State of New Jersey
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AMBIENT BIOMONITORING NETWORK

Atlantic Coastal Drainage Basin

1994 - 95 Benthic Macroinvertebrate Data

New Jersey Department of Environmental Protection
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COMMISSIONER

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Introduction

Historical Perspective

Since the early 1970's, the Bureau of Water Monitoring (BWM) has been conducting biomonitoring studies on the state's waterbodies. Biomonitoring conducted by the bureau has included both long-term ambient monitoring and intensive surveys.

Between 1977 and 1988 the ***Ambient Station Biomonitoring Network*** was sampled in cooperation with United States Environmental Protection Agency (USEPA) Region II and Headquarters and the United States Geological Survey (USGS). The resulting biological data was utilized by the 305(b) Program in its evaluations of waterbody impairment. After 1988, funding for ambient biomonitoring was severely curtailed, resulting in the abandonment of routine ambient biomonitoring in the State.

In 1991, BWM received numerous requests from the Office of Regulatory Policy to reactivate the Ambient Biomonitoring Network. The network stations have not been sampled since 1988 and a revisiting of the entire network was overdue. Long-term monitoring data from this network will be most beneficial to the generation of the 305(b) Biennial Report, to the updating of the 303(d) list, to providing the Department with the baseline data necessary to make sound environmental policy decisions in watershed management, and to direct permit activities.

Data Quality Objectives

Accordingly, in 1992 (NJ fiscal year 93), BWM designed and initiated the ***Ambient Biomonitoring Network (AMNET)***. The goal of the program is to establish a network of lotic (running water) stations in each major watershed drainage basin. Each watershed drainage basin will be biomonitored for benthic macroinvertebrate populations on a five to six year rotation. The frequency of sampling is reflective of a realistic temporal lag between the cessation of a perturbation and a biological community's recovery from said perturbation. Experience in the 305(b) Program, which reexamines the responses of New Jersey's biological communities to changes in water quality on a two year cycle, has indicated that five years is the optimum frequency for long-term biomonitoring.

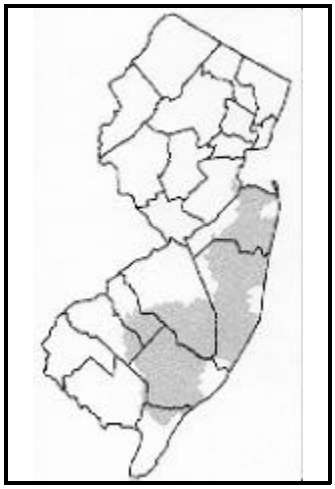

Figure 1 - Study Area

Based upon existing database deficiencies, the area of the Atlantic Coastal Drainage Basin shaded in Figure 1 was selected to be monitored during NJ fiscal year 1995 (calendar year 1994-1995). The area was sampled from the sources of its many tributaries down to the Head-of-Tide.

Site Selection

At least one monitoring station has been located on every second order stream and all first order streams at least three miles in length. Stream order is defined as a measure of the position of a stream in the hierarchy of tributaries. First order streams are those with no tributaries, while second order streams are those that have as tributaries only first order streams.

To the greatest extent possible, the network incorporated existing USGS and New Jersey Department of Environmental Protection (NJDEP) ambient monitoring stations so that correlation of the data sets could be maximized. Furthermore, the network was designed with mainstem (second or third order) stations located before the confluence of major tributaries and with stations located so as to assess the impacts of larger lakes. Known sources of contamination, and significant natural features (i.e., freshwater wetlands, preserves, Fish, Game and Wildlife Management Areas, etc.) were also considered when selecting the sampling locations. **Monitoring station locations in the study area are indicated on the Geographical Information System (G.I.S.) Maps # 1 through 12.** All stations were positioned via the Global Positioning System (GPS), using Trimble Pathfinder Basic Plus global positioning units. Position data was corrected via the NJDEP and University of Rhode Island base station data sets. ***Appendix A contains a compilation of all station locations as generated by the GPS.***

Since the objectives of this monitoring network are to provide long-term basin wide biological impact data, the geographical dispersion of the stations was deemed adequate. However, it is likely that the monitoring resolution will not be sufficient to adequately assess the impact of any one point source of pollution. The development of site specific biological impact data is best handled by conducting an intensive biomonitoring survey.

While biological monitoring using benthic macroinvertebrate community structure is an excellent water quality monitoring tool, it is only one branch of water quality monitoring. Additional tools include water column chemistry, sediment chemistry, toxicity testing, fish tissue analysis, and fish community analysis. The most comprehensive evaluation would incorporate all of these elements. However, financial constraints make such monitoring difficult to perform. The frugality of benthic macroinvertebrate analysis provides the water pollution control professional with a holistic assessment of water quality at a reasonable cost.

Methods

Benthic Macroinvertebrate Sampling

The benthic macroinvertebrate sampling was performed in accordance with the procedures delineated in Chapter 7, section K. of the Department's "Field Procedures Manual, NJDEP, May 1992" and, with the following modifications for application to New Jersey's waters, the USEPA's Rapid Bioassessment Protocol II as given in "U.S. Environmental Protection Agency (EPA), 1989, Rapid Bioassessment Protocols For Use In Streams and Rivers, EPA/4444/4-89-001, Assessment and Watershed Protection Division, Washington D.C." The rapid bioassessment was based upon an evaluation of relatively few samples collected at each station. AMNET's goal is to perform an evaluation of overall biological integrity by capitalizing upon the ability of benthic communities to holistically reflect environmental

perturbations. It was imperative, therefore, that sampling be conducted when most of the benthic macroinvertebrates had both attained a size range likely to be retained during standard sieving and sorting, and when in a life stage most conducive to accurate identification. Since most emergence and reproduction occur in the spring and fall, a time when about 80 percent of the macroinvertebrates would be too small to be captured by conventional methods, the period between early June and early September was selected as the optimal collection period. In cases where fall emergence and reproduction were not an issue, sampling could continue into late fall / early winter.

Protocol II of the Rapid Bioassessment (RBPII) employs a systematic field collection of benthic macroinvertebrates and the subsequent analysis of the samples for major taxa. Semiquantitative samples of benthic macroinvertebrates were collected from three different locations at each sampling station. Both riffle/run area samples and Coarse Particulate Organic Matter (CPOM) samples were included in a composite sample for a given station. Using composite samples ameliorates the effects of habitat inconsistency between stations. Samples were collected either with a Surber Sampler, Kick Net, Petite Ponar, or by hand picking. During the field investigation, qualitative observations of habitat, surrounding land use, obvious sources of pollution, and observations of other aquatic biota were made and recorded.

The entire sample collected was sieved through a #30 mesh sieve, put into an appropriate container, preserved with between 5% - 10% formalin (up to 20% formalin was used in cases of excessive organic loading), and transported to the bureau's biomonitoring laboratory for sorting and identification.

Sample Sorting and Identification

The samples were placed on a grid in a small pan with a light colored bottom for the sorting and enumeration of a 100-organism subsample, as per the protocol. The subsampling procedure consisted of evenly distributing the composite sample into the pan. Grids were randomly selected and all organisms within those grids were removed until 100 had been counted. All organisms in the subsample were identified to at least family, though in most cases the identifications were taken to the species level.

Data Analysis

Benthic community biological impairment may be manifested by the absence of pollution sensitive macroinvertebrate taxa (such as Ephemeroptera [mayfly], Plecoptera [stonefly], and Trichoptera [caddisfly]); by excessive dominance by certain taxon (especially pollution tolerant groups such as some Chironomidae [midge] and Oligochaeta [aquatic worm]); by low overall taxa richness; or by perceptible shifts in community structure relative to a reference condition. All of these indicators were utilized in evaluating the RBPII sampling data generated during this study.

The RBPII data analysis protocol is a standardized bioassessment protocol developed by the USEPA in response to a need for a cost effective biomonitoring tool. The RBPII data analysis protocol integrates several community, population, and functional parameters into one easily comprehended evaluation of biological integrity. This integrated approach to data analysis recognizes that each parameter, or biometric, has different ranges of sensitivity to pollution stresses. An integrated assessment provides increased assurance of validity due to the variety of biometrics evaluated. A deficiency in any one metric

for a particular environmental situation is, therefore, less likely to invalidate the study conclusions. The integrated assessment results in each station being given a biological condition category rating, providing the analyst with an easily communicated assessment of relative impairment; this assessment is referred to in this report as the ***Bioassessment Rating***.

The USEPA RBPII data analysis protocol, with some revision, was utilized to evaluate the 1993-94 sample data. Sample station data was evaluated by comparison to a historical database, consisting of 200 benthic macroinvertebrate samples collected in the state, using the impairment criteria developed by Mr. J. Kurtenbach, USEPA - Region II (A Method for Rapid Bioassessment of Streams in New Jersey Using Benthic Macroinvertebrates, Annual Meeting of the North American Benthological Society, Santa Fe, 1991). The bioassessment scores resulting from said analyses are referred to as ***NJ Impairment Scores*** *(NJIS)*.

