphitopsyche sparna
- Lepidostoma sp.
- Chimarra aterrima
- Goera sp.
- Goerita sp.

TRICHOPTERA (cont.)
- Psilotreta frontalis
- Helicopsyche borealis
- Diplectrona modestus
- Lype diversa
- Symphitopsyche morosa
- Apatania sp.
- Rhyacophila sp. 5
- Rhyacophila invaria

COLEOPTERA
- Optioservus ovalis
- Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest; closed canopy; good streambank vegetation; stream width - 6 ft., stream depth - <1 ft.; fast flow; fish; salamanders

SUBSTRATE and GEOLOGY
shale; Penn-Klinesville-Buck Association; well drained soils; first order stream; Pittstown USGS quadrangle

WATER QUALITY
clear water
Readings on 01-22-93
pH - 7.1 s.u.
dissolved oxygen - 12.0 ppm
conductivity - 98 umhos
water temperature - 6.5 øC

Ecoregion Site 12

Nishisakawick Creek watershed

Nishisakawick Creek, Airport Rd., Alexandria, Hunterdon Co.

Date Taxa(family)/no. per sample	Jul'92	Oct'92	Jan'93	Apr'93
Taeniopterygidae			10	
Hydropsychidae	23	31	8	4
Leuctridae	3			
Perlidae	12	4	12	6
Glossosomatidae	9	2	6	2
Polycentropodidae		1		
Empididae		1		1
Turbellaria				1
Odontoceridae		1		
Limnephilidae	14		15	4
Simuliidae			7	17
Lepidostomatidae	2			
Elmidae	10	9	9	10
Corydalidae	3			1
Perlodidae				1
Philopotamidae	7	18	1	2
Baetidae				1
Nemouridae				27
Naididae		4		1
Ceratopogonidae		4	4	1
Psephenidae	8	2	2	7
Capniidae			8	
Tipulidae	2	4	2	4
Gomphidae	3	1	3	
Chironomidae	2	2	11	5
Rhyacophilidae				1
Helicopsychidae		2		
Heptageniidae	2	10	1	
Ephemerellidae			1	4
Nemertea		4		
Dominant Family	Hydropsychidae	Hydropsychidae	Limnephilidae	Nemouridae
Family Biotic Index	2.84	3.81	3.25	3.43
Scraper/Filterer Collector	1.03	.14	2	.57
Shredder/Total	.06	.13	.16	.09
E+P+T	8	8	9	10
%EPT	72	69	62	52
EPT/C	36	34.50	5.64	10.40
Impairment(rating)	none(30)	none(30)	none(30)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 13

Nishisakawick Creek, one mile below Everittstown, Alexandria, Hunterdon Co.
Nishisakawick Creek watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Acroneuria abnormis
- Leuctra truncata
- Paragnetina media
- Hastaperla brevis
- Paragnetina immarginata
- Allocapnia sp.
- Isoperla transmarina
- Brachyptera gracilis
- Amphinemura delosa
- Nemoura trispinosa

EPHEMEROPTERA
- Isonychia sp.
- Stenonema interpunctatum
- Pseudocloeon carolina
- Heptagenia sp.
- Epeorus sp.
- Paraleptophlebia sp.
- Baetis vagans
- Centroptilum sp.
- Ephemerella invaria
- Stenonema smithae
- Stenonema nepotellum
- Parameletus sp.
- Baetis hageni
- Baetis propinquus

TRICHOPTERA
- Lepidostoma sp.
- Symphitopsyche sparna
- Symphitopsyche morosa
- Symphitopsyche slossonae
- Chimarra aterrima
- Psilotreta frontalis
- Glossosoma sp.
- Symphitopsyche bifida
- Helicopsyche borealis
- Goerita sp.
- Microsema wataga
- Diplectrona modestus
- Rhyacophila sp. 5

COLEOPTERA
- Optioservus ovalis

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest; mostly open canopy; good streambank vegetation; stream width - 25 ft., stream depth - <1 ft.; fast flow; suckers

SUBSTRATE and GEOLOGY
shale; Rowland-Birdsboro-Raritan Association; non stony soils on flood plains and terraces; Penn-Klinesville-Bucks Association; well drained soils; first order stream; Frenchtown USGS quadrangle

WATER QUALITY
clear water
Readings on 01-22-93
pH - 6.5 s.u.
dissolved oxygen - 11.8 ppm
conductivity - 275 umhos
water temperature - 6.5 øC

Ecoregion Site 13

Nishisakawick Creek watershed

Nishisakawick Creek, one mile below Everittstown, Hunterdon Co.

Date Taxa(family)/no. per sample	Jul'92	Oct'92	Jan'93	Apr'93
Hydropsychidae	42	40	3	3
Rhyacophilidae				1
Perlodidae				1
Nematoda				1
Simuliidae			44	34
Empididae				1
Ephemerellidae			4	10
Heptageniidae	2		4	13
Nemouridae				19
Philopotamidae	6	27		
Odontoceridae		1		
Psephenidae	4	10	1	3
Elmidae	13	2		
Caenidae	2	1		
Glossosomatidae	1			
Athericidae	1			
Lepidostomatidae	11			
Chironomidae	8	8	15	10
Capniidae			19	
Tipulidae	2	2	1	
Baetidae	2	7	2	2
Taeniopterygidae			4	
Siphlonuridae	3	1	1	1
Lumbriculidae	1		2	
Perlidae	2	1		1
Dominant Family	Hydropsychidae	Hydropsychidae	Simuliidae	Simuliidae
Family Biotic Index	3.82	3.86	4.51	4.18
Scraper/Filterer Collector	.10	0	.10	.08
Shredder/Total	.18	0	.31	.14
E+P+T	9	7	7	9
%EPT	71	78	37	51
EPT/C	8.88	9.75	2.47	5.10
Impairment(rating)	none(27)	none(27)	none(27)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 14

Nishisakawick Creek, Creek Rd., Frenchtown, Hunterdon Co.
Nishisakawick Creek watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Acroneuria abnormis
- Paragnetina media
- Hastaperla brevis
- Allocapnia sp.
- Brachyptera gracilis
- Nemoura trispinosa
- Acroneuria carolinensis
- Isoperla transmarina
- Amphinemura delosa

EPHEMEROPTERA
- Isonychia sp.
- Stenonema fuscum
- Stenonema smithae
- Epeorus sp.
- Heptagenia sp.
- Pseudocloeon carolina
- Baetis brunneicolor
- Ephemerella invaria
- Eurylophella temporalis
- Stenonema nepotellum
- Ephemerella rotunda
- Paraleptophlebia sp.
- Baetis vagans

TRICHOPTERA
- Lepidostoma sp.
- Chimarra aterrima
- Glossosoma sp.
- Symphitopsyche morosa
- Microsema wataga
- Mystacides sp.
- Leucotrichia pictipes
- Symphitopsyche sparna
- Psychomyia nomada
- Psilotreta frontalis
- Symphitopsyche slossonae
- Helicopsyche borealis
- Neophylax sp.

COLEOPTERA
- Optioservus ovalis

Habitat Characteristics
RIPARIAN and INSTREAM
old growth mixed forest; mostly open canopy; good streambank vegetation; stream
stream width - 25 ft., stream depth - <1 ft.; fast flow; fish

SUBSTRATE and GEOLOGY
shale; Rowland-Birdsboro-Raritan Association; non stony soils on flood plains
and terraces; first order stream; Frenchtown USGS quadrangle

WATER QUALITY
turbid after rain (7/27/92); clear water (10/6/92); slightly turbid after
rain (01-22-93)
Readings on 01-22-93
pH - 6.5 s.u.
dissolved oxygen - 11.6 ppm
conductivity - 230 umhos
water temperature - 6.5 øC

Ecoregion Site 14

Nishisakawick Creek watershed

Nishisakawick Creek, Creek Rd., Frenchtown, Hunterdon Co.

Date Taxa(family)/no. per sample	Jul'92	Oct'92	Jan'93	Apr'93
Taeniopterygidae			3	
Philopotamidae	11	18		
Hydropsychidae	17	26	7	8
Simuliidae			16	11
Empididae				4
Ephemerllidae			12	18
Lepidostomatidae	6			
Psephenidae	13	3	1	1
Leptophlebiidae				1
Helicopsychidae			1	1
Sialidae			1	
Nemertea	1	1		
Chironomidae	2	11	7	20
Capniidae			41	
Nemouridae			2	17
Siphlonuridae	12	11	1	2
Odontoceridae			1	1
Gomphidae			1	
Tipulidae	1	1		
Lumbriculidae	3			
Polycentropodidae	6	5		
Elmidae		3	1	
Turbellaria		1		
Caenidae	5			
Baetidae	7	7		1
Tricorythidae	2			
Pyralidae	1			
Perlidae	3		2	3
Heptageniidae	4	3	1	7
Limnephilidae				2
Hydroptilidae		10		
Gastropoda	1		1	
Leptoceridae	1			
Lumbricidae	1			2
Psychomyiidae				1
Brachycentridae	2			
Glossosomatidae	1		1	
Dominant Family	Hydropsychidae	Hydropsychidae	Capniidae	Chironomidae
Family Biotic Index	4.41	4.47	2.65	3.82
Scraper/Filterer Collector	.38	.24	.29	.27
Shredder/Total	.20	.09	.56	.28
E+P+T	13	7	11	12
%EPT	77	80	72	62
EPT/C	38.50	7.27	10.29	3.10
Impairment(rating)	none(30)	none(30)	none(27)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 15

Jacobs Creek, Woosamonsa Rd., Hopewell Twp., Mercer Co.
Jacobs Creek watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Phasganophora capitata
- Acroneuria xanthenes
- Allocapnia sp.
- Leuctra truncata
- Isoperla transmarina
- Brachyptera gracilis
- Nemoura trispinosa
- Amphinemura delosa
- Hastaperla brevis

EPHEMEROPTERA
- Eurylophella temporalis
- Ephemerella invaria
- Stenacron interpunctatum
- Paraleptophlebia sp.
- Centroptilum sp.
- Leptophlebia sp.
- Habrophlebia vibrans
- Pseudocloeon carolina
- Heptagenia sp.

TRICHOPTERA
- Chimarra aterrima
- Hydroptila sp.
- Mystacides sp.
- Symphitopsyche slossonae
- Symphitopsyche sparna
- Helicopsyche borealis
- Goerita sp.
- Glossosoma sp.
- Neophylax sp.
- Pycnopsyche sp.
- Lype diversa
- Rhyacophila invaria

COLEOPTERA
- Optioservus ovalis

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest, some spruce; half open canopy; good streambank vegetation; stream width - 6 ft., stream depth - <1 ft.; moderate flow; sunfish and darter

SUBSTRATE and GEOLOGY
cobbles/gravel; Neshaminy-Mount Lucas-Lehigh Association, stony soil over shale or siltstone; first order stream; Pennington USGS quadrangle

WATER QUALITY
clear water; slightly turbid after rain on 01/22/93
Readings on 01-22-93
pH - 6.9 s.u.
dissolved oxygen - 11.6 ppm
conductivity - 210 umhos
water temperature - 6.9 øC

Ecoregion Site 15

Jacobs Creek watershed

Jacobs Creek, Woosamonsa Rd., Hopewell Twp., Mercer Co.

