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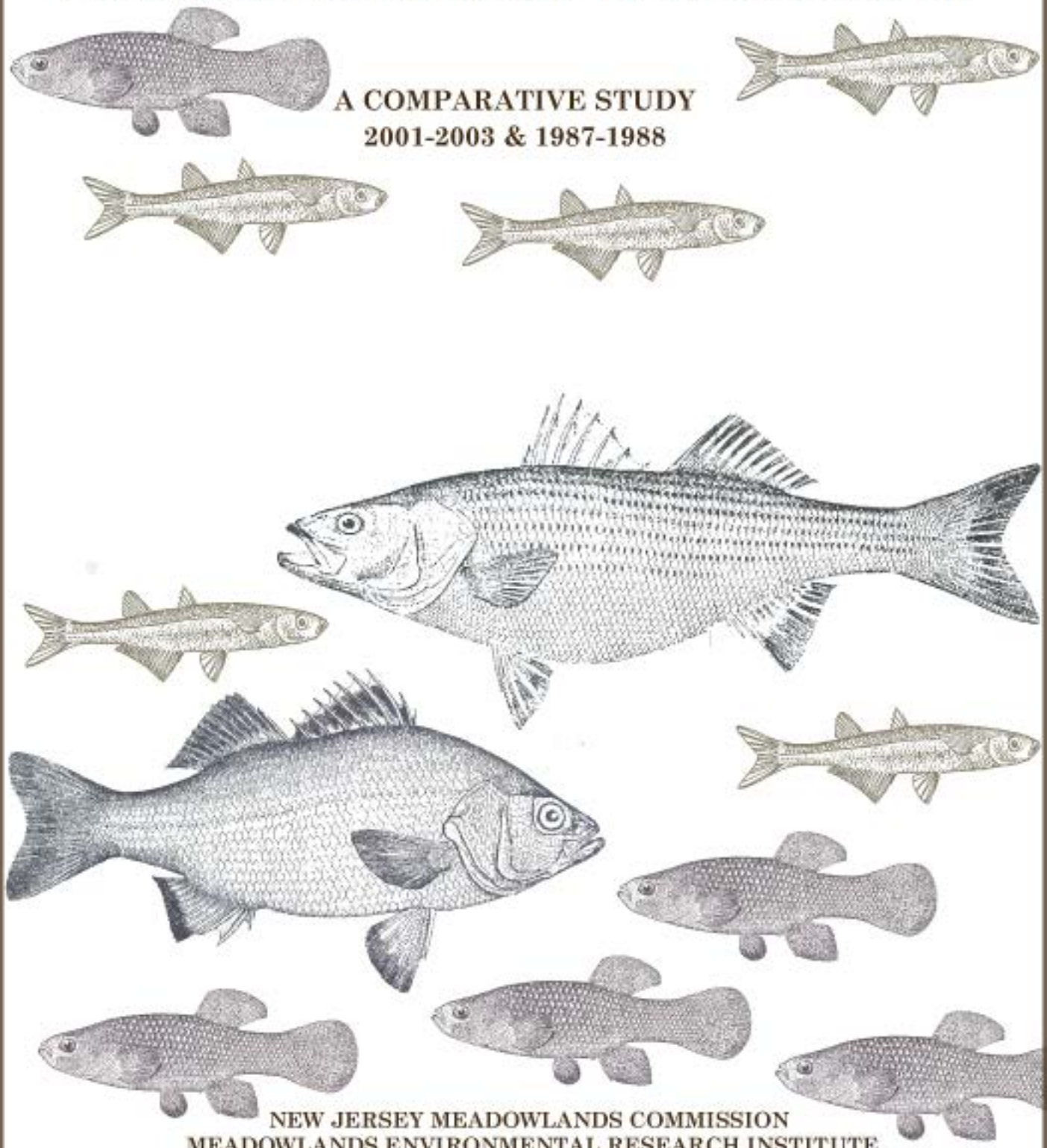
A FISHERY RESOURCE INVENTORY OF THE LOWER HACKENSACK RIVER WITHIN THE HACKENSACK MEADOWLANDS DISTRICT