The biometrics used in the assessments are based on family level taxonomy. The NJIS was developed, using the aforementioned database, for evaluating New Jersey biomonitoring stations. Community metric criteria were established for three categories of water quality bioassessment; ***non-impaired***, ***moderately impaired***, and ***severely impaired*** (Table 1), using the following metrics: **Taxa Richness,** which reflects the health of a community through a measure of the total taxa; **E + P + T**; the total number of the intolerant forms: *Ephemeroptera*, *Plecoptera*, and *Tricoptera*; **%EPT** (including the hydropsychid family); **%Contribution of the Dominant Family** (%CDF), a measure of community balance based upon the abundance of the numerically dominant taxon relative to the entire population; and **Modified Family Biotic Index** (FBI), which summarizes FTV (Family Tolerance Values) into a single score reflective of organic pollution.

In addition to the metrics listed above, any abnormalities observed in chironomid detritovores, herbivores, and periphyton feeders, demonstrated by number of abnormalities per number of chironomids analyzed for abnormalities, were also used, qualitatively, when developing the final evaluation of biological impairment.

Results and Discussion

The bioassessment ratings developed for each of the monitoring stations were used as the basis for evaluating the degree of biological impairment in the stream segments. In each subbasin, starting from the most downstream station, estimated stream segment bioassessment ratings were assigned by interpolating from the downstream station to the next contiguous upstream station. **The estimated stream segment bioassessment ratings are presented as color coded highlighted segments on each of the G.I.S. Maps # 1 through 12**. These ratings are best estimates of the instream biological impairment based upon the available data. For any given segment the actual instream conditions may be different due to unknown sources of degradation.

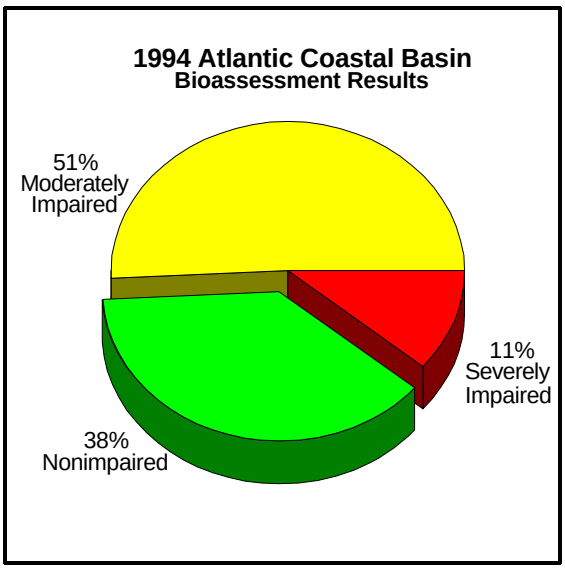

Figure 2

Overall, out of 197 monitoring stations sampled during this study period, **38%** were rated as ***NONIMPAIRED***, **51%** were rated as ***MODERATELY IMPAIRED***, and **11%** were rated as ***SEVERELY IMPAIRED*** (Figure 2).

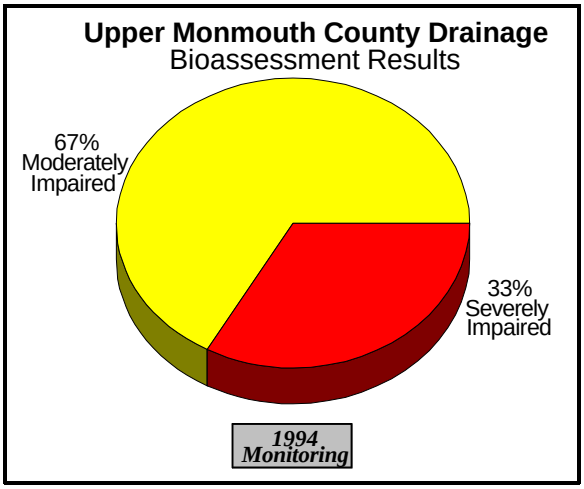

Figure 3

When the Atlantic Coastal Drainage Basin is examined by subbasin, different patterns of biological impairment emerge. The Upper Monmouth County drainage is depicted in Figure 3 (see also map 1). The majority of sites (67%) were rated as moderately impaired. The remaining sites (33%) were rated as severely impaired.

The Lower Monmouth County drainage is depicted in Figure 4 (see also map 2). No impairment was found at 18% of the sites. Moderate impairment was found at 73% of the sites while 9% of the sites were found to be severely impaired.

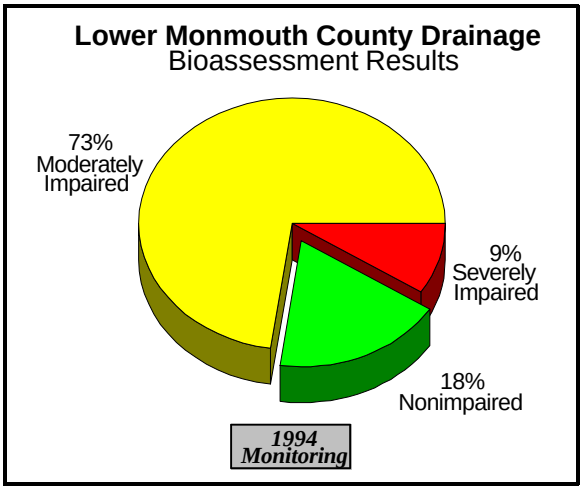

Figure 4

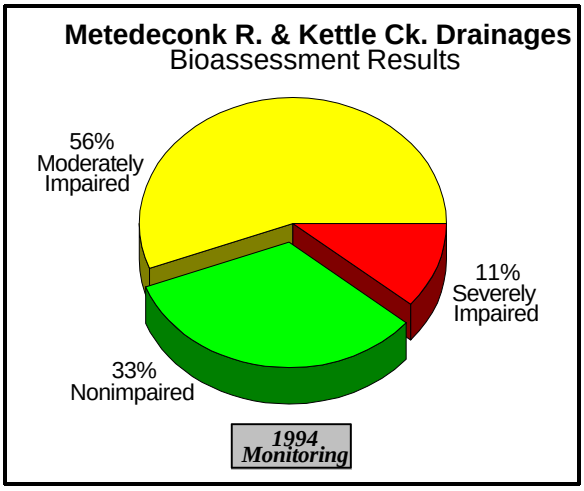

Figure 5

The Metedeconk River and Kettle Creek drainages are depicted in Figure 5 (see also map 3). Nonimpaired ratings were given to 33% of the sites. Moderate impairment was determined at 56% of the sites while 11% of the sites were rated as severely impaired.

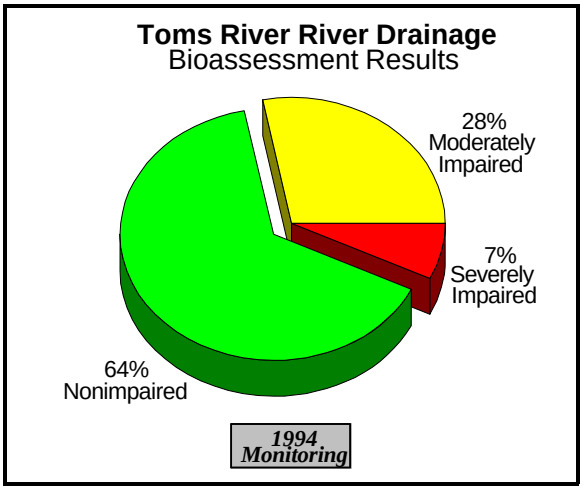

Figure 6

The Toms River drainage is depicted in Figure 6 (see also map 4). The majority of the sites (64%) were rated as nonimpaired. Moderate impairment was found at 28% of the sites while severe impairment was determined at 7% of the sites.

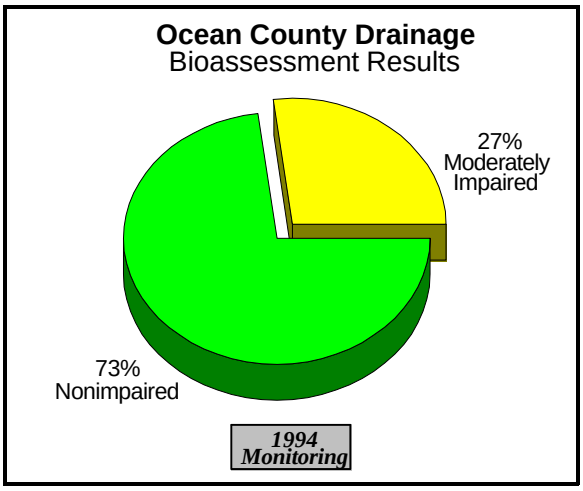

Figure 7

The Ocean County drainage with its associated smaller tributaries is depicted in Figure 7 (see also map 5). The results revealed that 73% of the sites were nonimpaired while moderate impairment was found at 27% of the sites.