Date Taxa(family)/no. per sample	Jul'92	Oct'92	Jan'93	Apr'93
Nemouridae				21
Simuliidae			78	59
Ephemerellidae		9	3	9
Elmidae	15	14	4	1
Capniidae			2	1
Empididae				1
Leptophlebiidae	6	1	2	
Taeniopterygidae			1	
Hydroptilidae	7	3		
Lumbricidae		1		
Psephenidae	11	1		
Caenidae		2	1	
Chironomidae	11	6	1	3
Perlodidae			1	1
Helicopsychidae		5	2	
Heptageniidae	3			
Leptoceridae	5			
Tipulidae	8	1		1
Tubificidae	2			
Lumbriculidae	2	2		
Polycentropodidae		1		
BloodRedChironomidae	4	1		
Hydropsychidae	15	23	2	1
Limnephilidae			1	1
Cambarinae	1			
Philopotamidae	2	18		
Talitridae	2			1
Baetidae	1	2		
Gastropoda	1			
Perlidae	2	2		
Turbellaria	1	8	1	
Leuctridae			1	
Dytiscidae	1			
Dominant Family	Hydropsychidae	Hydropsychidae	Simuliidae	Simuliidae
Family Biotic Index	4.43	3.79	5.32	4.61
Scraper/Filterer Collector	.95	.21	.05	.02
Shredder/Total	.10	.15	.08	.12
E+P+T	8	10	10	6
%EPT	41	66	16	34
EPT/C	2.73	9.43	16	11.33
Impairment(rating)	none(30)	none(30)	moderate(18)	none(27)
Deficiency(s) noted*	none	none	ODT	none

* ODT - Overwhelmingly Dominant Taxon

Ecoregion Site 16

Shipetaukin Creek, Van Kirk Rd., Lawrence Twp., Mercer Co.
Assunpink Creek watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Amphinenura delosa
 Paracapnia opis

EPHEMEROPTERA
 Eurylophella temporalis
 Centroptilum sp.
 Stenacron interpunctatum
 Paraleptophlebia sp.

TRICHOPTERA
 Ptilostomis sp.
 Chimarra aterrima
 Neophylax sp.

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest and old farmland; mostly open canopy (closed upstream); good streambank vegetation; stream width - 4 ft., stream depth - <1 ft.; slow to moderate flow (almost no flow in September); lots of filamentous green algae in Spring

SUBSTRATE and GEOLOGY
red shale bedrock/rubble/coarse sand/gravel (silt in March); Bucks-Penn-Readinton Association; first order stream; Princeton USGS quadrangle

WATER QUALITY
clear water
Readings on 12-09-91
pH - 7.1 s.u.
dissolved oxygen - 11.7 ppm
conductivity - 195 umhos
water temperature - 11.0 øC

Ecoregion Site 16

Assunpink Creek watershed

Shipetauken Creek, Van Kirk Rd., Lawrence Twp., Mercer Co.

Date Taxa(family)/no. per sample	May'91	Sep'91	Dec'91	Mar'92
Chironomidae	28	8	9	10
Hydropsychidae			2	
Hirudinea	4	2		
Psephenidae		2		
Culicidae		2		
Tubificidae	10	4	4	
Sialidae		2	1	
Naididae	31	17	1	
Bryozoa		3	2	
BloodRedChironomidae			2	1
Dytiscidae	1	1	1	1
Nemouridae	2			
Elmidae	4	4		
Sphaeriidae		3	16	2
Haliplidae	6			
Simuliidae	2		1	84
Hemiptera	5	11		
Caenidae		23	1	
Gastropoda	2	2	49	1
Asellidae	2		6	1
Baetidae	3	10		
Heptageniidae		2		
Ephemerellidae		1	3	
Hydrophilidae		1		
Coenagrionidae		1		
Psychomyiidae		1		
Phryganeidae			2	
Dominant Family	Chironomidae	Caenidae	Gastropoda	Simuliidae
Family Biotic Index	6.57	6.52	6.59	6.07
Scraper/Filterer Collector	.50	.22	0	0
Shredder/Total	.08	.31	.08	.04
E+P+T	3	5	5	0
%EPT	6	37	7	0
EPT/C	.18	4.63	.44	0
Impairment(rating)	moderate(18)	slight(24)	moderate(18	severe(6)
Deficiency(s) noted*	PCWO	PCWO SOP	PCWO SOP	PCWO ODT

* PCWO - Paucity of Clean Water Organisms
SOP - Significant Organic Pollution
ODT - Overwhelmingly Dominant Taxon

Ecoregion Site 17

Dwarskill, Ruckman Rd., Closter, Bergen Co.
Hackensack River watershed/Northeastern Coastal Zone Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Peltoperla sp.
 Hastaperla brevis
 Paracapnia opis
 Phasganophora capitata

EPHEMEROPTERA
 Paraleptophlebia sp.
 Ephemerella dorothea
 Centroptilum sp.

TRICHOPTERA
 Glossosoma sp.
 Dolophilodes sp.
 Rhyacophila fuscula
 Rhyacophila sp. 5
 Diplectrona modestus
 Theliopsyche sp.
 Psilotreta frontalis
 Neophylax sp.
 Lepidostoma sp.

COLEOPTERA
 Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth mixed forest, area protected by Oradell Water Co. and Palisades Interstate Pk.; closed canopy; good streambank vegetation; stream width - 5 feet, stream depth - <1 feet

SUBSTRATE and GEOLOGY
boulders/cobbles/rubble/gravel/sand

WATER QUALITY
clear
Readings on 04-05-94
pH - 6.8 s.u.
dissolved oxygen - 16.9 ppm
conductivity - 140 umhos
water temperature - 7.5 øC

Ecoregion Site 17

Hackensack River watershed

Dwarskill, Ruckman Rd., Closter, Bergen Co.

Date Taxa(family)/no. per sample	Jul'93	Oct'93
Chironomidae	49	2
Ephemerellidae	3	
Tipulidae	3	3
Gastropoda		1
Baetidae	4	
Empididae	3	
Hydropsychidae	6	10
Elmidae	4	7
Leptophlebiidae	2	1
Perlidae		1
Corydalidae		2
Ceratopogonidae	2	3
Glossosomatidae	1	
Naididae	4	7
Lepidostomatidae	4	46
Philopotamidae	3	1
Nemertea	1	
BloodRedChironomidae	2	
Hemiptera	1	1
Lumbriculidae		4
Rhyacophilidae	2	
Chloroperlidae	2	2
Odontoceridae		2
Capniidae		2
Dytiscidae	2	
Peltoperlidae	1	
Psephenidae	1	5
Dominant Family	Chironomidae	Lepidostomatidae
Family Biotic Index	4.81	2.79
Scraper/Filterer Collector	.78	.58
Shredder/Total	.10	.51
E+P+T	9	8
%EPT	27	65
EPT/C	.53	32.50
Impairment(rating)	none(27)	none(27)
Deficiency(s) noted	none	none

Ecoregion Site 18

Primrose Brook, Jockey Hollow National Park, Morris Co.
Passaic River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-TM

Important Species

PLECOPTERA
- Leuctra truncata
- Peltoperla sp.
- Allocapnia sp.
- Hastaperla brevis
- Paracapnia opis
- Acroneuria abnormis
- Pteronarcys sp.
- Nemora truncata
- Isoperla transmarina
- Isoperla marlynia
- Amphinemura delosa

EPHEMEROPTERA
- Paraleptophlebia sp.
- Eurylophella temporalis
- Baetis vagans
- Stenonema luteum
- Stenacron interpunctatum
- Ephemerella invaria
- Pseudocloeon carolina
- Stenonema smithae
- Stenonema pudicum
- Heptagenia sp.
- Cinygmula sp.
- Ephemerella dorothea

EPHEMEROPTERA (cont.)
- Epeorus sp.
- Danella simplex
- Parameletus sp.

TRICHOPTERA
- Diplectrona modestus
- Dolophilodes sp.
- Goera sp.
- Pycnopsyche sp
- Rhyacophila sp. 5
- Symphitopsyche sparna
- Rhyacophila fuscula
- Neophylax sp.
- Molanna sp.
- Micrasema rusticum
- Goerita sp.
- Agapetus sp.
- Theliopsyche sp.
- Lepidostoma sp.

COLEOPTERA
- Oulimnus latiusculus
- Optioservus ovalis

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest in highlands, many trees over 100 years old; closed canopy; good streambank vegetation; stream width - 5 ft., stream depth - <1 ft.; moderate flow; darter

SUBSTRATE and GEOLOGY
cobbles/sand/gravel; Edneyville-Parker_mechesville Association, gravelly and soils; first order stream; Mendham USGS quadrangle

WATER QUALITY
clear
Readings on 05-19-92
pH - 7.6 s.u.
dissolved oxygen - 10.5 ppm
conductivity - 91 umhos
water temperature - 14.5 øC

Ecoregion Site 18

Passaic River watershed

Primrose Brook, Jockey Hollow National Park, Morris Co.

Date Taxa(family)/no. per sample	Aug'91	Nov'91	Feb'92	May'92
Heptageniidae				10
Peltoperlidae	4		2	16
Hydropsychidae	21	2	2	1
Ephemerellidae	2	4	25	12
Leuctridae	20			7
Chironomidae	21	48	31	6
Capniidae		15	4	
Philopotamidae	3	2		8
Nemouridae				7
Leuctridae		1		
Sphaeriidae	2			
Rhyacophilidae	2		1	1
Gomphidae	1	1	1	
Perlidae		1	1	
Pteronarcyidae			1	
Elmidae	4	8		8
Naididae		6	1	7
Molannidae			1	
Lepidostomatidae			4	6
Psephenidae	1			
Bryozoa	3			
Cordulegastridae	1			
Cambarinae	1			
Tipulidae	3	6	6	4
Perlodidae				5
Empididae				1
Siphlonuridae			1	
Leptophlebiidae		1	1	
Nemertea	3			
Tubificidae	2		1	
Dixidae	1		1	
Gastropoda			1	
Simuliidae	1		7	
Turbellaria	2	1		
Coenagrionidae	1			
Limnephilidae	1	3	7	1
Nematoda		1	1	
Dominant Family	Chironomidae	Chironomidae	Chironomidae	Peltoperlidae
Family Biotic Index	3.66	4.39	3.67	2.65
Scraper/Filterer Collector	.03	2.33	1.73	.44
Shredder/Total	.34	.27	.40	.43
E+P+T	6	8	11	10
%EPT	49	29	48	58
EPT/C	2.33	.60	1.55	9.67
Impairment(rating)	none(30)	none(27)	none(30)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 19

Passaic River, Valley Rd., near Millington, Somerset-Morris Co.
Passaic River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Perlesta placida
- Phasganophora capitata

EPHEMEROPTERA
- Stenonema nepotellum
- Eurylophella temporalis
- Ephemerella dorothea
- Ephemerella rotunda
- Attenuatella attenuata
- Stenacron interpunctatum

TRICHOPTERA
- Hydroptila sp.
- Macronemum carolina
- Micrasema wataga
- Chimarra obscura
- Pycnopsyche sp.
- Psychomyia nomada
- Protoptila sp.

TRICHOPTERA (cont.)
- Neophylax sp.
- Symphitopsyche bifida
- Symphitopsyche sparna
- Lepidostoma sp.
- Apatania sp.
- Mystacides sp.
- Symphitopsyche morosa

COLEOPTERA
- Psephenus herricki
- Promoresia tardella
- Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
deciduous forest along streambanks and scattered in residential area; open canopy; good streambank vegetation; stream width - 50 ft., stream depth - 1 ft; moderate flow; macrophytes, eel grass, milfoil; darter

SUBSTRATE and GEOLOGY
sand/rocks; Parsippany-Lansdowne-Watchung Association, loamy soils; third order stream; Bernardsville USGS quadrangle

WATER QUALITY
clear water, turbid after rain on 05-19-92
Readings on 05-19-92
pH - 7.7 s.u.
dissolved oxygen - 8.4 ppm
conductivity - 230 umhos
water temperature - 17.0 øC

Ecoregion Site 19

Passaic River watershed

Passaic River, Valley Rd., near Millington, Somerset-Morris Co.

Date Taxa(family)/no. per sample	Feb'92	May'92	Dec'92	Aug'93
Chironomidae	21	15	29	8
Limnephilidae		1		
Simuliidae	10			
Gammaridae	15	19	16	8
Naididae		12		1
Coenagrionidae	2	1	1	
Ephemerellidae		1		
Elmidae	13	19	24	16
Philopotamidae		1		5
Hemiptera				1
Empididae		2	1	1
Lepidostomatidae	5		2	1
Hydropsychidae	11	7	9	38
Glossosomatidae		3		
Taeniopterygidae	6		4	
Psephenidae	4	2		2
Gastropoda	2	5	5	2
Baetidae		4		5
Turbellaria	2	1		1
Tricorythide				1
Tubificidae		1		
Heptageniidae		1	4	
Perlidae	1	3		
Caenidae		1	1	
Sialidae	1		1	
Leptoceridae	2		1	
Asellidae	1			
Tipulidae	1			
Hydroptilidae	1			6
Sphaeriidae	1	1	2	4
Empididae	1			
Dominant Family	Chironomidae	Elmidae	Chironomidae	Hydropsychidae
Family Biotic Index	4.57	4.78	4.77	4.39
Scraper/Filterer Collector	.29	.67	.11	.20
Shredder/Total	.07	.11	.04	.07
E+P+T	6	9	6	6
%EPT	26	22	21	56
EPT/C	1.24	1.47	.72	7
Impairment(rating)	none(30)	none(30)	none(30)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 20

Dead River tributary, Somerville Rd., Bernards Twp., Somerset Co.
Passaic River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Paracapnia opis
- Allocapnia sp.
- Nemoura truncata
- Leuctra truncata
- Isoperla transmarina
- Amphinemura delosa

EPHEMEROPTERA
- Paraleptophlebia sp.
- Stenonema luteum
- Stenacron interpunctatum
- Cloeon sp.
- Centroptilum sp.
- Eurylophella temporalis
- Ephemerella invaria
- Leptophlebia sp.
- Ephemerella rotunda
- Ephemerella dorothea
- Stenonema smithae

TRICHOPTERA
- Helicopsyche borealis
- Psilotreta frontalis
- Neophylax sp.
- Mystacides sp.
- Chimarra aterrima
- Limnephilus sp.
- Pycnopsyche sp.

COLEOPTERA
- Optioservus ovalis
- Anchytarsus bicolor

Habitat Characteristics
RIPARIAN and INSTREAM
deciduous forest in highlands area(was cleared farmland some 50 years ago); mostly open canopy; good streambank vegetation; stream width - 5 ft., stream depth - <1 ft.; slow flow; Elodea canadensis; fish; crayfish; salamanders; leaf litter choked flow (1-14-91)

SUBSTRATE and GEOLOGY
gravel/some cobbles; Parsippany-Lansdowne-Watchung Association, loamy soils, upstream area is Neshaminy-Mount Lucas-Amwell Association, loamy gravelly soils; first order stream; Bernardsville USGS quadrangle

WATER QUALITY
clear
Readings on 05-19-92
pH - 7.8 s.u.
dissolved Oxygen - 10.7 ppm
conductivity - 235 umhos
water temperature - 13.0 øC

Ecoregion Site 20

Passaic River watershed

Dead River tributary, Somerville Rd., Bernards Twp., Somerset Co.

Date Taxa(family)/no. per sample	Aug'91	Nov'91	Feb'92	May'92
Perlodidae				1
Coenagrionidae	4			
Sphaeriidae	1	1	3	1
Odontoceridae			10	
BloodRedChironomidae		2		
Aeshnidae		1		
Anthomyiidae		1		
Leptophlebiidae		1	1	2
Philopotamidae		2		
Hemiptera	2			
Odontoceridae	34	23		7
Tubificidae	1	10	17	32
Psephenidae	10	21	2	
Chironomidae	21	9	24	32
Helicopsychidae	2		1	
Hydrozoa	1			1
Limnephilidae	5	2	5	1
Naididae				3
Simuliidae			19	1
Heptageniidae	7	1	1	1
Elmidae	2	12	4	3
Athericidae		1		
Ephemerellidae		3	2	4
Turbellaria		1		
Hydropsychidae	2	3		
Baetidae	4			1
Nematoda	1			
Tipulidae	1	2		
Capniidae		1	8	
Tabanidae		3		1
Psephenidae				5
Gomphidae	1			
Sialidae	1		1	
Nemouridae			2	3
Ceratopogonidae				1
Dominant Family	Odontoceridae	Odontoceridae	Chironomidae	Chironomidae
Family Biotic Index	3.43	3.85	5.23	6.26
Scraper/Filterer Collector	4.08	5.50	.59	1
Shredder/Total	.11	.09	.18	.11
E+P+T	6	8	8	8
%EPT	54	36	30	20
EPT/C	2.57	3.27	1.25	.63
Impairment(rating)	none(30)	none(30)	none(27)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 21

Dead River, Somerville Rd., Bernards Twp., Somerset Co.
Passaic River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Peltoperla sp.
- Leuctra truncata
- Acroneuria abnormis
- Taeniopteryx parvula
- Paracapnia opis
- Allocapnia sp.
- Taenipteryx nivalis
- Nemoura truncata
- Phasganophora capitata
- Perlesta placida
- Amphinemura delosa

EPHEMEROPTERA
- Stenacron interpunctatum
- Stenonema smithae
- Centroptilum sp.
- Paraleptophlebia sp.
- Ephemerella invaria
- Eurylophella temporalis
- Ephemerella rotunda
- Leptophlebia sp.
- Ephemerella dorothea

TRICHOPTERA
- Helicopsyche borealis
- Psilotreta frontalis
- Hydroptila sp.
- Pycnopsyche sp.
- Rhyacophila sp. 5
- Chimarra aterrima
- Chimarra obscura
- Goerita sp.
- Protoptila sp.
- Psychomyia nomada
- Neophylax sp.

COLEOPTERA
- Oulimnius latiusculus
- Optioservus ovalis
- Microcylloepus pusillus pusillus

Characteristics

RIPARIAN and INSTREAM
deciduous forest in highlands area, farms; open canopy; good streambank vegetation; stream width - 12 ft., stream depth - <1 ft.; moderate flow; periphyton; darter; crayfish

SUBSTRATE and GEOLOGY
cobbles/coarse sand/silt; Parsippany-Lansdowne-Watchung Association, loamy soils; second order stream; Bernardsville USGS quadrangle

WATER QUALITY
slightly turbid (08-20-91), clear (11-14-91, 02-04-92, 05-19-92)
Readings on 05-19-92
pH - 7.9 s.u.
dissolved oxygen - 10.8 ppm
conductivity - 415 umhos
water temperature - 14.5 øC

Ecoregion Site 21

Passaic River watershed

Dead River, Somerville Rd., Bernards Twp., Somerset Co.

Date Taxa(family)/no. per sample	Aug'91	Nov'91	Feb'92	May'92
Capniidae		2	5	
Gomphidae			1	
Psephenidae	4	3		
Helicopsychidae	11			3
Hydroptilidae	9		1	
Gastropoda			1	
Limnephilidae			1	
Hydropsychidae	30	20	1	1
Taeniopterygidae			1	
Porifera			1	
Naididae		2		6
Elmidae	10	3	3	5
Caenidae				1
Perlidae				1
Turbellaria	7	8	2	
Odontoceridae	4			
Philopotamidae	6	11		
Heptageniidae	3	2		
Nematoda		2		1
Glossosomatidae		1		
BloodRedChironomidae		1		2
Hydrozoa				1
Corydalidae				1
Tubificidae		1		10
Chironomidae	11	19	21	66
Nemouridae			1	
Gammaridae	4	4		1
Ephemerellidae		21	14	1
Simuliidae			46	
Odontoceridae			1	
Tipulidae	1			

Dominant Family	Hydropsychidae	Ephemerellidae	Simuliidae	Chironomidae
Family Biotic Index	3.88	3.74	4.72	5.95
Scraper/Filterer Collector	.65	.12	.06	2
Shredder/Total	.03	.28	.23	.08
E+P+T	6	6	8	5
%EPT	63	57	25	9
EPT/C	5.73	2.85	1.19	.13
Impairment(rating)	none(30)	none(30)	none(27)	moderate(15)
Deficiency(s) noted*	none	none	none	ODT

* ODT - Overwhelmingly Dominant Taxon

Ecoregion Site 22

Burnetts Brook, Old Mill Rd., Mendham Twp., Morris Co.
Raritan River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-TP C1

Important Species

PLECOPTERA
- Acroneuria abnormis
- Amphinemura delosa
- Leuctra truncata
- Perlesta placida
- Pteronarcys sp.
- Paragnetina media
- Peltoperla sp.
- Isoperla transmarina
- Allocapnia sp.
- Hastaperla brevis
- Brachyptera gracilis
- Nemoura trispinosa

EPHEMEROPTERA
- Baetis flavistriga
- Danella lita
- Drunella cornutella
- Ephemerella dorothea
- Ephemerella invaria
- Paraleptophleblia sp.
- Baetis vagans
- Epeorus sp.
- Drunella lata
- Eurylophella temporalis
- Isonychia sp.
- Baetis brunneicolor
- Ephemerella rotunda
- Pseudocloeon carolina

TRICHOPTERA
- Dolophilodes sp.
- Goerita sp.
- Hydroptila sp.
- Neophylax sp.
- Protoptila sp.
- Pycnopsyche sp.
- Rhyacophila fuscula
- Symphitopsyche morosa
- Symphitopsyche sparna
- Glossosoma sp.
- Goera sp.
- Lype diversa
- Rhyacophila sp. 5
- Rhyacophila manistee
- Diplectrona modestus
- Dolophilodes sp.
- Apatania sp.
- Chimarra aterrima
- Rhyacophila fenestra

COLEOPTERA
- Oulimnius latiusculus
- Optioservus ovalis

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest; closed canopy; good streambank vegetation; stream width - 20 ft., stream depth - <1 ft.; moderate flow; mosses

SUBSTRATE and GEOLOGY
cobbles/gravel/sand; first order stream; Chester USGS quadrangle

WATER QUALITY
clear, cold water

Readings on 06-19-90	Readings on 12-07-92
pH - 7.2 s.u.	pH - 7.8 s.u.
dissolved oxygen - 9.9 ppm	dissolved oxygen - 15.2 ppm
conductivity - 146 umhos	conductivity - 140 umhos
water temperature - 16.7 øC	water temperature - 3.0 øC

Ecoregion Site 22

Raritan River watershed

Burnetts Brook, Old Mill Rd., Mendham Twp., Morris Co.

Date Taxa(family)/no. per sample	Jun'90	Sep'92	Dec'92	Mar'93
Psephenidae	16	11	1	1
BloodRedChironomidae		2		
Gammaridae		4		
Chironomidae	25	23	4	5
Elmidae	6	1	1	
Rhyacophilidae	2		2	
Peltoperlidae			2	
Perlodidae			1	
Simuliidae	7			81
Philopotamidae	2			1
Limnephilidae	1	2	18	1
Heptageniidae		8	7	2
Glossosomatidae	13	26	1	
Philopotamidae			1	
Tipulidae		2	3	1
Caeniidae			11	
Ephemerellidae	15	2	2	3
Siphlonuridae			2	1
Sphaeriidae			1	
Empididae			1	
Corydalidae	1			
Nemouridae	1			
Lumbriculidae	1	3	7	
Gomphidae			2	
Simuliidae			1	
Pyralidae			1	
Pteronarcyidae		1	1	
Ceratopogonidae		1	1	
Goeridae		1		
Gastropoda		1		
Perlidae		1		
Leuctridae	2	1	2	
Naididae	1			
Hydropsychidae	3	4	4	
Taeniopterygidae			21	
Baetidae	2	6	2	4
Isotomidae	1			
Hydroptilidae	1			
Dominant Family	Chironomidae	Glossosomatidae	Taeniopterygidae	Simuliidae
Family Biotic Index	3.56	3.44	3.30	5.64
Scraper/Filterer Collector	1.83	3.50	2	1
Shredder/Total	.42	.18	.27	.03
E+P+T	10	10	14	6
%EPT	42	52	75	12
EPT/C	1.68	2.08	18.75	2.40
Impairment(rating)	none(30)	none(30)	none(30)	moderate(15)
Deficiency(s) noted*	none	none	none	ODT

* ODT - Overwhelmingly Dominant Taxon

Ecoregion Site 23

North Branch Raritan River, Rt. 202, Far Hills, Somerset Co.
Raritan River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-TM

Important Species

PLECOPTERA
- Perlesta placida
- Acroneuria abnormis
- Acroneuria lycorias
- Paragnetina media
- Acroneuria xanthenes
- Amphinemura delosa

EPHEMEROPTERA
- Ephemerella invaria
- Ephemerella dorothea
- Ephemerella rotunda
- Pseudocloeon carolina
- Isonychia sp.
- Stenonema nepotellum
- Stenonema smithae
- Ephemerella aurivillii
- Heptagenia sp.
- Epeorus sp.
- Drunella lata
- Eurylophella temporalis
- Baetis sp.