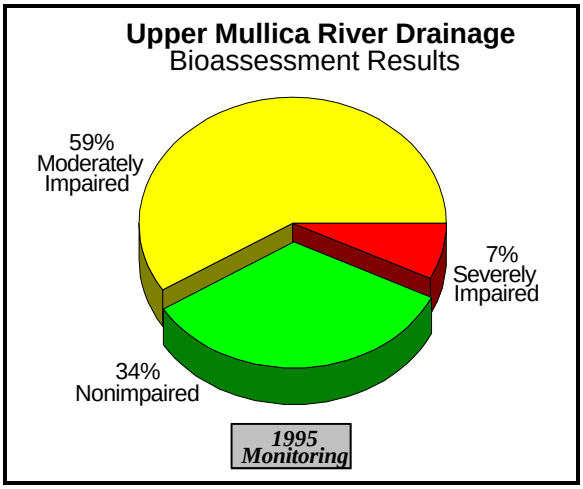

Figure 8

The Upper Mullica River drainage is depicted in Figure 8 (see also map 6). No impairment was indicated at 34% of the sites. The majority of the sites (59%) were rated as moderately impaired while 7% were rated as severely impaired.

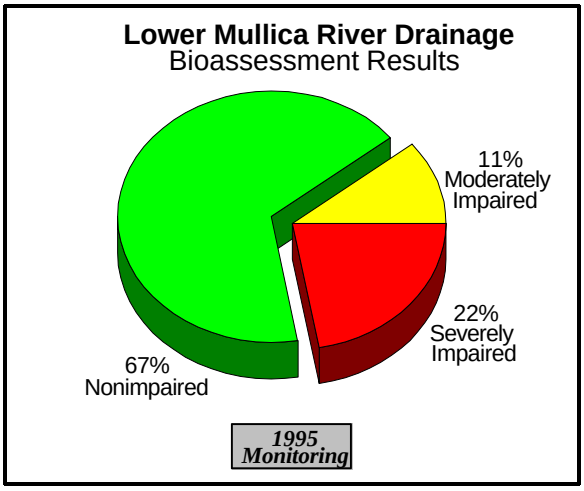

Figure 9

The Lower Mullica River drainage is depicted in Figure 9 (see also map 7). The majority of the sites (67%) were rated as nonimpaired. Moderate impairment was found at 11% of the sites while the remaining 22% of the sites were rated as severely impaired.

The Wading River and Bass River drainages are depicted in Figure 10 (see also map 8). No impairment was indicated at 33% of the sites. Moderate impairment was found at 56% of the sites while severe impairment was determined at 11% of the sites.

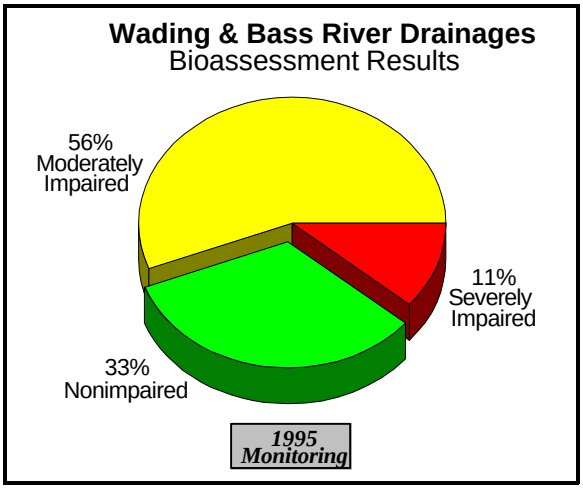

Figure 10

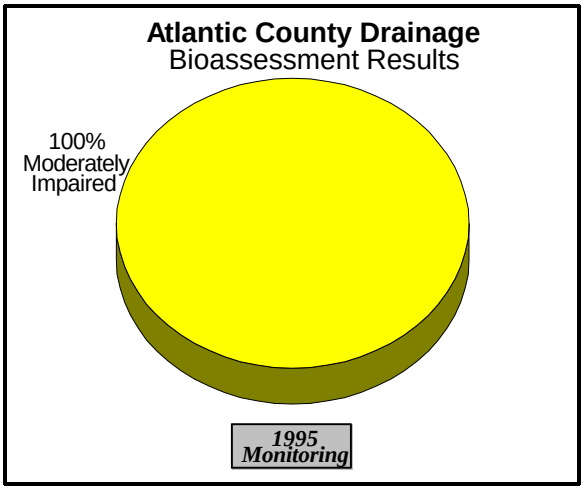

Figure 11

The Atlantic County drainage with its associated smaller tributaries is depicted in Figure 11 (see also map 9). All sites (100%) were rated as moderately impaired.

The Upper Egg Harbor River drainage is depicted in Figure 12 (see also map 10). No impairment was determined at 39% of the sites. The majority of the sites (55%) were rated as moderately impaired while the remaining 6% of the sites were rated as severely impaired.

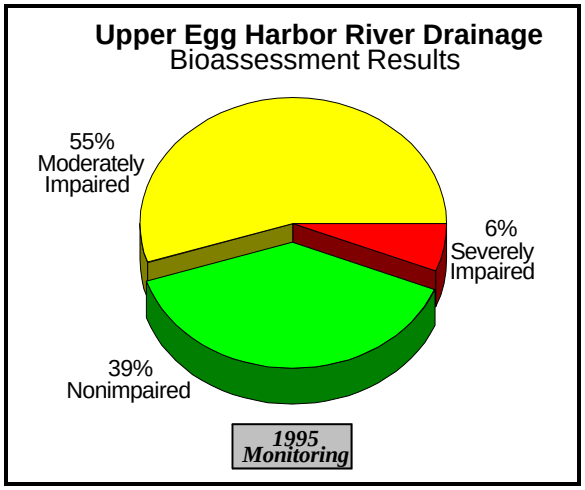

Figure 12

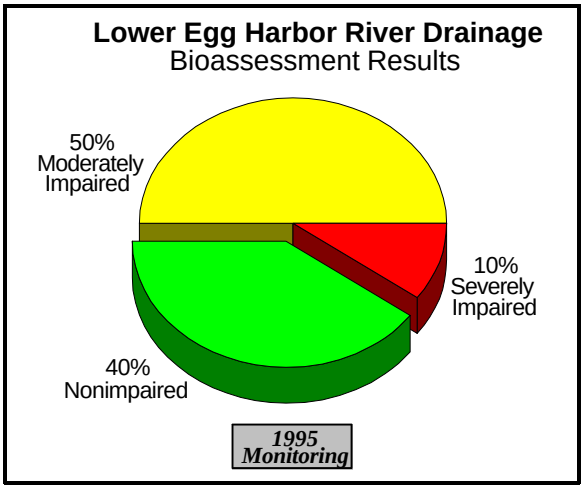

Figure 13

The Lower Egg Harbor river drainage is depicted in Figure 13 (see also map 11). No impairment was indicated at 40% of the sites. Moderate impairment was found at 50% of the sites while severe impairment was determined at 10% of the sites.

The Tuckahoe River drainage is depicted in Figure 14 (see also map 12). No impairment was detected at 60% of the sites while moderate impairment was found at the remaining (40%) sites.

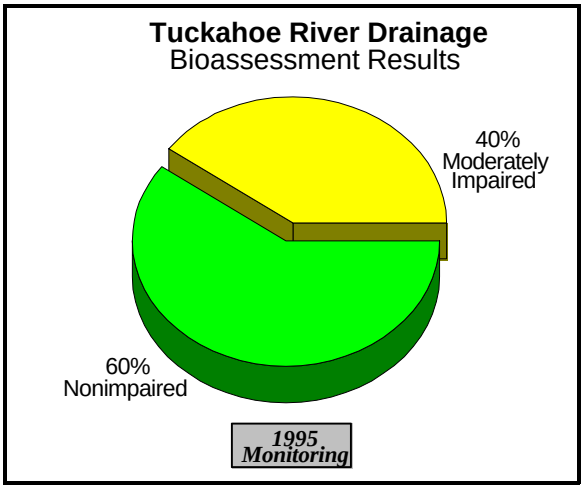

Figure 14

The raw taxonomic data, statistical analyses, and biological assessment ratings for each station are located in ***Appendix B***.

References

Kurtenbach, J., *A Method for Rapid Bioassessment of Streams in New Jersey Using Benthic Macroinvertebrates*, Bulletin of the North American Benthological Society, 8(1):129., 1990.

New Jersey Department of Environmental Protection, Bureau of Water Monitoring, *Standard Operating Procedures Manual for Biomonitoring Laboratory*, 1990.

New Jersey Department of Environmental Protection and Energy, *Field Sampling Procedures Manual* NJDEPE, 1992.

U.S. Environmental Protection Agency, *Rapid Bioassessment Protocols For The Use In Streams And Rivers* USEPA, 1989.

TABLE 1

CRITERIA FOR SCREENING WATER QUALITY IN NEW JERSEY STREAMS

Scoring Criteria For Rapid Bioassessments[1]

Biometrics	6	3	0
Taxa Richness (total Families)	> 10	10-5	4-0
E + P + T Index (EPT)	> 5	5-3	2-0
Percent Dominance (%CDF)	< 40	40-60	> 60
Percent EPT[2] (%EPT)	> 35	35-10	< 10
Modified Family Biotic Index[3] (FBI)	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. A community characterized by a maximum taxa richness, balanced taxa groups and good representation of intolerant individuals.

Moderately Impaired: Macroinvertebrate richness is reduced, in particular EPT taxa. Taxa composition changes result in reduced community balance and intolerant taxa become absent.

Severely Impaired: A dramatic change in the benthic community has occurred. Macroinvertebrates are dominated by a few taxa which are very abundant. Tolerant taxa are the only individuals present.

[1] Based on 100 organism subsamples
[2] Including the hydropsychid family
[3] Also known as the Hilsenhoff Biotic Index

MAPS

Appendix A Atlantic Coastal Basin GPS Data

Station	Waterbody	Latitude/ Longitude
AN0456	Matawan Ck	40 24'12.735"N 74 15'42.577"W
AN0457	Gravelly Bk	40 24'28.377"N 74 13'42.797"W
AN0458	Wilkson Ck	40 24'24.215"N 74 13'16.701"W
AN0459	Flat Ck	40 25'37.403"N 74 10'29.561"W
AN0460	Mahoras Bk	40 24'41.014"N 74 08'20.746"W
AN0461	Town Bk	40 23'20.121"N 74 06'17.813"W
AN0462	McClees Ck	40 23'06.687"N 74 03'58.023"W
AN0463	Poricy Bk	40 21'25.358"N 74 05'09.491"W
AN0464	Nut Swamp Bk	40 20'48.837"N 74 06'41.162"W
AN0465	Hop Bk	40 22'12.645"N 74 10'32.421"W
AN0466	Hop Bk	40 19'48.015"N 74 10'19.853"W
AN0467	Willow Bk	40 21'37.789"N 74 12'14.399"W
AN0468	Willow Bk	40 19'47.304"N 74 10'24.318"W
AN0469	Big Bk	40 19'26.412"N 74 14'39.876"W
AN0470	Big Bk	40 19'24.881"N 74 10'25.215"W
AN0471	Yellow Bk	40 16'33.719"N 74 13'07.024"W
AN0472	Yellow Bk	40 17'49.057"N 74 10'14.063"W
AN0473	Mine Bk	40 17'30.242"N 74 10'09.093"W
AN0474	Swimming River	40 19'12.279"N 74 06'46.344"W
AN0475	Hockhockson Bk	40 17'24.123"N 74 07'17.497"W
AN0476	Pine Bk	40 18'15.425"N 74 06'02.660"W
AN0477	Whale Pond Bk	40 16'31.284"N 74 00'35.573"W
AN0478	Poplar Bk	40 15'23.978"N 73 59'48.693"W
AN0479	Jumping Bk	40 14'10.903"N 74 04'56.910"W
AN0480	Jumping Bk	40 12'11.845"N 74 03'51.907"W
AN0481	Shark River	40 13'42.032"N 74 07'28.261"W
AN0482	Shark River	40 11'55.088"N 74 04'11.362"W

Station	Waterbody	Latitude/ Longitude
AN0483	Wreck Pond Bk	40 08'38.240"N 74 03'11.170"W
AN0484	Hannabrand Bk	40 08'36.888"N 74 03'11.801"W
AN0485	Manasquan River	40 12'02.761"N 74 20'28.054"W
AN0486	Debois Ck	40 14'58.026"N 74 15'26.422"W
AN0487	Debois Ck	40 12'32.333"N 74 16'07.114"W
AN0488	Unnamed Trib to Manasquan River	40 12'32.120"N 74 15'48.845"W
AN0489	Manasquan River	40 12'15.745"N 74 15'22.766"W
AN0490	Manasquan River	40 11'33.921"N 74 11'42.422"W
AN0491	Marsh Bog Bk	40 12'52.149"N 74 10'52.465"W
AN0492	Marsh Bog Bk	40 10'01.260"N 74 09'32.215"W
AN0493	Manasquan River	40 09'42.051"N 74 09'16.348"W
AN0494	Mingamahone Bk	40 12'45.620"N 74 10'04.877"W
AN0495	Mingamahone Bk	40 09'57.503"N 74 08'59.733"W
AN0496	Stan Bk	40 08'39.281"N 74 09'48.259"W
AN0497	Squankum Bk	40 09'03.496"N 74 09'12.710"W
AN0498	Manasquan River	40 08'35.408"N 74 07'01.761"W
AN0499	N Br Metedeconk River	40 11'39.202"N 74 20'49.876"W
AN0500	N Br Metedeconk River	40 10'52.799"N 74 17'15.151"W
AN0501	N Br Metedeconk River	40 08'51.913"N 74 15'13.826"W
AN0502	N Br Metedeconk River	40 06'36.253"N 74 13'08.040"W
AN0503	Haystack Bk	40 08'46.678"N 74 11'57.276"W
AN0504	Haystack Bk	40 07'26.667"N 74 11'17.514"W
AN0505	Muddy Ford Bk	40 06'34.545"N 74 09'41.915"W
AN0506	N Br Metedeconk River	40 04'53.908"N 74 09'06.501"W
AN0507	Cabinfield Br	40 04'58.896"N 74 09'27.740"W
AN0508	S Br Metedeconk River	40 09'42.417"N 74 21'41.889"W
AN0509	S Br Metedeconk River	40 08'51.224"N 74 19'30.814"W

Appendix A Atlantic Coastal Basin GPS Data

Station	Waterbody	Latitude/ Longitude
AN0510	S Br Metedeconk River	40 07'36.448"N 74 16'40.381"W
AN0511	S Br Metedeconk River	40 05'12.980"N 74 12'43.838"W
AN0512	S Br Metedeconk River	40 04'43.762"N 74 09'23.207"W
AN0513	Beaverdam Ck	40 04'24.382"N 74 06'53.325"W
AN0514	Cedar Bridge Br	40 03'19.213"N 74 08'18.571"W
AN0515	Kettle Ck	40 03'17.311"N 74 11'45.941"W
AN0516	Kettle Ck	40 02'30.867"N 74 08'33.926"W
AN0517	Toms River	40 11'06.329"N 74 24'32.297"W
AN0518	Toms River	40 09'58.700"N 74 25'05.315"W
AN0519	Toms River	40 06'35.239"N 74 22'25.318"W
AN0520	Unnamed Trib to Toms River	40 06'43.052"N 74 20'38.031"W
AN0521	Maple Root Br	40 04'52.484"N 74 19'37.719"W
AN0522	Dove Mill Br	40 04'08.821"N 74 17'28.182"W
AN0523	Toms River	40 03'42.060"N 74 16'28.461"W
AN0524	Toms River	40 00'05.063"N 74 13'53.627"W
AN0525	Bordens Mill Br	40 03'04.136"N 74 26'18.297"W
AN0526	Shannae Bk	40 03'31.479"N 74 23'29.576"W
AN0527	Ridgeway Br	40 02'50.290"N 74 20'04.829"W
AN0528	Ridgeway Br	40 01'16.602"N 74 16'25.455"W
AN0529	Blacks Br	40 00'46.737"N 74 22'47.782"W
AN0530	Blacks Br	40 00'30.662"N 74 19'47.856"W
AN0531	Old Hurricane Br	39 59'28.903"N 74 22'44.706"W
AN0532	Manapaqua Br	40 00'44.351"N 74 18'08.892"W
AN0533	Union Br	40 00'29.381"N 74 17'37.405"W
AN0534	Union Br	40 00'22.763"N 74 14'48.685"W
AN0535	Toms River	39 59'11.738"N 74 13'25.468"W
AN0536	Wrangel Bk	39 58'22.141"N 74 19'26.457"W