TRICHOPTERA
- Neophylax sp.
- Symphitopsyche sparna

TRICHOPTERA (cont.)
- Symphitopsyche bifida
- Symphitopsyche morosa
- Protoptila sp.
- Lype diversa
- Micrasema wataga
- Hydropsyche venularis
- Macronemum carolina
- Lepidostoma sp.
- Helicopsyche borealis
- Dolophilodes sp.
- Hydroptila sp.
- Glossosoma sp.
- Rhyacophila sp. 5
- Leucotrichia pictipes
- Psychomyia nomada
- Mystacides sp.
- Micrasema rusticum
- Rhyacophila fuscula
- Apatina sp.
- Hydropsyche demora
- Chimarra aterrima

COLEOPTERA
- Optioservus ovalis

Habitat Characteristics

RIPARIAN and INSTREAM

deciduous woods with over grown farm land; open canopy; good streambank vegetation; park and town of Far Hills just upstream; stream width - 50 ft., stream depth - <1 ft moderate flow; velocity - 6 ft/sec

SUBSTRATE and GEOLOGY

cobbles/sand/gravel; Rowland-Birdsboro-Raritan Association, loamy soils; fourth order stream; Gladstone USGS quadrangle

WATER QUALITY

clear water
Readings on 12-07-92
pH - 7.7 s.u.
dissolved oxygen - 14.7 ppm
conductivity - 154 umhos
water temperature - 4.0 øC

Ecoregion Site 23

Raritan River watershed

North Branch Raritan River, Rt. 202, Far Hills, Somerset Co.

Date Taxa(family)/no. per sample	Jun'90	Sep'92	Dec'92	Apr'93
Gammaridae	1		3	
Tricorythidae		2		
Baetidae	6	31		1
Brachycentridae		4	3	2
Heptageniidae		5	2	4
Hydropsychidae	19	13	7	5
Glossosomatidae	5	19	1	1
Gomphidae				1
Elmidae	4	5	13	18
Rhyacophilidae			1	
Hirudinea			1	
Turbellaria			4	
Ephemerellidae	23	1	22	51
Empididae				1
Perlidae	5			
Leptoceridae			2	
Helicopsychidae		12	12	
Sphaeriidae			3	
Tipulidae	2	1		
Chironomidae	20	10	1	7
Lepidostomatidae		1	1	3
Nemouridae				1
Limnephilidae	7	1	15	1
Nematoda		1		
Turbellaria		1		1
Caenidae		1		
Simuliidae	5	2		
Psychomyiidae	2			
Psephenidae	2	1	9	1
Siphlonuridae				1
Lumbricidae				1
Lumbriculidae		1		
Dominant Family	Ephemerellidae	Baetidae	Ephemerellidae	Ephemerellidae
Family Biotic Index	3.41	3.38	3.22	2.48
Scraper/Filterer Collector	.52	.91	3.36	.50
Shredder/Total	.31	.41	.24	.63
E+P+T	7	10	10	10
%EPT	66.34	78	66	70
EPT/C	3.35	7.80	66	10
Impairment(rating)	none(30)	none(30)	none(30)	none(27)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 24

Millstone River, Baird Rd., Millstone Twp., Monmouth Co.
Millstone River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Taenipteryx burksi

EPHEMEROPTERA
 Stenonema smithae
 Ephemerella sp.
 Pseudocloeon sp.

TRICHOPTERA
 Cheumatopsyche sp.
 Diplectrona modestus
 Chimarra aterrima
 Ptilostomis sp.

COLEOPTERA
 Psephenus herricki
 Stenelmis sp.

Habitat Characteristics
RIPARIAN and INSTREAM
deciduous forest and bush-filled wetlands; open canopy; good streambank vegetation;
stream width - 12 ft, stream depth - <1 ft; moderate flow; velocity - 6 ft/sec
eel grass; some filamentous green algae; salamanders; some iron precipitate

SUBSTRATE and GEOLOGY
brown sand/some cobbles by bridge; Manahawkin Association, mucky and sandy soils;
second order stream; Roosevelt USGS quadrangle

WATER QUALITY
slightly turbid

Readings on 07-25-90	Readings on 01-21-93
pH - 6.6 s.u.	pH - 6.2 s.u.
dissolved oxygen - 8.8 ppm	dissolved oxygen - 12.5 ppm
conductivity - 88 umhos	conductivity - 79 umhos
water temperature - 22.0 øC	water temperature - 4.0 øC

Ecoregion Site 24

Millstone River watershed

Millstone River, Baird Rd., Millstone Twp., Monmouth Co.

Date Taxa(family)/no. per sample	Jul'90	Oct'92	Jan'93	Apr'93
Nemertea	1	21		1
Bryozoa	1			1
Simuliidae	1	29	90	39
Heptageniidae	13	5		
Baetidae	1			
Hemiptera		2		
Hydropsychidae	33	15	1	5
Coenagrionidae		2		
Chironomidae	30	6	8	36
Lumbriculidae				2
BloodRedChironomidae	5			
Ephemerellidae			1	1
Psephenidae		1		
Aeshnidae		2		
Gastropoda		3		1
Elmidae	1	1		
Tubificidae		1		1
Lumbricidae				1
Naididae	1			
Tipulidae	4	2		6
Cambarinae		1		
Nematoda		1		5
Empididae	2	2		
Asellidae	6	1		1
Entomobryinae	1	1		
Philopotamidae		2		
Gomphidae		1		
Turbellaria		1		
Phryganeidae		1		
Dominant Family	Hydropsychidae	Simuliidae	Simuliidae	Simuliidae
Family Biotic Index	5.19	5.27	5.93	5.82
Scraper/Filterer Collector	0	.02	0	.02
Shredder/Total	.25	.07	.01	.08
E+P+T	3	4	2	2
%EPT	47	23	2	6
EPT/C	1.34	3.83	.25	.17
Impairment(rating)	slight(24)	slight(24)	severe(3)	moderate(18)
Deficiency(s) noted*	none	none	LD ODT PCWO	PCWO

* LD - Low Diversity
ODT - Overwhelmingly Dominant Taxon
PCWO - Paucity of Clean Water Organisms

Ecoregion Site 25

Bacon Run, Georgetown-Bordentown Rd., Georgetown, Burlington Co.
Black Creek watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Brachyptera gracilis

TRICHOPTERA
 Limnephilus sp.
 Caborius sp.
 Pycnopsyche sp.
 Banksiola sp.
 Oligostoma sp.

Habitat Characteristics
RIPARIAN and INSTREAM
immediate area is marshy with associate vegetation, the upstream and downstream areas are old growth deciduous forest of oak and maple, the adjacent area was farmed until very recently, when homes were built; partly open canopy; stream width - 4 feet, stream depth - <1 foot; slow flow; macrophytes; Callitriche, Nuphar; fish, eastern mud minnows; heavy detritus; site was flooded on visit of 5/15/91, possibly due to beaver activity.

SUBSTRATE and GEOLOGY
mud/(brown sand upstream); Freehold-Holmdel-Adelphia Association, fine sandy loam to sandy clay loam; first order stream; Columbus USGS quadrangle

WATER QUALITY
clear water (even following rain)

Ecoregion Site 25

Black Creek watershed

Bacon Run, Georgetown-Bordentown Rd., Georgetown, Burlington Co.

Date Taxa(family)/no. per sample	Oct'90	Feb'91
Gammaridae	61	16
Sphaeriidae	21	43
Gastropoda	2	
Phryganeidae	3	
Hemiptera	2	1
Chironomidae	3	12
Nemertea	1	1
Taeniopterygidae		1
Chrysomelidae		1
Psychodidae		1
Limnephilidae	2	1
Naididae		2
Simuliidae		2
Elmidae	1	
Asellidae	2	2
BloodRedChironomidae		1
Tabanidae		1
Tubificidae	2	15
Dominant Family	Gammaridae	Sphaeriidae
Family Biotic Index	5.25	7.20
Scraper/Filterer Collector	.05	.04
Shredder/Total	.02	.08
E+P+T	2	2
%EPT	5	2
EPT/C	1.67	.15
Impairment(rating)	moderate(12)	moderate(9)
Deficiency(s) noted*	ODT PCWO	PCWO SOP

* ODT - Overwhelmingly Dominant Taxon
PCWO - Paucity of Clean Water Organisms
SOP - Significant Organic Pollution

Ecoregion Site 26

Masons Creek, Ark Rd., Lumberton, Burlington Co.
Rancocas Creek watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
TRICHOPTERA
 Limnephilus sp.
 Ptilostomis sp.

COLEOPTERA
 Psephenus herricki

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest, undergrowth not dense; partly open canopy; farms surround; good streambank vegetation; stream width - 1.5 to 4 ft., stream depth - <1 ft.; slow to moderate flow; macrophytes; detritus

SUBSTRATE and GEOLOGY
brown sand; Freehold-Holmdel-Adelphia Association, fine sandy loam to sandy clay loam; first order stream; Mount Holly USGS quadrangle

WATER QUALITY
clear water
Readings on 12-10-91
pH - 4.9 s.u.
dissolved oxygen - 10.2 ppm
conductivity - 61 umhos
water temperature - 9.0 øC

Ecoregion Site 26

Rancocas Creek watershed

Masons Creek, Ark Rd., Lumberton, Burlington Co.

Date Taxa(family)/no. per sample	Apr'91	Jun'91	Sep'91	Dec'91
Chironomidae	38	14	27	13
Tubificidae		3	3	5
Phryganeidae		1		
Asellidae	29	47	8	7
Psychodidae				1
BloodRedChironomidae		3	5	2
Tipulidae			1	
Anthomyiidae			1	
Simuliidae	18			
Sphaeriidae	8	28	30	59
Sialidae	1	3		2
Psephenidae				1
Lumbriculidae	2			
Pyralidae	1			
Phoridae	1		25	10
Dytiscidae	1	1		
Polycentropodidae	1			
Dominant Family	Chironomidae	Asellidae	Sphaeriidae	Sphaeriidae
Family Biotic Index	6.74	7.58	7.20	7.64
Scraper/Filterer Collector	0	0	0	.02
Shredder/Total	.18	.11	.19	.04
E+P+T	1	1	0	0
%EPT	1	1	0	0
EPT/C	.03	.06	0	0
Impairment(rating)	moderate(12)	severe(6)	moderate(9)	severe(6)
Deficiency(s) noted*	PCWO	PCWO SOP	PCWO SOP	PCWO SOP

* PCWO - Paucity of Clean Water Organisms
SOP - Significant Organic Pollution

Ecoregion Site 27

McDonalds Branch, USGS Gage, Woodmansie Rd., Lebanon S.F., Burlington Co.
Rancocas Creek watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
PL

Important Species
PLECOPTERA
 Leuctra tenuis

EPHEMEROPTERA
 Leptophlebia sp.
 Paraleptophlebia sp.

TRICHOPTERA
 Oxyethira sp.
 Lepidostoma sp.
 Diplectrona modestus
 Hydropsyche decalda
 Limnephilus sp.
 Chimarra aterrima
 Agrypnia sp.

Habitat Characteristics
RIPARIAN and INSTREAM
white cedar swamp; partly open canopy; good streambank vegetation; stream width - 4 ft. (upstream of gage), stream depth - 2 ft; slow flow (upstream of gage); see USGS water year book for additional information

SUBSTRATE and GEOLOGY
white sand/(some gravel near gage); Atsion-Muck-Alluvial sandy association, sandy and loamy sand and poorly drained muck subject to flooding; first order stream; Browns Mills USGS quadrangle

WATER QUALITY
clear, cedar water
Readings on 12-10-91
pH - 4.4 s.u.
dissolved oxygen - 5.8 ppm
conductivity - 33 umhos
water temperature - 8.0 øC

Ecoregion Site 27

Rancocas Creek watershed

McDonalds Branch, USGS Gage, Woodmansie Rd., Lebanon S.F., Burlington Co.