Station	Waterbody	Latitude/ Longitude
AN0537	Wrangel Bk	39 57'53.690"N 74 14'36.988"W
AN0538	Sunken Br	39 58'02.914"N 74 14'31.134"W
AN0539	Wrangel Bk	39 57'39.477"N 74 13'41.257"W
AN0540	Davenport Br	39 55'35.966"N 74 20'17.971"W
AN0541	Davenport Br	39 57'37.775"N 74 14'40.168"W
AN0542	Jakes Br	39 54'55.658"N 74 16'24.661"W
AN0543	Jakes Br	39 56'07.451"N 74 12'41.579"W
AN0544	Unnamed Trib to Toms River	39 57'19.937"N 74 09'57.889"W
AN0545	Webbs Mill Br	39 53'16.503"N 74 22'46.543"W
AN0546	Cedar Ck	39 53'50.254"N 74 18'58.633"W
AN0547	Factory Br	39 52'52.182"N 74 16'30.652"W
AN0548	Cedar Ck	39 53'38.637"N 74 13'30.747"W
AN0549	Cedar Ck	39 52'03.701"N 74 10'08.079"W
AN0550	Long Br of N Br Forked River	39 49'02.140"N 74 17'34.177"W
AN0551	N Br Forked River	39 51'31.375"N 74 13'29.853"W
AN0552	Oyster Ck	39 47'53.907"N 74 15'00.327"W
AN0553	Waretown Ck	39 47'34.873"N 74 11'45.572"W
AN0554	Four Mile Br	39 42'26.783"N 74 16'00.961"W
AN0555	Mill Ck	39 41'33.720"N 74 15'31.934"W
AN0556	Cedar Run	39 40'48.951"N 74 16'15.046"W
AN0557	Westecunk Ck	39 39'59.592"N 74 19'12.923"W
AN0558	Westecunk Ck	39 38'24.939"N 74 18'28.067"W
AN0559	Mill Br of Tuckerton Ck	39 36'37.501"N 74 20'59.833"W
AN0560	Mullica River	39 47'09.311"N 74 51'36.670"W
AN0561	Mullica River	39 46'34.587"N 74 47'55.514"W
AN0562	Mullica River	39 44'35.026"N 74 45'25.637"W
AN0563	Wesickaman Ck	39 44'27.878"N 74 43'24.077"W

Appendix A Atlantic Coastal Basin GPS Data

Station	Waterbody	Latitude/ Longitude
AN0564	Mullica River	39 39'33.315"N 74 39'30.917"W
AN0565	Hays Mill Ck	39 45'02.448"N 74 50'27.301"W
AN0566	Sleeper Br	39 43'21.979"N 74 45'23.637"W
AN0567	Clarks Br	39 42'48.684"N 74 46'40.249"W
AN0568	Prices Br	39 43'19.550"N 74 47'47.944"W
AN0569	Pump Br	39 41'58.655"N 74 50'39.208"W
AN0570	Blue Anchor Bk	39 41'17.490"N 74 50'04.093"W
AN0571	Albertson Bk	39 41'35.070"N 74 48'22.624"W
AN0572	Albertson Bk	39 41'40.910"N 74 44'38.276"W
AN0573	Great Swamp Bk	39 40'18.019"N 74 49'30.981"W
AN0574	Great Swamp Bk	39 41'03.368"N 74 45'47.927"W
AN0575	Cedar Bk	39 39'52.436"N 74 45'56.055"W
AN0576	Nescohague Ck	39 38'28.782"N 74 39'40.933"W
AN0577	Hammonton Ck	39 37'57.912"N 74 45'37.641"W
AN0578	Hammonton Ck	39 37'40.762"N 74 41'36.744"W
AN0579	Batsto River	39 48'02.393"N 74 40'20.754"W
AN0580	Roberts Br	39 47'16.213"N 74 39'33.924"W
AN0581	Skit Br	39 47'08.597"N 74 39'29.778"W
AN0582	Indian Mills Bk	39 47'35.360"N 74 44'47.794"W
AN0583	Muskingum Bk	39 47'41.517"N 74 44'29.657"W
AN0584	Springers Bk	39 46'45.701"N 74 44'18.819"W
AN0585	Springers Bk	39 45'19.474"N 74 41'46.395"W
AN0586	Batsto River	39 42'34.668"N 74 39'58.838"W
AN0587	Pen Swamp Br	39 41'02.959"N 74 39'01.352"W
AN0588	Batsto River	39 38'31.254"N 74 38'59.579"W
AN0589	Lucas Br	39 37'03.357"N 74 37'48.428"W
AN0590	Landing Ck	39 32'08.751"N 74 39'26.918"W

Station	Waterbody	Latitude/ Longitude
AN0591	Elliots Ck	39 32'41.029"N 74 36'22.910"W
AN0592	Landing Ck	39 33'24.529"N 74 36'10.286"W
AN0593	Indian Cabin Ck	39 34'15.793"N 74 39'50.060"W
AN0594	Indian Cabin Ck	39 33'31.228"N 74 36'17.837"W
AN0595	West Br Wading River	39 48'52.036"N 74 32'49.311"W
AN0596	West Br Wading River	39 47'23.466"N 74 32'08.800"W
AN0597	Shoal Br	39 46'35.273"N 74 30'30.785"W
AN0598	Mile Run	39 45'14.431"N 74 33'15.274"W
AN0599	Tulpehocken Ck	39 46'17.049"N 74 36'52.225"W
AN0600	Tulpehocken Ck	39 42'51.783"N 74 33'57.169"W
AN0601	Little Hauken Run	39 42'57.765"N 74 32'05.993"W
AN0602	Wading River	39 40'26.247"N 74 32'13.815"W
AN0603	Oswego River	39 46'32.771"N 74 22'04.117"W
AN0604	Plains Br	39 45'51.390"N 74 24'28.223"W
AN0605	Papoose Br	39 44'32.151"N 74 27'09.681"W
AN0606	Oswego River	39 43'53.532"N 74 29'19.798"W
AN0607	Oswego River (E Br Wading River)	39 39'48.457"N 74 31'24.552"W
AN0608	Arnold Br	39 38'46.247"N 74 30'12.048"W
AN0609	Tub Mill Br	39 38'40.920"N 74 30'02.755"W
AN0610	West Br Bass River	39 37'27.357"N 74 26'45.044"W
AN0611	Dans Bridge Br	39 38'12.016"N 74 25'34.679"W
AN0612	East Br Bass River	39 37'24.146"N 74 26'28.020"W
AN0613	Clarks Mill Stream	39 30'57.885"N 74 30'28.201"W
AN0614	Morses Mill Stream	39 30'39.081"N 74 30'11.840"W
AN0615	Mattix Run	39 29'39.424"N 74 28'45.286"W
AN0616	N Br Absecon Ck	39 26'42.079"N 74 32'20.056"W
AN0617	S Br Absecon Ck	39 26'23.385"N 74 33'58.793"W

Appendix A Atlantic Coastal Basin GPS Data

Station	Waterbody	Latitude/ Longitude
AN0618	Mill Br	39 23'44.571"N 74 35'35.497"W
AN0619	Maple Run	39 22'32.351"N 74 34'18.285"W
AN0620	Great Egg Harbor River	39 46'52.071"N 74 56'35.204"W
AN0621	Great Egg Harbor River	39 44'01.753"N 74 57'05.024"W
AN0622	Four Mile Br	39 41'47.628"N 74 56'23.787"W
AN0623	Great Egg Harbor River	39 40'10.371"N 74 54'48.289"W
AN0624	Squankum Br	39 40'04.359"N 74 57'38.194"W
AN0625	Great Egg Harbor River	39 35'39.832"N 74 51'04.227"W
AN0626	Penny Pot Stream	39 34'48.229"N 74 49'02.597"W
AN0627	Hospitality Br	39 38'40.179"N 74 59'08.709"W
AN0628	Hospitality Br	39 37'14.233"N 74 55'37.429"W
AN0629	Faraway Br	39 36'58.367"N 74 56'09.741"W
AN0630	White Oak Br	39 35'47.012"N 74 55'05.246"W
AN0631	Collings Br	39 33'57.943"N 74 55'33.719"W
AN0632	Collings Br	39 35'23.355"N 74 52'53.270"W
AN0633	Hospitality Br	39 35'18.515"N 74 51'31.545"W
AN0634	Three Pond Bk	39 34'51.890"N 74 52'02.117"W
AN0635	Great Egg Harbor River	39 31'05.251"N 74 46'43.162"W
AN0636	Deep Run	39 31'20.641"N 74 55'11.740"W
AN0637	Deep Run	39 30'26.186"N 74 46'54.885"W
AN0638	Mare Run	39 28'43.593"N 74 45'26.992"W
AN0639	Watering Race	39 28'21.891"N 74 42'54.977"W
AN0640	Babcock Ck	39 28'08.225"N 74 41'33.057"W
AN0641	Gravelly Run	39 25'38.137"N 74 42'06.261"W
AN0642	Miry Run	39 24'20.259"N 74 41'29.242"W
AN0643	South River	39 28'16.176"N 74 50'35.343"W
AN0644	South River	39 26'25.336"N 74 45'20.120"W

Station	Waterbody	Latitude/ Longitude
AN0645	Stephens Ck	39 24'56.173"N 74 47'41.893"W
AN0646	Stephens Ck	39 23'37.822"N 74 44'53.539"W
AN0647	Gibson Ck	39 21'11.307"N 74 45'22.319"W
AN0648	Tuckahoe River	39 22'20.030"N 74 51'12.404"W
AN0649	Tuckahoe River	39 19'26.042"N 74 51'40.518"W
AN0650	Tuckahoe River	39 18'25.426"N 74 49'13.234"W
AN0651	McNeals Br	39 18'57.708"N 74 49'27.551"W
AN0652	Mill Ck	39 17'03.613"N 74 47'31.199"W

APPENDIX B

AN0456 # Matawan Ck, Morganville Rd, Marlboro Twp
USGS Quad + South Amboy

August 2, 1994

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AN0457 # Gravelly Bk, Church St, Aberdeen Twp
USGS Quad + Keyport

August 1, 1994

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AN0458 # Wilkson Ck, Church St, Aberdeen Twp
USGS Quad + Keyport

August 1, 1994

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AN0459 # Flat Ck, Middle Rd, Raritan Twp
USGS Quad + Keyport

August 1, 1994

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AN0460 # Mahoras Bk, Rt 35, Middletown Twp
USGS Quad + Keyport

August 1, 1994

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AN0461 # Town Bk, Spruce Rd, Middletown Twp
USGS Quad + Sandy Hook

August 2, 1994

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AN0462 # McClees Ck, Whippoorwill Rd, Middletown Twp
USGS Quad + Sandy Hook

August 3, 1994

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AN0463 # Poricy Bk, Navesink R Rd, Middletown Twp
USGS Quad + Long Branch

August 3, 1994

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AN0464 # Nut Swamp Bk, Normandy Rd, Middletown Twp
USGS Quad + Long Branch

August 3, 1994

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AN0465 # Hop Bk, Roberts Rd, Holmdel Twp
USGS Quad + Marlboro

August 9, 1994

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AN0466 # Hop Bk, Willow Bk Rd, Holmdel Twp
USGS Quad + Marlboro

August 3, 1994

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AN0467 # Willow Bk, Schank Rd, Holmdel Twp
USGS Quad + Marlboro

August 9, 1994

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AN0468 # Willow Bk, Willow Bk Rd, Colts Neck Twp
USGS Quad + Marlboro

August 3, 1994

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AN0469 # Big Bk, Rt 79, Marlboro Twp
USGS Quad + Marlboro

August 9, 1994

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AN0470 # Big Bk, Cross Rd, Colts Neck Twp
USGS Quad + Marlboro

August 3, 1994

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AN0471 # Yellow Bk, Rt 537, Freehold Twp
USGS Quad + Marlboro

August 9, 1994

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AN0472 # Yellow Bk, Creamery Rd, Colts Neck Twp
USGS Quad + Marlboro

August 9, 1994

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AN0473 # Mine Bk, Creamery Rd, Colts Neck Twp
USGS Quad + Marlboro

August 9, 1994

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AN0474 # Swimming R, Swimming R Rd, Lincroft
USGS Quad + Long Branch

August 3, 1994

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AN0475 # Hockhockson Bk, Hockhockson Rd, Colts Neck Twp
USGS Quad + Long Branch

August 3, 1994

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AN0476 # Pine Bk, Tinton Ave (Rt 537), Tinton Falls
USGS Quad + Long Branch

August 3, 1994

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AN0477 # Whale Pd Bk, Larchwood Ave, Oakhurst
USGS Quad + Long Branch

August 4, 1994

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AN0478 # Poplar Bk, Almyr Ave, Deal
USGS Quad + Long Branch

August 4, 1994

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AN0479 # Jumping Bk, Essex Rd, New Shrewsbury Twp
USGS Quad + Asbury Pk

August 4, 1994

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AN0480 # Jumping Bk, Corlies Ave, Neptune Twp
USGS Quad + Asbury Pk

September 20, 1994

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AN0481 # Shark R, Shark R Rd, Wall Twp
USGS Quad + Asbury Pk

August 4, 1994

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AN0482 # Shark R, Remsen Mill Rd, Remsen
USGS Quad + Asbury Pk

September 20, 1994

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AN0483 # Wreck Pd, Old Mill Rd, Wall Twp
USGS Quad + Asbury Pk

August 10, 1994

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AN0484 # Hannabrand Bk, Old Mill Rd, Wall Twp
USGS Quad + Asbury Pk

August 10, 1994

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AN0485 # Manasquan R, off Turkey Swamp Rd, Freehold Twp
USGS Quad + Adelphia

October 7, 1992

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AN0486 # Debois Ck, Rt 33, Freehold Twp
USGS Quad + Adelphia

September 14, 1994

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AN0487 # Debois Ck, Strickland Rd, Howell Twp
USGS Quad + Adelphia

September 14, 1994

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AN0488 # Manasquan R un trb, Strickland Rd, Howell Twp
USGS Quad + Adelphia

September 14, 1994

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AN0489 # Manasquan R, Rt 9, Wyckoff Mills
USGS Quad + Adelphia

September 14, 1994

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AN0490 # Manasquan R, W Farms Rd, Howell Twp
USGS Quad + Farmingdale

August 9, 1994

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AN0491 # Marsh Bog Bk, Cranberry Bog Rd, Howell Twp
USGS Quad + Farmingdale

August 9, 1994

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AN0492 # Marsh Bog Bk, Yellow Bk Rd, Squankum
USGS Quad + Farmingdale

August 9, 1994

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AN0493 # Manasquan R, Rt 547, Squankum
USGS Quad + Farmingdale

August 9, 1994

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AN0494 # Mingamahone Bk, Cranberry Bog Rd, Howell Twp
USGS Quad + Farmingdale

August 9, 1994

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AN0495 # Mingamahone Bk, Rt 524, Squankum
USGS Quad + Farmingdale

August 9, 1994

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AN0496 # Stan Bk, Easy St, Howell Twp
USGS Quad + Farmingdale

October 30, 1990

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AN0497 # Squankum Bk, Spur 549, Howell Twp
USGS Quad + Farmingdale

August 10, 1994

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AN0498 # Manasquan R, Hospital Rd, Wall Twp
USGS Quad + Asbury Pk

August 10, 1994

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AN0499 # N Br Metedeconk R, Rt 527, Freehold Twp
USGS Quad + Adelphia

September 28, 1994

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AN0500 # N Br Metedeconk R, Jackson Mills Rd, Freehold Twp
USGS Quad + Adelphia

September 28, 1994

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AN0501 # N Br Metedeconk R, Aldrich Rd, Howell Twp
USGS Quad + Adelphia

September 28, 1994

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AN0502 # N Br Metedeconk R, Rt 9, Lakewood
USGS Quad + Lakewood

September 28, 1994

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AN0503 # Haystack Bk, Southard Rd, Howell Twp
USGS Quad + Farmingdale

August 10, 1994

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AN0504 # Haystack Bk, Rt 547, Howell Twp
USGS Quad + Lakewood

August 10, 1994

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AN0505 # Muddy Ford, Greenville Rd, Howell Twp
USGS Quad + Lakewood

September 20, 1994

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AN0506 # N Br Metedeconk R, Rt 88, Lakewood Twp
USGS Quad + Lakewood

September 20, 1994

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AN0507 # Cabinfield Br, Lanes Mill Rd, Lakewood Twp
USGS Quad + Lakewood

September 20, 1994

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AN0508 # S Br Metedeconk R, Leesville-Siloam Rd, Jackson Twp
USGS Quad + Adelphia

October 29, 1990

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AN0509 # S Br Metedeconk R, Jackson Mills Rd, Jackson Mills
USGS Quad + Adelphia

September 28, 1994

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AN0510 # S Br Metedeconk R, Bennetts Mill Rd, Bennetts Mill
USGS Quad + Adelphia

September 28, 1994

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AN0511 # S Br Metedeconk R, Cedar Bridge Rd, Lakewood
USGS Quad + Lakewood

October 18, 1994

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AN0512 # S Br Metedeconk R, Chambers Bridge Rd, Brick Twp
USGS Quad + Lakewood

October 18, 1994

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AN0513 # Beaver Dam Ck, Rt 88, Brick Twp
USGS Quad + Pt Pleasant

September 20, 1994

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AN0514 # Cedar Bridge Br, Moore Rd, Brick Twp
USGS Quad + Lakewood

October 18, 1994

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AN0515 # Kettle Ck, New Hampshire Ave, Lakewood Twp
USGS Quad + Lakewood