Date Taxa(family)/no. per sample	Apr'91	Jun'91	Sep'91	Dec'91
Phryganeidae				2
Tipulidae				1
Naididae		3	5	4
Corduliidae				1
Hemiptera				2
Tabanidae				1
Philopotamidae				1
BloodRedChironomidae		1	4	
Lumbricidae			1	
Chironomidae	28	26	34	44
Hydropsychidae			3	
Hydroptilidae	10			
Tubificidae	4	18	6	4
Corydalidae	3			
Simuliidae	8			2
Leptophlebiidae	2			1
Coenagrionidae	3			
Leuctridae	1			
Polycentropodidae	1			2
Limnephilidae				3
Ceratopogonidae				1
Lepidostomatidae	1			
Dominant Family	Chironomidae	Chironomidae	Chironomidae	Chironomidae
Family Biotic Index	5.48	7.60	6.66	6.04
Scraper/Filterer Collector	1.25	0	0	0
Shredder/Total	.11	.13	.42	.26
E+P+T	5	0	1	5
%EPT	24.59	0	5.66	13.04
EPT/C	.54	0	.08	.20
Impairment(rating)	moderate(18)	severe(3)	moderate(9)	moderate(15)
Deficiency(s) noted*	none	LD PCWO SOP	ODT PCWO	ODT

* LD - Low Diversity
ODT - Overwhelmingly Dominant Taxon
PCWO - Paucity of Clean Water Organisms
SOP - Significant Organic Pollution

Ecoregion Site 28

North Branch Rancocas Creek, Main (Hanover) St., Pemberton, Burlington Co.
Rancocas Creek watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Perlesta placida
- Leuctra truncata
- Allocapnia sp.
- Acroneuria lycorias
- Taeniopteryx nivalis

COLEOPTERA
- Stenelmis humerosa
- Stenelmis mirabilis
- Oulimnius sp.
- Promoresia tardella

EPHEMEROPTERA
- Stenonema smithae
- Baetis propinquus
- Eurylophella temporalis
- Paraleptophlebia sp.
- Leptophlebia sp.

TRICHOPTERA
- Hydroptila sp.
- Chimarra aterrima
- Chimarra socia
- Macronemum carolina
- Symphitopsyche sparna
- Brachycentrus numerosus
- Athripsodes sp.
- Oxyethira sp.
- Hydropsyche decalda
- Psychomyiid genus A
- Molanna sp.
- Pycnopsyche sp.

Habitat Characteristics
RIPARIAN and INSTREAM
patchy deciduous forest; open canopy; poor streambank vegetation; partly tree-lined, partly urbanized; stream impounded here; stream width - 75 ft., stream depth - variable; moderate flow; macrophytes; blue gill sunfish

SUBSTRATE and GEOLOGY
sand/boulders; Shrewsbury-Alluvial land, loamy Keansburg Association sandy loam, sandy clay; fourth order stream; Pemberton USGS quadrangle

WATER QUALITY
clear, cedar water
Readings on 04-13-94
pH - 4.1 s.u.
dissolved oxygen - 16.0 ppm
conductivity - 85 umhos
water temperature - 11.0 øC

Ecoregion Site 28

Rancocas Creek watershed

North Branch Rancocas Creek, Main (Hanover) St., Pemberton, Burlington Co.

Date Taxa(family)/no. per sample	Jan'93	Jul'93	Oct'93
Philopotamidae	8	4	31
Hydropsychidae	45	5	40
Chironomidae	14	32	13
Naididae		17	5
Heptageniidae	1	1	2
Ephemerellidae			1
Taeniopterygidae	4		
Corydalidae	2	2	
Polycentropodidae		1	
Leptophlebiidae	5		1
Asellidae	5		
Limnephilidae	2		
Sphaeriidae	2	4	1
Hydroptilidae		18	
Athericidae		1	
Elmidae		5	2
Molannidae	2		
Lumbricidae	1		
Simuliidae	1		3
Leptoceridae			1
Tubificidae	2		
Tipulidae	4		
Capniidae	1		
Perlidae	1	1	
Leuctridae		3	
Sialidae		3	
Baetidae		3	
Dominant Family	Hydropsychidae	Chironomidae	Hydropsychidae
Family Biotic Index	4.36	5.04	4.15
Scraper/Filterer Collector	0	.67	0
Shredder/Total	.10	.09	.03
E+P+T	9	8	6
%EPT	69	36	76
EPT/C	4.93	1.13	5.85
Impairment(rating)	none(27)	none(27)	none(27)
Deficiency(s) noted	none	none	none

Ecoregion Site 29

Black Run at Kettle Run Rd., Evesham Twp., Burlington Co.
Rancocas Creek watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Leuctra tenuis

EPHEMEROPTERA
 Leptophlebia sp.
 Eurylophella temporalis
 Paraleptophlebia sp.

TRICHOPTERA
 Lepidostoma sp.
 Diplectrona modestus
 Molanna sp.
 Hydropsychidae decalda
 Chimarra aterrima
 Mystacides sp.
 Pycnopsyche sp.
 Pseudostenophylax sp.
 Hydroptila sp.
 Oxyethira sp.
 Phylocentropus sp.
 Limnephilus sp.
 Heteroplectron sp.

Habitat Characteristics
RIPARIAN and INSTREAM
old growth mixed forest; mostly open canopy; good streambank vegetation;
stream width - 3 ft., stream depth - <1 ft.; moderate flow; detritus upstream
of road where flow is slower; water did not have brown tint

SUBSTRATE and GEOLOGY
white sand/(some gravel downstream of road); Lakehurst-Lakewood-Evesboro Association,
loamy sand and sand; first order stream; Clementon USGS quadrangle

WATER QUALITY
clear water
Readings on 12-10-91
pH - 5.0 s.u.
dissolved Oxygen - 10.5 ppm
conductivity - 25 umhos
water temperature - 8.9 øC

Ecoregion Site 29

Rancocas Creek watershed

Black Run at Kettle Run Rd., Evesham Twp., Burlington Co.

Date Taxa(family)/no. per sample	Apr'91	Jun'91	Sep'91	Dec'91
Chironomidae	43	21	18	21
Aeshnidae			1	
Simuliidae	11	2	3	17
Coenagrionidae		1	1	
Empididae			1	
Corydalidae		1	3	4
Tipulidae		2	1	3
Ceratopogonidae	2	1		2
Nematoda		1		
Leptoceridae	4	5	3	1
Molannidae	3		10	4
BloodRedChironomidae			1	
Leuctridae	9	59	6	2
Ephemerellidae	2	1	1	5
Tubificidae	7		5	
Hydropsychidae	6	2	30	17
Philopotamidae		1		4
Limnephilidae	2			2
Leptophlebiidae	2		3	6
Philopotamidae			4	
Hydroptilidae	1			
Tabanidae	1		1	
Lepidostomatidae	3	2		
Polycentropodidae	1		4	3
Lumbricidae	2			
Lumbriculidae	1	1	4	9
Dominant Family	Chironomidae	Leuctridae	Hydropsychidae	Chironomidae
Family Biotic Index	5.25	2.07	4.78	4.72
Scraper/Filterer Collector	.41	.08	.07	0
Shredder/Total	.20	.65	.15	.20
E+P+T	10	6	8	9
%EPT	33	70	61	44
EPT/C	.77	3.33	3.21	2.10
Impairment(rating)	slight(24)	none(27)	none(30)	none(30)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 30

North Tributary to Black Run at Braddock Mill Rd., Evesham Twp., Burlington Co.
Rancocas Creek watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Nemoura truncata

TRICHOPTERA
 Limnephilus sp.
 Pycnopsyche sp.
 Ptilostomis sp.
 Hydropsyche decalda

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest, some pines, white cedar, magnolias; mostly closed canopy; good streambank vegetation; stream width - 4 ft.; stream depth - 1 ft., many deep holes > 1 ft.; slow flow; lots of snags; detritus, seasonally FPOM from cranberry bogs upstream

SUBSTRATE and GEOLOGY
white sand; Lakehurst-Lakewood-Evesboro Association, loamy sand and sand; first order stream; Clementon USGS quadrangle

WATER QUALITY
clear water
Readings on 12-10-91
pH - 4.3 s.u.
dissolved oxygen - 10.7 ppm
conductivity - 46 umhos
water temperature - 7.7 øC

Ecoregion Site 30

Rancocas Creek watershed

North Tributary to Black Run at Braddock Mill Rd., Burlington Co.

Date Taxa(family)/no. per sample	Apr'91	Jun'91	Sep'91	Dec'91
Lumbriculidae		11		1
Simuliidae	66	1		3
Ceratopogonidae		2	4	
Nematoda		1		
Entomobryinae		1		1
Chironomidae	16	66	55	28
Sialidae			2	5
Naididae				1
Psychodidae				1
Cordulegastridae				1
Phoridae				1
Phryganeidae			5	
Asellidae	12	17	12	28
Sphaeriidae		1		
Tubificidae	3		17	10
Limnephilidae	1			
Hydropsychidae	1			
BloodRedChironomidae	1		2	
Turbellaria			1	
Hemiptera			1	
Corduliidae			1	
Dominant Family	Simuliidae	Chironomidae	Chironomidae	Chironomidae
Family Biotic Index	6.34	6.62	6.81	
Scraper/Filterer Collector	0	0	0	
Shredder/Total	.05	.25	.48	
E+P+T	2	0	1	
%EPT	2	0	5	
EPT/C	.12	0	.09	
Impairment(rating)	severe(6)	severe(6)	moderate(12)	moderate(12)
Deficiency(s) noted*	ODT PCWO	ODT PCWO	PCWO	PCWO SOP

* ODT - Overwhelmingly Dominant Taxon
PCWO - Paucity of Clean Water Organisms
SOP - Significant Organic Pollution

Ecoregion Site 31

Stone Bridge Branch tributary, Garwood Rd. (Waddell Farm), Erial, Camden Co.
Big Timber Creek watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Leuctra truncata
- Leuctra tenuis
- Paracapnia opis
- Isoperla transmarina

EPHEMEROPTERA
- Paraleptophlebia sp.
- Leptophlebia sp.
- Eurylophella temporalis

TRICHOPTERA
- Molanna sp.
- Lype diversa
- Ptilostomis sp.
- Heteroplectron sp.
- Pycnopsyche sp.
- Diplectrona modestus
- Rhyacophila sp. 5
- Lepidostoma sp.
- Limnephilus sp.

Rare Species

ISOPODA
- Asellus nodulus

COLEOPTERA
- Optioservus immunis

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest, primeval vegetation, mosses, ferns, lycopodiums, magnolia, cedar, holly, persimmons, oak, pine, maple, marsh pinks, blueberries; surrounding area last farmed in the 1950's; closed canopy; stream width - 4 ft., stream depth - <1 ft.; slow flow; macrophytes, some Vallisneria; thick filamentous green algae in May; fine detritus

SUBSTRATE and GEOLOGY
white sand/mud; Aura-Downer Association, gravelly and sandy soil; first order stream; Runnemede USGS quadrangle

WATER QUALITY
clear water
Readings on 07-09-91
pH - 4.6 s.u.
dissolved oxygen - 6.2 ppm
conductivity - 65 umhos
water temperature - 17.5 øC

Ecoregion Site 31

Big Timber Creek watershed

Stone Bridge Branch tributary, Garwood Rd. (Waddell Farm), Erial, Camden Co.

Date Taxa(family)/no. per sample	Oct'90	Feb'91	May'91	Jul'91
Tipulidae		1	2	
Leuctridae		13	7	4
Simuliidae		58	7	
Chironomidae	75	10	69	89
Corydalidae		4		1
BloodRedChironomidae		3	2	
Lumbriculidae			3	1
Lepidostomatidae			1	1
Polycentropodidae	11	1		
Lumbriculidae	3			
Sialidae	3			
Phryganeidae	2			
Limnephilidae	1		1	
Ephydridae			1	
Sphaeriidae	2	4	7	4
Hydropsychidae	1	2		
Psychodidae	1	2		
Coenagrionidae		1		
Calamoceratidae		1		
Psychomyiidae	1			
Dominant Family	Chironomidae	Simuliidae	Chironomidae	Chironomidae
Family Biotic Index	5.96	5.10	5.93	5.75
Scraper/Filterer Collector	0	.03	0	0
Shredder/Total	.62	.23	.34	.72
E+P+T	5	4	3	2
%EPT	16	17	8	5
EPT/C	.21	1.31	.14	.06
Impairment(rating)	moderate(12)	moderate(18)	moderate(12)	moderate(9)
Deficiency(s) noted*	ODT	none	ODT	ODT PCWO

* ODT - Overwhelmingly Dominant Taxon
PCWO - Paucity of Clean Water Organisms

Ecoregion Site 32

Manasquan River off Turkey Swamp Rd., Freehold Twp., Monmouth Co.
Manasquan R. watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Paraleuctra sara
 Nemoura trispinosa
 Leuctra tenuis

EPHEMEROPTERA
 Leptophlebia sp.
 Stenonema rubrum

TRICHOPTERA
 Lepidostoma sp.
 Wormaldia sp.
 Limnephilus sp.
 Oligostomis sp.
 Ptilostomis sp.
 Cheumatopsyche sp.
 Ironoquia sp.

Habitat Characteristics
RIPARIAN and INSTREAM
old growth forest of oak and pine, dense understory of pinelands vegetation; closed canopy; stream width - 2 ft, depth - <1 ft; slow flow; channelized; some filamentous green algae; macrophytes; mud minnows

SUBSTRATE and GEOLOGY
white sand; Atsion sandy soils; first order stream; elevation - 140 ft; Adelphia USGS quadrangle

WATER QUALITY
clear, cedar water
Readings on 01-21-93
pH - 5.4 s.u.
dissolved oxygen - 10 ppm
conductivity - 42 umhos
water temperature - 4 øC

Ecoregion Site 32

Manasquan River watershed

Manasquan River off Turkey Swamp Rd., Monmouth Co.

Date Taxa(family)/no. per sample	Jul'92	Oct'92	Jan'93	Apr'93
Sphaeriidae	59	25	3	10
Heptageniidae				1
Asellidae	14	37	6	6
Pytchopteridae	2	10	16	7
Simuliidae			6	8
Leuctridae			21	22
Chironomidae	6	11	42	28
Nemouridae				1
Naididae	1		1	
Hydropsychidae			1	
Leptophlebiidae			1	
Lumbriculidae	5	7	1	5
Cordulegastridae		1		
Tabanidae	2		1	
Libellulidae	1		1	
Tubificidae	5			
Ceratopogonidae	1			
Sialidae	1	3		2
Hydrophilidae	1			
Dytiscidae	1	1		1
Limnephilidae		1		6
Isotomidae		2		
Nemertea		1		
Phryganeidae		1		
Helodidae	1			
Tipulidae				3
Corduliidae				
Dominant Family	Sphaeriidae	Asellidae	Chironomidae	Chironomidae
Family Biotic Index	7.78	7.50	5.24	4.91
Scraper/Filterer Collector	0	0	0	0
Shredder/Total	.04	.20	.51	.53
E+P+T	0	2	3	4
%EPT	0	2	23	30
EPT/C				
Impairment(rating)	moderate(9)	moderate(12)	slight(21)	none(27)
Deficiency(s) noted*	PCWO SOP	PCWO SOP	none	none

* PCWO - Paucity of Clean Water Organisms
SOP - Significant Organic Pollution

Ecoregion Site 33

Stan Brook, Easy St., Squankum, Ocean Co.
Manasquan River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-TM

Important Species
PLECOPTERA
 Leuctra tenuis
 Allocapnia sp.

EPHEMEROPTERA
 Leptophlebia sp.

TRICHOPTERA
 Diplectrona modestus
 Heteroplectron sp.
 Pycnopsyche sp.
 Molanna sp.
 Limnephilus sp.
 Lype diversa
 Phylocentropus sp.
 Ironoquia sp.
 Ptilostomis sp.
 Lepidostoma sp.
 Frenesia sp.

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest of oak and maple; partly open canopy; stream width - 2 ft., stream depth - <1 ft.; slow-moderate flow; mud minnows; fine detritus; heavy leaf litter in fall and winter; surrounding areas support farming and some light industry

SUBSTRATE and GEOLOGY
white sand/mud; Lakewood-Lakehurst-Evesboro, sandy soils; first order stream; Farmingdale USGS quadrangle

WATER QUALITY
clear water
Readings on 07-10-91
pH - 5.54 s.u.
dissolved oxygen - 5.9 ppm
conductivity - 50 umhos
water temperature - 18.0 øC

Ecoregion Site 33

Manasquan River watershed

Stan Brook, Easy St., Squankum, Monmouth Co.

Date Taxa(family)/no. per sample	Oct'90	Mar'91	May'91	Jul'91
Corydalidae	1			2
Coenagrionidae				2
Simuliidae	1	15	13	
Entomobryinae	1			
Chironomidae	18	27	16	21
Limnephilidae	8	11	8	
Calamoceratidae	2	3	1	10
Lepidostomatidae			4	1
Tipulidae	3	4	1	3
Molannidae	2	6	1	3
Gyrinidae				1
Sialidae	1			1
Hemiptera				
Sphaeriidae	4	15	6	8
Leptoceridae			2	
Psychomyiidae	1	2		
Capniidae		1		
Leptophlebiidae	3	1		
Tubificidae		2	3	3
Hydropsychidae	20		1	
Tabanidae	2	2	2	1
Lampyridae		1		
Polycentropodidae	1	2	4	11
Empididae			1	
Asellidae	13	1	29	28
BloodRedChironomidae		1		2
Lumbriculidae	12	2	5	3
Leuctridae		1		
Naididae		2	3	
Gastropoda		1		
Dominant Family	Hydropsychidae	Chironomidae	Asellidae	Asellidae
Family Biotic Index	5.58	5.74	6.44	6.09
Scraper/Filterer Collector	0	0	0	0
Shredder/Total	.17	.21	.16	.22
E+P+T	7	8	7	4
%EPT	39.78	27	21	25
EPT/C	2.06	.96	1.31	1.09
Impairment(rating)	none(27)	none(27)	none(27)	slight(24)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 34

South Branch Metedeconk River, Leesville Siloam Rd., Jackson Twp., Ocean Co.
Metedeconk River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Leuctra tenuis
 Isoperla transmarina
 Allocapnia sp.
 Paraleuctra sara
 Paracapnia opis

EPHEMEROPTERA
 Leptophlebia sp.

TRICHOPTERA
 Pycnopsyche sp.
 Heteroplectron sp.
 Psilotreta frontalis
 Diplectrona modestus
 Lype diversa
 Brachycentrus numerosus
 Hydroptila sp.
 Lepidostoma sp.

Habitat Characteristics
RIPARIAN and INSTREAM
old growth mixed forest, pinelands transition area, dense understory of mostly oak; half open canopy; stream width - 5 ft., stream depth - <1 ft.; moderate flow; mosses and macrophytes, little detritus in spring/summer, heavy detritus in fall/winter

SUBSTRATE and GEOLOGY
white sand and small gravel; Lakewood-Lakehurst-Evesboro, sandy soils; first order stream; Adelphia USGS quadrangle

WATER QUALITY
clear water
Readings on 07-10-91
pH - 6.12 s.u.
dissolved oxygen - 8.3 ppm
conductivity - 47 umhos
water temperature - 16.8 øC

Ecoregion Site 34

Metedeconk River watershed

S. Br. Metedeconk River, Leesville Siloam Rd., Jackson Twp., Ocean Co.

Date Taxa(family)/no. per sample	Oct'90	Feb'91	May'91	Jul'91
Anthomyiidae				1
Hemiptera				4
Sphaeriidae	10		3	9
Leuctridae	48	54	44	25
Corydalidae				3
Capniidae	25	17		
Lumbriculidae	3		1	1
Tabanidae				1
Ceratopogonidae			1	
Limnephilidae	3	6	1	
Cordulegastridae		1		
Psychomyiidae		1	1	
Polycentropodidae		1	3	
Perlodidae		3	3	
Chironomidae	3	10	19	30
Lepidostomatidae			8	2
Calamoceratidae				8
Gyrinidae				2
Tipulidae	2	1	4	8
Naididae			4	
Hydroptilidae			1	
Simuliidae		1	1	
Gastropoda	1			
Leptophlebiidae	1			
Odontoceridae	1		2	2
BloodRedChironomidae	1			
Hydropsychidae	1	5	4	4
Phoridae	1			
Dominant Family	Leuctridae	Leuctridae	Leuctridae	Chironomidae
Family Biotic Index	1.93	1.47	2.56	3.52
Scraper/Filterer Collector	0	.14	.44	.12
Shredder/Total	.70	.70	.56	.40
E+P+T	6	7	9	5
%EPT	79	87	67	41
EPT/C	19.75	8.70	3.53	1.37
Impairment(rating)	none(27)	none(27)	none(27)	none(27)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 35

Toms River, Paint Island Rd., Millstone Twp., Monmouth Co.
Toms River watershed/Northern Piedmont Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
PLECOPTERA
 Leuctra tenuis
 Isoperla transmarina
 Allocapnia sp.

EPHEMEROPTERA
 Leptophlebia sp.
 Eurylophella temporalis

TRICHOPTERA
 Diplectrona modestus
 Limnephilus sp.
 Ptilostomis sp.
 Lype diversa
 Pycnopsyche sp.
 Wormaldia sp.
 Lepidostoma sp.
 Molanna sp.

COLEOPTERA
 Anchytarsus bicolor

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest of oak and maple, dense understory; partly open canopy; the stream source is a spring in a very small pond - 500 feet upstream; stream width - 2 ft., stream depth - <1 ft.; moderate flow; mud minnows; detritus; tree nursery adjacent to stream

SUBSTRATE and GEOLOGY
white sand/some gravel; Lakewood-Lakehurst-Evesboro, sandy soils; first order stream; Roosevelt USGS quadrangle

WATER QUALITY
clear water
Readings on 07-10-91
pH - 5.95 s.u.
dissolved oxygen - 7.2 ppm
conductivity - 85 umhos
water temperature - 18.8 øC

Ecoregion Site 35

Toms River watershed

Toms River, Paint Island Rd., Monmouth Co.

Date Taxa(family)/no. per sample	Oct'90	Feb'91	May'91	Jul'91
Lepidostomatidae			4	
Chironomidae	16	45	30	27
Phoridae				1
Tubificidae		3		4
Simuliidae	3	9	13	1
Leuctridae	51	11	27	14
Sialidae				6
Molannidae				1
Coenagrionidae				1
Hemiptera				3
Gomphidae				1
Ceratopogonidae	1	1	4	
Capniidae		1		
Polycentropodidae	3	1	2	1
BloodRedChironomidae				12
Hydropsychidae	10	5	2	9
Limnephilidae		9		
Tabanidae	1	1		
Psychomyiidae	1			
Ptilodactylidae	5		3	
Sphaeriidae	1	4	1	11
Leptophlebiidae	1	1		
Corydalidae	1		1	
Naididae	1	1	5	
Ephemerellidae	3	1		1
Nematoda				1
Bryozoa				1
Phryganeidae		1		
Tipulidae	1		2	1
Elmidae	1	2	2	4
Lumbriculidae		1	3	
Philopotamidae		3	1	
Dominant Family	Leuctridae	Chironomidae	Chironomidae	Chironomidae
Family Biotic Index	2.18	5.13	3.93	5.38
Scraper/Filterer Collector	0	.81	.12	0
Shredder/Total	.73	.51	.58	.33
E+P+T	6	7	5	5
%EPT	69	31	36	26
EPT/C	4.31	.60	1.20	.67
Impairment(rating)	none(27)	slight(24)	none(27)	slight(24)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 36

Old Hurricane Branch, Beckerville Rd., Manchester Twp., Ocean Co.
Toms River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
PL

Important Species

PLECOPTERA
- Leuctra tenuis
- Isoperla transmarina
- Nemoura similis

COLEOPTERA
- Oulimnius latiusculus

EPHEMEROPTERA
- Stenonema smithae
- Leptophlebia sp.

TRICHOPTERA
- Heteroplectron sp.
- Brachycentrus numerosus
- Pycnopsyche sp.
- Dolophilodes sp.
- Diplectrona modestus
- Psilotreta frontalis
- Chimarra aterrima
- Rhyacophila sp. 5
- Limnephilus sp.
- Molanna sp.
- Hydroptila sp.
- Lepidostoma sp.
- Hydropsyche decalda
- Mystacides sp.