October 18, 1994

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AN0516 # Kettle Ck, Moore Rd, Brick Twp
USGS Quad + Lakewood

October 18, 1994

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AN0517 # Toms R, Paint Island Rd, Millstone Twp
USGS Quad + Roosevelt

October 29, 1990

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AN0518 # Toms R, Rt 571, Holmson
USGS Quad + Roosevelt

October 12, 1994

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AN0519 # Toms R, Rt 528, Cassville
USGS Quad + Lakehurst

October 12, 1994

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USGS Quad + Lakehurst

October 12, 1994

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AN0521 # Maple Root Br, Bowman Rd, Jackson Twp
USGS Quad + Lakehurst

October 12, 1994

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AN0522 # Dove Mill Br, Grawtown Rd, Jackson Twp
USGS Quad + Lakehurst

October 13, 1994

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USGS Quad + Lakehurst

October 13, 1994

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AN0524 # Toms R, Rt 571, Dover Twp
USGS Quad + Lakewood

October 13, 1994

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AN0525 # Bordens Mill Br, Colliers Mills WMA, Jackson Twp
USGS Quad + Cassville

October 18, 1994

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AN0526 # Shannae Br, Colliers Mills WMA, Jackson Twp
USGS Quad + Cassville

October 18, 1994

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AN0527 # Ridgeway Br, Rt 571, Legler
USGS Quad + Lakehurst

October 19, 1994

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AN0528 # Ridgeway Br, Rt 70, Manchester Twp
USGS Quad + Lakehurst

October 19, 1994

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AN0529 # Blacks Br, Naval Air Sta boundary, Manchester Twp
USGS Quad + Lakehurst

October 18, 1994

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AN0530 # Blacks Br, Rt 70, Lakehurst
USGS Quad + Lakehurst

October 19, 1994

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AN0531 # Old Hurricane Br, Beckerville Rd, Manchester Twp
USGS Quad + Whiting

November 14, 1990

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AN0532 # Manapaqua Bk, Rt 70, Lakehurst
USGS Quad + Lakehurst

October 19, 1994

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AN0533 # Union Br, Colonial Dr, Manchester Twp
USGS Quad + Lakehurst

October 19, 1994

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AN0534 # Union Br, Beacon Ave, Pine Lk Pk-Manchester Twp
USGS Quad + Lakewood

November 1, 1994

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AN0535 # Toms R, Oakridge Pkwy, Dover Twp
USGS Quad + Toms R

October 13, 1994

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AN0537 # Wrangel Bk, Mule Rd, Berkeley Twp
USGS Quad + Toms R

November 1, 1994

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AN0538 # Sunken Br, Mule Rd, Berkeley Twp
USGS Quad + Toms R

November 3, 1994

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AN0539 # Wrangel Bk, S Hampton Rd, Berkeley Twp
USGS Quad + Toms R

November 3, 1994

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AN0540 # Davenport Br, Lacey Rd, Berkeley Twp
USGS Quad + Keswick Grove

November 29, 1994

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AN0541 # Davenport Br, Mule Rd, Berkeley Twp
USGS Quad + Keswick Grove

November 3, 1994

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AN0542 # Jakes Br, Dover Rd, Berkeley Twp
USGS Quad + Keswick Grove

November 29, 1994

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AN0543 # Jakes Br, Double Trouble Rd, S Toms R
USGS Quad + Toms R

November 29, 1994

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AN0544 # Toms R un trb, Rt 37, Dover Twp
USGS Quad + Toms R

October 19, 1994

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AN0545 # Webbs Mill Br, Rt 539, Lacey Twp
USGS Quad + Whiting

December 1, 1994

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AN0546 # Cedar Ck, Whiting Lacey Rd, Bamber Lk-Lacey Twp
USGS Quad + Keswick Grove

December 1, 1994

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AN0547 # Factory Br, Whiting Lacey Rd, Lacey Twp
USGS Quad + Keswick Grove

December 1, 1994

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AN0548 # Cedar Ck, Double Trouble St Pk, Lacey Twp
USGS Quad + Toms R

December 1, 1994

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AN0549 # Cedar Ck, Rt 9, Lanoka Harbor
USGS Quad + Forked R

December 1, 1994

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AN0550 # Long Br, , Lacey-Ocean Twp boundary
USGS Quad + Brookville

December 13, 1994

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AN0551 # N Br Forked R, @ powerlines, Lacey Twp
USGS Quad + Forked R

November 29, 1994

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AN0552 # Oyster Ck, Rt 532, Ocean Twp
USGS Quad + Brookville

December 13, 1994

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AN0553 # Waretown Ck, Rt 9, Waretown
USGS Quad + Forked R

December 13, 1994

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AN0554 # Four Mile Br, Oxycocus St, Manahawkin
USGS Quad + West Creek

December 20, 1994

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AN0555 # Mill Ck, Rt 72, Manahawkin
USGS Quad + West Creek

December 13, 1994

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AN0556 # Cedar Run, Rt 9, Mayetta
USGS Quad + West Creek

December 20, 1994

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AN0557 # Westecunk Ck, Forge Rd, Eagleswood Twp
USGS Quad + West Creek

December 20, 1994

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AN0558 # Westecunk Ck, Rail Road Ave, West Creek
USGS Quad + West Creek

December 20, 1994

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AN0559 # Mill Br, Nugentown Rd, Nugentown
USGS Quad + Tuckerton

December 20, 1994

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AN0560 # Mullica R, Jackson-Medford Rd, Waterford Twp
USGS Quad + Medford Lks

March 9, 1995

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AN0561 # Mullica R, Jackson Rd, Waterford Twp
USGS Quad + Medford Lks

March 9, 1995

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AN0562 # Mullica R, Burnt House Rd, Shamong Twp
USGS Quad + Hammonton

March 9, 1995

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AN0563 # Wesickamon Ck, Atsion-Quakerbridge Rd, Atsion
USGS Quad + Atsion

February 23, 1995

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AN0564 # Mullica R, Constable Bridge, Mullica Twp
USGS Quad + Atsion

February 23, 1995

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AN0565 # Hays Mill Ck, Tremont Ave, Waterford Twp
USGS Quad + Medford Lks

March 16, 1995

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AN0566 # Sleeper Br, Parkdale, Waterford Twp
USGS Quad + Hammonton

March 16, 1995

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AN0567 # Clarks Br, Burnt Mill Rd, Waterford Twp
USGS Quad + Hammonton

March 16, 1995

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AN0568 # Prices Br, Burnt Mill Rd, Waterford Twp
USGS Quad + Hammonton

March 16, 1995

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AN0569 # Pump Br, Old White Horse Pike, Winslow Twp
USGS Quad + Hammonton

March 23, 1995

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AN0570 # Blue Anchor Bk, Rt 30, Winslow Twp
USGS Quad + Hammonton

March 28, 1995

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AN0571 # Albertson Bk, Wharton Ave, Waterford Twp
USGS Quad + Hammonton

March 23, 1995

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AN0572 # Albertson Bk, Old Bridge Crossing, Hammonton
USGS Quad + Atsion

March 23, 1995

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AN0573 # Great Swamp Br, Rt 30, Winslow Twp
USGS Quad + Hammonton

March 23, 1995

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AN0574 # Great Swamp Br, Rt 206, Hammonton
USGS Quad + Hammonton

March 16, 1995

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AN0575 # Cedar Bk, Myrtle Ave, Hammonton
USGS Quad + Hammonton

March 23, 1995

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AN0576 # Nescochague Ck, Pleasant Mills, Mullica Twp
USGS Quad + Atsion

March 28, 1995

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AN0577 # Hammonton Ck, Boyer Rd (blw STP), Hammonton
USGS Quad + Hammonton

January 29, 1992

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AN0578 # Hammonton Ck, Columbia Rd, Mullica Twp
USGS Quad + Atsion

January 29, 1992

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AN0579 # Batsto R, Carranza Rd, Shamong Twp
USGS Quad + Indian Mills

February 16, 1995

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AN0580 # Roberts Br, Carranza Rd, Shamong Twp
USGS Quad + Indian Mills

February 16, 1995

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AN0581 # Skit Br, Carranza Rd, Shamong Twp
USGS Quad + Indian Mills

February 16, 1995

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AN0582 # Indian Mills Bk, Willow Grove Rd, Indian Mills
USGS Quad + Indian Mills

February 16, 1995

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AN0583 # Muskingum Bk, Tabernacle Rd, Indian Mills
USGS Quad + Indian Mills

February 22, 1995

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AN0584 # Springers Bk, Rt 206, Shamong Twp
USGS Quad + Indian Mills

February 16, 1995

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AN0585 # Springers Bk, Hampton Rd, Shamong Twp
USGS Quad + Indian Mills