Habitat Characteristics
RIPARIAN and INSTREAM
old growth mixed forest, pinelands transition area, dense understory of mostly oak; mostly open canopy; stream width - 7 ft., stream depth - 1 to 3 ft.; fast flow; macrophytes; some moss; abundant filamentous green algae and diatoms in spring

SUBSTRATE and GEOLOGY
gravel/white sand; Manahawkin-Atsion-Berryland Association organic and sandy soils, source of Old Hurricane Branch is Lakewood-Lakehurst-Evesboro Association; third order stream; Whiting USGS quadrangle

WATER QUALITY
clear water
Readings on 07-11-91
pH - 6.9 s.u.
dissolved oxygen - 6.9 ppm
conductivity - 40 umhos
water temperature - 17.7 øC

Ecoregion Site 36

Toms River watershed

Old Hurricane Branch, Beckerville Rd., Manchester Twp. WMA, Ocean Co.

Date Taxa(family)/no. per sample	Nov'90	Mar'91	May'91	Jul'91
Taeniopterygidae	14			
Naididae	11	41	11	
Simuliidae	3	1	8	6
Rhyacophilidae		2	1	
Leptoceridae			1	
Hydroptilidae			1	
Tubificidae	4	1	2	1
Polycentropodidae				1
Hydropsychidae	30	16	19	44
Lepidostomatidae		10		
Corydalidae	2		1	7
Heptageniidae	4		3	1
Elmidae	2	1	3	
Perlodidae		2	3	
Limnephilidae	4			
Leuctridae	14	5	25	15
Philopotamidae	3	1		
Chironomidae	8	13	13	18
Empididae	1	2	6	
Lepidostomatidae			3	
Nemouridae		5		
Dominant Family	Hydropsychidae	Naididae	Leuctridae	Hydropsychidae
Family Biotic Index	3.86	4.88	3.76	3.63
Scraper/Filterer Collector	0	0	.04	.02
Shredder/Total	.23	.20	.31	.20
E+P+T	6	7	8	6
%EPT	69	41	56	63
EPT/C	8.63	3.15	4.31	3.50
Impairment(rating)	none(30)	none(27)	none(30)	none(27)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 37

Oswego River, Spur 563 (below Harrisville Lk.), Bass River Twp., Burlington Co.
Mullica River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
PL

Important Species
PLECOPTERA
 Leuctra tenuis
 Isoperla transmarina

EPHEMEROPTERA
 Baetisca carolina

TRICHOPTERA
 Hydropsyche decalda
 Chimarra aterrima
 Diplectrona modestus
 Pycnopsyche sp.
 Mystacides sp.

COLEOPTERA
 Stenelmis humerosa
 Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth forest of pine and oak with dense understory of pinelands vegetation; open canopy; channelized for bridge and USGS dam; stream width - 75 ft., stream depth - 1.5 ft.; fast flow; macrophytes (>50% coverage); chlorophyll a (mg/m3) - 2.95 on 05-19-92, 2.82 on 07-28-92, 0.89 on 10-07-92

SUBSTRATE and GEOLOGY
white sand/gravel; Atsion-muck-Alluvial land sandy association, sand and loamy sand subsoil; fourth order stream; Jenkins USGS quadrangle

WATER QUALITY
clear, cedar water; see USGS records; bridge leaches creosote
Readings on 12-09-91
pH - 4.6 s.u.
dissolved oxygen - 12.9 ppm
conductivity - 33 umhos
water temperature - 9 øC

Ecoregion Site 37

Mullica River watershed

Oswego River, Harrisville Lake outlet, Burlington Co.

Date Taxa(family)/no. per sample	May'91	Sep'91	Dec'91	Mar'92
Hydropsychidae	54	49	34	40
Chironomidae	26	15	33	36
Baetiscidae		11	10	2
Tabanidae			1	
Simuliidae		3		
Leptoceridae		3	1	
Sphaeriidae			1	
Empididae			1	2
Asellidae		2		
Elmidae	3	3	1	1
Philopotamidae		1		1
Lumbriculidae	8	1		
Coenagrionidae		1		
Tubificidae	2	2	12	11
Polycentropodidae		1		2
Leuctridae	6			
BloodRedChironomidae	4			
Tipulidae	3			2
Ceratopogonidae	1		4	2
Naididae	1	8	2	
Perlodidae	1			
Corydalidae	1			1
Dominant Family	Hydropsychidae	Hydropsychidae	Hydropsychidae	Hydropsychidae
Family Biotic Index	4.76	4.79	5.50	5.41
Scraper/Filterer Collector	0	0	.05	0
Shredder/Total	.13	.07	2	.11
E+P+T	3	5	3	4
%EPT	55.45	65	45	45
EPT/C	2.03	4.33	1.36	1.25
Impairment(rating)	slight(24)	slight(24)	slight(24)	slight(21)
Deficiency(s) noted	none	none	none	none

Ecoregion Site 38

Great Egg Harbor River, Williamstown-New Freedom Rd., Camden Co.
Great Egg Harbor River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
PL

Important Species

PLECOPTERA
- Isoperla transmarina

EPHEMEROPTERA
- Leptophlebia sp.
- Stenonema smithae
- Eurylophella temporalis
- Baetis propinquus
- Centroptilum sp.
- Paracloeodes sp.
- Pseudocloeon carolina

TRICHOPTERA
- Pycnopsyche sp.
- Psilotreta frontalis
- Heteroplectron sp.
- Molanna sp.
- Agarodes sp.
- Diplectrona modestus
- Phylocentropus sp.

TRICHOPTERA (continued)
- Goera sp.
- Brachycentrus numerosus
- Lype diversa
- Mystacides sp.
- Oxyethira sp.
- Lepidostoma sp.

COLEOPTERA
- Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth forest of oak and maple; mostly open canopy; good streambank vegetation; stream width - 30 ft., depth - 1 ft.; slow flow; macrophytes

SUBSTRATE and GEOLOGY
white sand/gravel; second order stream; Williamstown USGS quadrangle

WATER QUALITY
clear, cedar water
Readings on 12-08-92
pH - 6.5 s.u.
dissolved oxygen - 12.5 ppm
conductivity - 35 umhos
water temperature - 4 øC

Ecoregion Site 38

Great Egg Harbor River watershed

Great Egg Harbor River, Williamstown-New Freedom Rd., Camden Co.

Date Taxa(family)/no. per sample	Mar'92	Sep'92	Dec'92	Mar'93	Jun'93
Baetidae	2	3	2		6
Hemiptera		1			
Elmidae		1	1		8
Leptophlebiidae	17	1	2	7	
Empidiae			1		
Tipulidae			1		
Odontoceridae	10	3	2	2	15
Chironomidae	11	31	46	11	25
Turbellaria		1			1
Ephemerellidae	7		18	10	2
Lepidostomatidae					3
Sericostomatidae	8	4	1	8	1
Ceratopogonidae			1		
Molannidae	8	1	1		1
Leptoceridae					1
Asellidae		2			1
Gammaridae					1
Limnephilidae	23		1	17	8
Goeridae	2				
Tubificidae	4		1	1	
Lumbriculidae				1	
Heptageniidae	1	12	4	1	8
Hydropsychidae	1	28	8	2	6
Corydalidae	1	2	2		1
Simuliidae		4	6	38	3
Brachycentridae		2			
Coenagrionidae		2			
Calamoceratidae	2	2	1	1	8
Tabanidae				1	
Polycentropodidae	2				
Sialidae	1		1		1
Dominant Family	Limnephilidae	Chironomidae	Chironomidae	Simuliidae	Chironomidae
Family Biotic Index	3.43	4.54	4.36	4.46	3.50
Scraper/Filterer Collector	3.33	.26	.11	.24	1.70
Shredder/Total	.54	.23	.40	.37	.44
E+P+T	12	9	10	8	11
%EPT	83	56	40	48	59
EPT/C	7.55	1.81	.87	4.36	2.36
Impairment(rating)	none(30)	none(30)	none(27)	none(30)	none(30)
Deficiency(s) noted	none	none	none	none	none

Ecoregion Site 39

Great Egg Harbor River, Williamstown-Winslow Rd., Winslow Twp., Camden Co.
Great Egg Harbor River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
PL

Important Species

PLECOPTERA
- Isoperla transmarina
- Acroneuria lycorias
- Leuctra tenuis
- Paracapnia opis
- Allocapnia sp.
- Perlesta placida

EPHEMEROPTERA
- Leptophlebia sp.
- Stenonema smithae
- Eurylophella temporalis
- Centroptilum sp.
- Paraleptophlebia sp.
- Baetis pygmaeus
- Baetis propinquus
- Paracloeodes sp.
- Choroterpes sp.
- Cloeon sp.

TRICHOPTERA
- Mystacides sp.
- Molanna sp.

TRICHOPTERA (continued)
- Brachycentrus numerosus
- Psilotreta frontalis
- Agarodes sp.
- Goera sp.
- Symphitopsyche sparna
- Chimarra aterrima
- Hydroptila sp.
- Micrasema wataga
- Lepidostoma sp.
- Pycnopsyche sp.
- Lype diversa
- Diplectrona modestus
- Neophylax sp.

COLEOPTERA
- Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth forest of oak and maple; wildlife management area; mostly open canopy; good streambank vegetation; stream width - 25 ft., depth - 1 ft.; moderate flow; macrophytes; numerous Brachycentrus numerosus

SUBSTRATE and GEOLOGY
white sand/gravel; third order stream; Williamstown USGS quadrangle

WATER QUALITY
clear, cedar water
Readings on 12-08-92
pH - 6.3 s.u.
dissolved oxygen - 12.7 ppm
conductivity - 35 umhos
water temperature - 5 øC

Ecoregion Site 39

Great Egg Harbor River watershed
Great Egg Harbor River at Williamstown-Winslow Rd., Camden Co.

Date Taxa(family)/no. per sample	Mar'92	Sep'92	Dec'92	Apr'93	Jun'93
Chironomidae	24	22	39	8	20
Gammaridae				2	
Gastropoda				8	
Taeniopterygidae			3		
Odontoceridae	4	3	1	2	
Capniidae		2	15		
Leptophlebiidae	9		2	1	4
Asellidae			1	3	
Ceratopogonidae			1		
Ephemerellidae			1	1	4
Hemiptera				1	
Molannidae				1	
Brachycentridae	5	17	12	10	
BloodRedChironomidae		4	1	7	1
Lepidostomatidae		2	2	5	1
Cordulegastridae				1	
Aeshnidae				2	
Lumbriculidae				5	
Limnephilidae	14			5	3
Perlodidae	4		1	4	
Tipulidae	4	2	5	1	1
Corydalidae	4				
Baetidae	2	3		1	17
Haliplidae		1			
Perlidae	4				4
Sphaeriidae	3			7	
Heptageniidae	1	3	3	12	16
Goeridae	5	6		1	1
Sericostomatidae		4	2	7	6
Tabanidae	1			3	
Nemertea	2		1		
Pyralidae	2		1		
Tubificidae			2		6
Leptoceridae					2
Hydropsychidae	4	25	2	2	
Elmidae	1	2	1		3
Simuliidae					8
Philopotamidae	4	2	2		
Naididae		2	1		
Empididae			1		
Sialidae	1				
Molannidae	2				3
Dominant Family	Chironomidae	Hydropsychidae	Chironomidae	Heptageniidae	Chironomidae
Family Biotic Index	3.57	3.60	3.92	4.59	4.56
Scraper/Filterer Collector	.75	.45	1	2	.29
Shredder/Total	.32	.21	.59	.35	.44
E+P+T	12	10	12	13	11
%EPT	58	67	46	52	61
EPT/C	2.42	2.58	1.15	3.47	2.90
Impairment(rating)	none(30)	none(30)	none(30)	none(30)	none(30)
Deficiency(s) noted	none	none	none	none	none

Ecoregion Site 40

Great Egg Harbor River, Route 54, Folsom, Atlantic Co.
Great Egg Harbor River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
PL

Important Species

PLECOPTERA
- Acroneuria lycorias
- Leuctra tenuis
- Paracapnia opis
- Allocapnia sp.
- Isoperla transmarina
- Perlesta placida

EPHEMEROPTERA
- Stenonema smithae
- Leptophlebia sp.
- Paraleptophlebia sp.
- Eurylophella temporalis

TRICHOPTERA
- Brachycentrus numerosus
- Symphitopsyche sparna
- Goera sp.
- Psilotreta frontalis
- Agarodes sp.
- Mystacides sp.
- Micrasema wataga

TRICHOPTERA (continued)
- Lepidostoma sp.
- Pycnopsyche sp.
- Neophylax sp.
- Lype diversa
- Triaenodes sp.
- Hydroptila sp.
- Molanna sp.
- Hydropsyche decalda

COLEOPTERA
- Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth forest of oak with dense understory of pinelands vegetation; mostly closed canopy; good streambank vegetation; stream width - 20 ft, stream depth - 1 ft. moderate flow

SUBSTRATE and GEOLOGY
white sand/gravel/some ironstone; third order stream; Newtownville USGS quadrangle

WATER QUALITY
clear, cedar water
Readings on 12-08-92
pH - 6.3 s.u.
dissolved oxygen - 13.6 ppm
conductivity - 35 umhos
water temperature - 5 øC

Ecoregion Site 40

Great Egg Harbor River watershed

Great Egg Harbor River, Route 54 in Folsom, Atlantic Co.