February 16, 1995

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AN0586 # Batsto R, Quaker Bridge, Washington Twp
USGS Quad + Atsion

February 22, 1995

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AN0587 # Pen Swamp Br, Quaker Bridge-Batsto Rd, Washington Twp
USGS Quad + Atsion

February 22, 1995

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AN0588 # Batsto R, Rt 542, Batsto
USGS Quad + Atsion

February 22, 1995

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AN0589 # Lucas Br, Pleasant Mills-Weekstown Rd, Mullica Twp
USGS Quad + Egg Harbor City

March 28, 1995

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AN0590 # Landing Ck, Rt 30, Egg Harbor City
USGS Quad + Egg Harbor City

April 6, 1995

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AN0591 # Elliots Ck, Bremen Ave, Egg Harbor City
USGS Quad + Green Bank

March 28, 1995

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AN0592 # Landing Ck, Indian Cabin Rd, Mullica Twp
USGS Quad + Green Bank

March 28, 1995

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AN0593 # Indian Cabin Ck, Fifth Ave, Mullica Twp
USGS Quad + Egg Harbor City

April 6, 1995

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AN0594 # Indian Cabin Ck, EHC Lk outlet, Egg Harbor City
USGS Quad + Green Bank

March 28, 1995

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AN0595 # W Br Wading R, Rt 532, Woodland Twp
USGS Quad + Chatsworth

January 24, 1995

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AN0596 # W Br Wading R, Rt 563, Washington Twp
USGS Quad + Chatsworth

January 24, 1995

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AN0597 # Shoal Br, Jones Mill Rd, Woodland Twp
USGS Quad + Chatsworth

January 26, 1995

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AN0598 # Mile Run, Hawkins-Speedwell Rd, Washington Twp
USGS Quad + Chatsworth

January 26, 1995

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AN0599 # Tulpehocken Ck, Carranza Rd, Tabernacle Twp
USGS Quad + Chatsworth

January 23, 1992

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AN0600 # Tulpehocken Ck, Maxwell-Friendship Rd, Washington Twp
USGS Quad + Jenkins

January 26, 1995

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AN0601 # Ltl Hauken Run, Rt 563, Washington Twp
USGS Quad + Jenkins

January 24, 1995

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AN0602 # W. Br. Wading R, Rt 563, Washington Twp
USGS Quad + Jenkins

January 24, 1995

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AN0603 # Oswego R, Rt 539, Barnegat Twp
USGS Quad + Brookville

January 18, 1995

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AN0604 # Plains Br, Jenkins Rd, Bass R Twp
USGS Quad + Woodmansie

January 18, 1995

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AN0605 # Papoose Br, Jenkins Rd, Washington Twp
USGS Quad + Oswego Lk

January 18, 1995

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AN0606 # Oswego R, Andrews Rd, Oswego Lk
USGS Quad + Oswego Lk

January 18, 1995

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AN0607 # Oswego R, Chatsworth Rd. (679), Harrisville
USGS Quad + Jenkins

December 9, 1991

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AN0608 # Arnolds Br, Chatsworth Rd. (679), Bass R Twp
USGS Quad + Jenkins

January 12, 1995

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AN0609 # Tub Mill Br, Chatsworth Rd. (679), Bass R Twp
USGS Quad + Oswego Lk

January 12, 1995

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AN0610 # W Br Bass R, Stage Rd, Bass R Twp
USGS Quad + New Gretna

January 12, 1995

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AN0611 # Dan's Bridge Br, Dan's Bridge Rd, Bass R Twp
USGS Quad + Oswego Lk

January 12, 1995

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AN0612 # E Br Bass R, Stage Rd, Bass R Twp
USGS Quad + New Gretna

January 12, 1995

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AN0613 # Clarks Mill Stream, Rt 575, Port Republic
USGS Quad + Green Bank

April 6, 1995

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AN0614 # Morses Mill Stream, Riverside Dr, Port Republic
USGS Quad + Green Bank

April 6, 1995

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AN0615 # Mattix Run, Moss Mill Rd, Galloway Twp
USGS Quad + Oceanville

April 6, 1995

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AN0616 # N Br Absecon Ck, Garden St Pkwy, Egg Harbor Twp
USGS Quad + Pleasantville

April 11, 1995

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AN0617 # S Br Absecon Ck, FAA Facility, Egg Harbor Twp
USGS Quad + Pleasantville

June 21, 1995

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AN0618 # Mill Br, Spruce Ave, Egg Harbor Twp
USGS Quad + Pleasantville

April 11, 1995

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AN0619 # Maple Run, Mill Rd, Northfield
USGS Quad + Pleasantville

April 11, 1995

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AN0620 # Gr Egg Harbor R, Watsontown-New Freedom Rd, Berlin
USGS Quad + Clementon

May 31, 1995

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AN0621 # Gr Egg Harbor R, Williamstown-New Freedom Rd, Winslow Twp
USGS Quad + Williamstown

June 3, 1993

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AN0622 # Four Mile Br, Malaga Rd, Monroe Twp
USGS Quad + Williamstown

March 10, 1992

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AN0623 # Gr Egg Harbor R, Williamstown-Winslow Rd, Winslow Twp
USGS Quad + Williamstown

June 3, 1993

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AN0624 # Squankum Br, Malaga Rd, Monroe Twp
USGS Quad + Williamstown

March 10, 1992

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AN0625 # Gr Egg Harbor R, Rt 54, Folsom
USGS Quad + Newtonville

June 3, 1993

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AN0626 # Penny Pot Stream, Eighth St, Folsom Twp
USGS Quad + Newtonville

March 10, 1992

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AN0627 # Hospitality Br, Blue Bell Rd, Monroe Twp
USGS Quad + Williamstown

May 31, 1995

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AN0628 # Hospitality Br, Rt 538, Monroe Twp
USGS Quad + Buena

May 23, 1995

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AN0629 # Faraway Br, Jackson Rd, Monroe Twp
USGS Quad + Buena

May 23, 1995

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AN0630 # White Oak Br, Jackson Rd, Monroe Twp
USGS Quad + Buena

May 23, 1995

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AN0631 # Collings Br, Unexpected Rd, Franklin Twp
USGS Quad + Buena

May 31, 1995

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AN0632 # Collings Br, Blue Anchor Rd, Buena Vista Twp
USGS Quad + Buena

May 23, 1995

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AN0633 # Hospitality Br, Rt 54, Folsom
USGS Quad + Newtonville

March 10, 1992

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AN0634 # Three Pond Run, Rt 54, Folsom
USGS Quad + Newtonville

May 23, 1995

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AN0635 # Gr Egg Harbor R, Rt 559, Weymouth
USGS Quad + Newtonville

June 3, 1993

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AN0636 # Deep Run, Rt 54, Buena
USGS Quad + Buena

March 11, 1992

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AN0637 # Deep Run, Rt 559, Hamilton Twp
USGS Quad + Newtonville

March 11, 1992

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AN0638 # Mare Run, Rt 559, Hamilton Twp
USGS Quad + Dorothy

May 16, 1995

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AN0639 # Watering Race, Rt 50, Hamilton Twp
USGS Quad + Mays Landing

April 11, 1995

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AN0640 # Babcock Ck, Rt 322, Hamilton Twp
USGS Quad + Mays Landing

May 9, 1995

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AN0641 # Gravelly Run, Rt 559, Hamilton Twp
USGS Quad + Mays Landing

May 9, 1995

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AN0642 # Miry Run, Thelma Ave, Egg Harbor Twp
USGS Quad + Mays Landing

May 9, 1995

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AN0643 # South R, Estelle Ave, Hamilton Twp
USGS Quad + Dorothy

May 16, 1995

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AN0644 # South R, Forty Wire Rd, Weymouth Twp
USGS Quad + Dorothy

May 16, 1995

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AN0645 # Stephens Ck, Eleventh Ave, Estell Manor
USGS Quad + Dorothy

May 16, 1995

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AN0646 # Stephens Ck, Rt 50, Estellville
USGS Quad + Mays Landing

May 9, 1995

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AN0647 # Gibson Ck, Rt 50, Estell Manor
USGS Quad + Tuckahoe

May 9, 1995

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AN0648 # Tuckahoe R, Cumberland Ave, Estell Manor
USGS Quad + Tuckahoe

June 1, 1995

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AN0649 # Tuckahoe R, Rt 49, Hunters Mill (Estell Manor)
USGS Quad + Tuckahoe

June 1, 1995

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AN0650 # Tuckahoe R, Rt 49, Head of River (Estell Manor)
USGS Quad + Tuckahoe

June 1, 1995

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AN0651 # McNeals Br, Rt 666, Estell Manor
USGS Quad + Tuckahoe

June 1, 1995

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AN0652 # Mill Ck, Rt 557, Upper Twp
USGS Quad + Tuckahoe

June 1, 1995

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