Date	Mar'92	Sep'92	Dec'92	Apr'93	Jun'93
Taxa(family)/no. per sample					
BloodRedChironomidae				1	
Goeridae	16	4	2	18	1
Ephemerellidae	1				
Limnephilidae	21	1		5	1
Tabanidae		1			
Leptoceridae		1		1	
Hydropsychidae	16	46	24	16	38
Capniidae			2		
Odontoceridae	2			23	3
Chironomidae	20	17	60	2	14
Perlidae	2	3		2	1
Elmidae		2		15	20
Tipulidae	4			2	3
Lumbriculidae					1
Leptophlebiidae	7		1		
Heptageniidae	2	3	1	5	1
Brachycentridae	5	18	6	4	16
Tubificidae	1				
Psychomyiidae	1				
Corydalidae	1				
Simuliidae	1	1	1	2	
Leuctridae		1			
Naididae		1	1	1	
Lepidostomatidae				1	1
Corydalidae			1		
Sericostomatidae		1	1	2	
Dominant Family	Limnephilidae	Hydropsychidae	Chironomidae	Odontoceridae	Hydropsychidae
Family Biotic Index	3.28	3.57	4.86	2.26	3.59
Scraper/Filterer Collector	1.12	.10	.16	2.50	.11
Shredder/Total	.39	.16	.41	.10	.03
E+P+T	10	9	7	10	8
%EPT	73	78	37	77	62
EPT/C	3.65	4.59	.62	25.67	4.43
Impairment(rating)	none(30)	none(27)	none(27)	none(27)	none(30)
Deficiency(s) noted	none	none	none	none	none

Ecoregion Site 41

Great Egg Harbor River, Rt. 559, Weymouth, Atlantic Co.
Great Egg Harbor River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
PL

Important Species

PLECOPTERA
- Acroneuria lycorias
- Leuctra tenuis
- Paracapnia opis
- Allocapnia sp.
- Isoperla transmarina
- Perlesta placida

EPHEMEROPTERA
- Stenonema smithae
- Eurylophella temporalis
- Leptophlebia sp.
- Paraleptophlebia sp.
- Chloroterpes sp.

TRICHOPTERA
- Brachycentrus numerosus
- Goera sp.
- Psilotreta frontalis
- Symphitopsyche sparna
- Lepidostoma sp.
- Agarodes sp.
- Phylocentropus sp.

TRICHOPTERA (continued)
- Diplectrona modestus
- Chimarra aterrima
- Neophylax sp.
- Pycnopsyche sp.
- Hydroptila sp.
- Ptilostomis sp.
- Limnephilus sp.

COLEOPTERA
- Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth forest of oak with dense understory of pinelands vegetation; mostly open canopy; good streambank vegetation; stream width - 75 ft., stream depth - 1 ft.; fast flow

SUBSTRATE and GEOLOGY
white sand/gravel/ironstone; fourth order stream; Newtonville USGS quadrangle

WATER QUALITY
clear, cedar water
Readings on 12-08-92
pH - 6.3 s.u.
dissolved oxygen - 13.3 ppm
conductivity - 32 umhos
water temperature - 5 øC

Ecoregion Site 41

Great Egg Harbor River watershed

Great Egg Harbor River, Rt. 559, Weymouth, Atlantic Co.

Date	Mar'92	Sep'92	Dec'92	Apr'93	Jun'93
Taxa(family)/no. per sample					
Limnephilidae	3	1	3	6	
Perlodidae				2	
Tubificidae			1		
Polycentropodidae			2		
Lepidostomatidae	19	17	11	19	3
Sericostomatidae		5	2		
Capniidae			23		
Taeniopterygidae			13		
Odontoceridae	10	1	1	3	1
Philopotamidae		1			
Elmidae	12	2	1	13	22
Asellidae			1		
Heptageniidae			1		1
Simuliidae		1			
Lumbriculidae	3			1	1
Ephemerellidae				2	
Goeridae	18	3	2	17	
Tipulidae			2	3	1
Brachycentridae	4	11	6	7	57
Hydropsychidae	17	41	13	17	2
Chironomidae	6	16	12	2	6
BloodRedChironomidae	2		1	1	
Leptoceridae	1			5	1
Perlidae	1		2		3
Leuctridae					2
Hydroptilidae	1				
Psychomyiidae	1				
Empididae	1	1	3	1	
Athericidae	1			1	
Dominant Family	Lepidostomatidae	Hydropsychidae	Capniidae	Lepidostomatidae	Brachycentridae
Family Biotic Index	2.46	3.30	2.80	2.41	2.14
Scraper/Filt.Collector	1.94	.23	.54	1.29	.50
Shredder/Total	.19	.23	.40	.28	.08
E+P+T	10	8	12	9	8
%EPT	75	80	79	78	70
EPT/C	9.38	5	6.08	26	11.67
Impairment(rating)	none(30)	none(27)	none(30)	none(30)	none(27)
Deficiency(s) noted	none	none	none	none	none

Ecoregion Site 42

Green Branch, Crow Pond Rd., Crow Pond, Salem Co.
Maurice River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species

PLECOPTERA
- Leuctra tenuis
- Paracapnia opis
- Taeniopteryx burksi

EPHEMEROPTERA
- Eurylophella temporalis
- Paraleptophlebia sp.
- Stenonema smithae
- Baetis flavistriga
- Leptophlebia sp.

TRICHOPTERA
- Molanna sp.
- Psilotreta frontalis
- Diplectrona modestus
- Heteroplectron sp.
- Limnephilus sp.
- Lepidostoma sp.

TRICHOPTERA (cont.)
- Pycnopsyche sp.
- Ptilostomis sp.
- Brachycentrus numerosus
- Pseudostenophylax sp.
- Goera sp.
- Hydropsyche decalda
- Oxyethira sp.
- Hesperophylax sp.

COLEOPTERA
- Oulimnius latiusculus

Habitiat Characteristics
RIPARIAN and INSTREAM
old growth deciduous/evergreen forest, some magnolias, dense understory; partly open canopy; stream width - 6 ft., stream depth - <1 ft; moderate - fast flow macrophytes, Vallisnaria; detritus

SUBSTRATE and GEOLOGY
white sand/gravel; Aura-Sassafras-Downer Association, gravelly and sand; second order stream; Newfield USGS quadrangle

WATER QUALITY
clear water
Readings on 12-09-91
pH - 5.5 s.u.
dissolved oxygen - 9.2 ppm
conductivity - 39 umhos
water temperature - 12.5 øC

Ecoregion Site 42

Maurice River watershed

Green Branch, Crow Pond Rd., Crow Pond, Salem Co.

Date Taxa(family)/no. per sample	Mar'91	Jun'91	Sep'91	Dec'91
Sphaeriidae	14	1	1	4
Elmidae		1	3	2
Simuliidae	17	27	14	4
Tabanidae				2
Chironomidae	24	9	14	31
Hemiptera		3		
Tubificidae	9		3	7
Hydropsychidae	9	1	41	17
Corydalidae			2	1
Asellidae	9	49	8	17
Goeridae			1	1
Coenagrionidae			3	1
Ephemerellidae			1	2
Leuctridae			4	
Naididae			1	
BloodRedChironomidae			1	
Lepidostomatidae	3	1		1
Hirudinea		1		
Gyrinidae		1		
Limnephilidae	2			3
Leptoceridae	1			
Tipulidae	1	1	1	
Odontoceridae	2		1	4
Heptageniidae	1		1	1
Phryganeidae	1			
Nematoda	1			
Molannidae	2			
Leptophlebiidae	1			1
Calamoceratidae	2	1		1
Gammaridae	1	2		
Dominant Family	Chironomidae	Asellidae	Hydropsychidae	Chironomidae
Family Biotic Index	6.06	6.93	4.96	5.66
Scraper/Filterer Collector	.05	.03	.03	.19
Shredder/Total	.21	.07	.14	.30
E+P+T	10	3	5	8
%EPT	24	3	49	31
EPT/C	1	.33	3.27	1
Impairment(rating)	none(27)	moderate(15)	none(27)	none(27)
Deficiency(s) noted*	none	PCWO	none	none

* PCWO - Paucity of Clean Water Organisms

Ecoregion Site 43

White Marsh Run, Hogbin Rd., near Millville, Cumberland Co.
Maurice River watershed/Middle Atlantic Coastal Plain Ecoregion

NJDEPE CLASSIFICATION
FW2-NT

Important Species
EPHEMEROPTERA
 Eurylophella temporalis

TRICHOPTERA
 Hydropsyche decalda
 Pycnopsyche sp.
 Heteroplectron sp.
 Molanna sp.
 Oligostomus sp.
 Limnephilus sp.
 Pseudostenophylax sp.
 Ironoquia sp.
 Lepidostoma sp.
 Lype diversa

COLEOPTERA
 Oulimnius latiusculus

Habitat Characteristics
RIPARIAN and INSTREAM
old growth deciduous forest, mostly oak, some white cedar along stream, dense understory; open canopy at road, closed canopy upstream; stream width - 6 ft., stream depth - <1 ft.; slow flow; macrophytes , Vallisneria; detritus

SUBSTRATE and GEOLOGY
white sand; Aura-Downer-Sassafras Association, loamy, sandy and gravelly soil; first order stream; Millville USGS quadrangle

WATER QUALITY
clear water
Readings on 07-11-91
pH - 5.5 s.u.
dissolved oxygen - 7.9 ppm
conductivity - 27 umhos
water temperature - 17.8 øC

Ecoregion Site 43

Maurice River watershed

White Marsh Run, Hogbin Rd., near Millville, Cumberland Co.

Date Taxa(family)no. per sample	Oct'90	Mar'91	May'91	Jul'91
Elmidae	1		2	
Nematoda			1	
Tubificidae	3		12	
Gammaridae	48	50	51	25
Naididae			21	
Ephemerellidae		6		
Chironomidae	7	14	1	51
Lumbriculidae	21	6	5	14
Calamoceratidae	3	5	1	
Lumbricidae			3	
Simuliidae		1		
Sphaeriidae	2	7	1	
Molannidae	2			
Hydropsychidae	4	3		6
Tipulidae	2	3		2
Lepidostomatidae				2
Tabanidae	1	1		
Asellidae	3			
Limnephilidae	2	3	2	
Phryganeidae	1			
Dominant Family	Gammaridae	Gammaridae	Gammaridae	Chironomidae
Family Biotic Index	5.28	4.43	5.77	5.50
Scraper/Filterer Collector	0	0	0	0
Shredder/Total	.09	.24	.03	.49
E+P+T	5	4	2	2
%EPT	12	17.17	3	8
EPT/C	1.71	1.21	3	.16
Impairment(rating)	moderate(18)	slight(21)	moderate(12)	moderate(12)
Deficiency(s) noted*	none	none	PCWO	PCWO

* PCWO - Paucity of Clean Water Organisms