A COMPARATIVE STUDY
2001-2003 & 1987-1988



NEW JERSEY MEADOWLANDS COMMISSION
MEADOWLANDS ENVIRONMENTAL RESEARCH INSTITUTE

A FISHERY RESOURCE INVENTORY
OF THE
LOWER HACKENSACK RIVER
WITHIN THE HACKENSACK MEADOWLANDS DISTRICT

A COMPARATIVE STUDY
2001-2003 vs. 1987-1988

New Jersey Meadowlands Commission
Meadowlands Environmental Research Institute

by

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May 2005

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

APPENDIX A
LIST OF 2001-2003 DATA TABLES

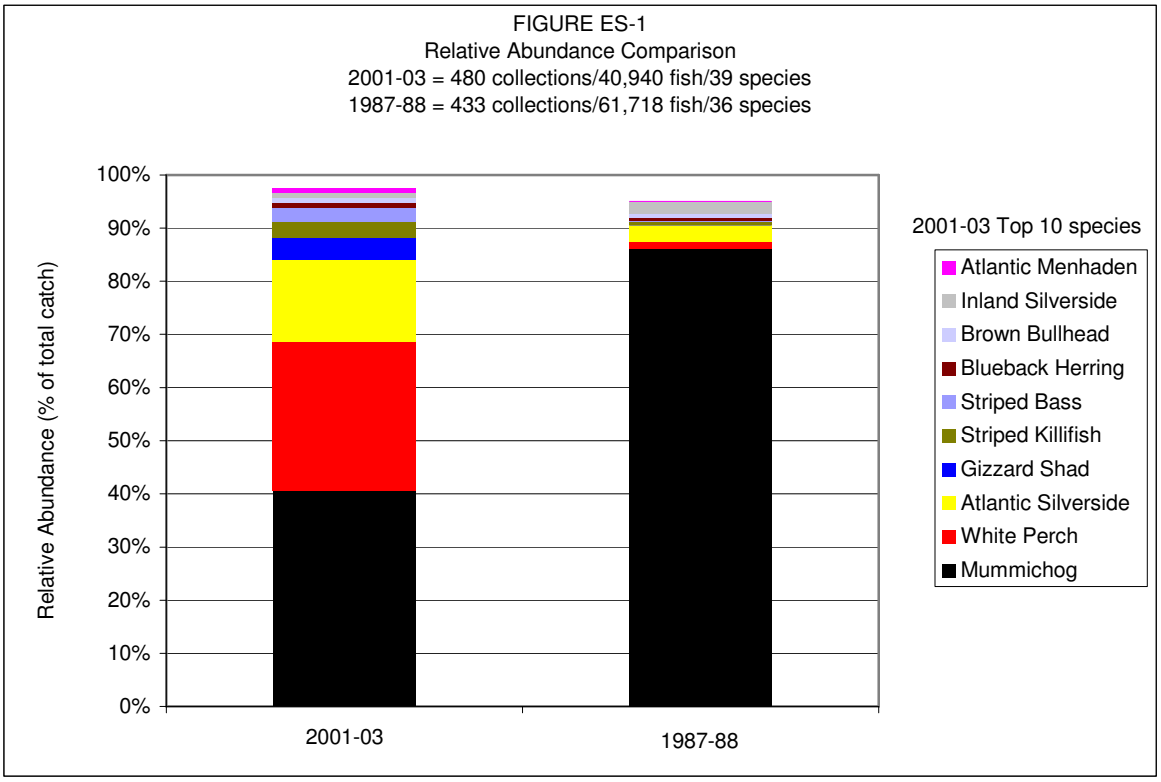
TABLE OF CONTENTS

APPENDIX B
LIST OF 1987-1988 DATA TABLES

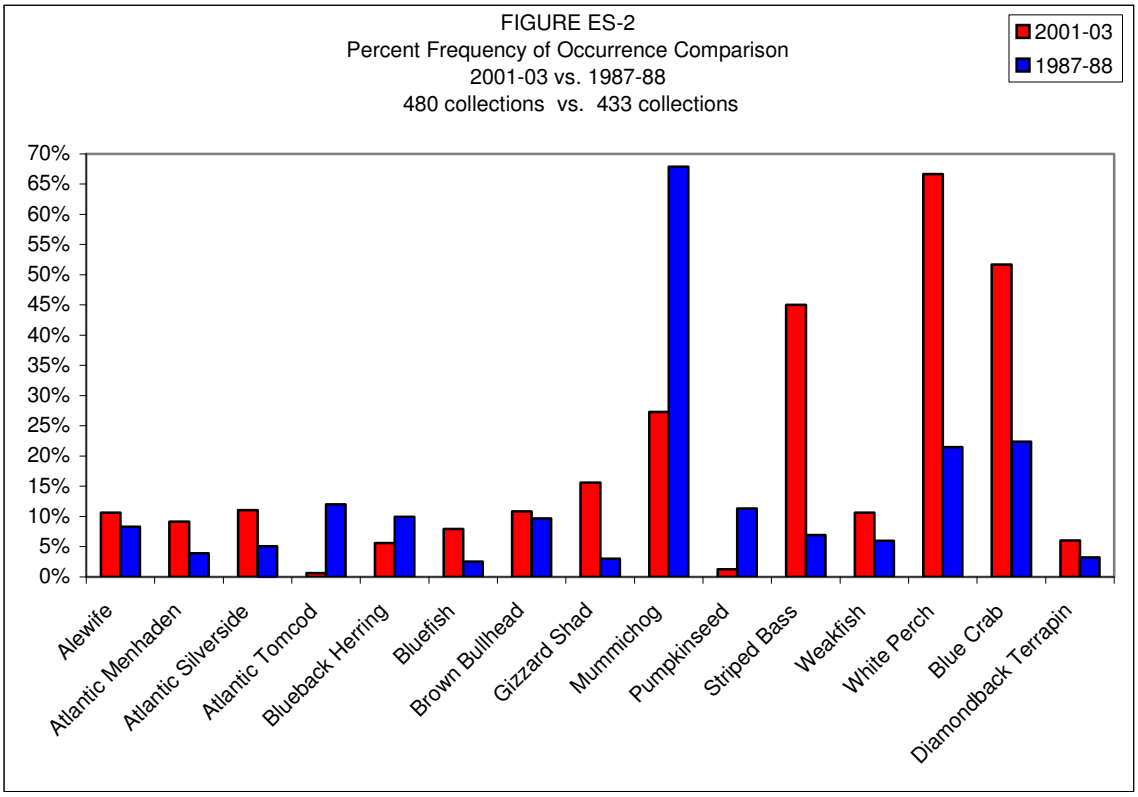
EXECUTIVE SUMMARY

Between August 2001 and September 2003, the NJMC/MERI conducted a fish inventory of the Hackensack River and some of its larger tributaries. Four different gear types were used to make the fishery collections. Fishery collections and water quality data were collected from a total of 21 sampling locations (Attachment A). Each location was sampled monthly during the first year (August 2001 to July 2002), and seasonally during the second year (October 2002 to September 2003). A total of 40,940 fish, representing 39 species were identified from 480 collections. As expected in a brackish estuary, the minnow-sized mummichog was the most abundant species captured. Large numbers of white perch, Atlantic silverside, and gizzard shad were also collected during the study.

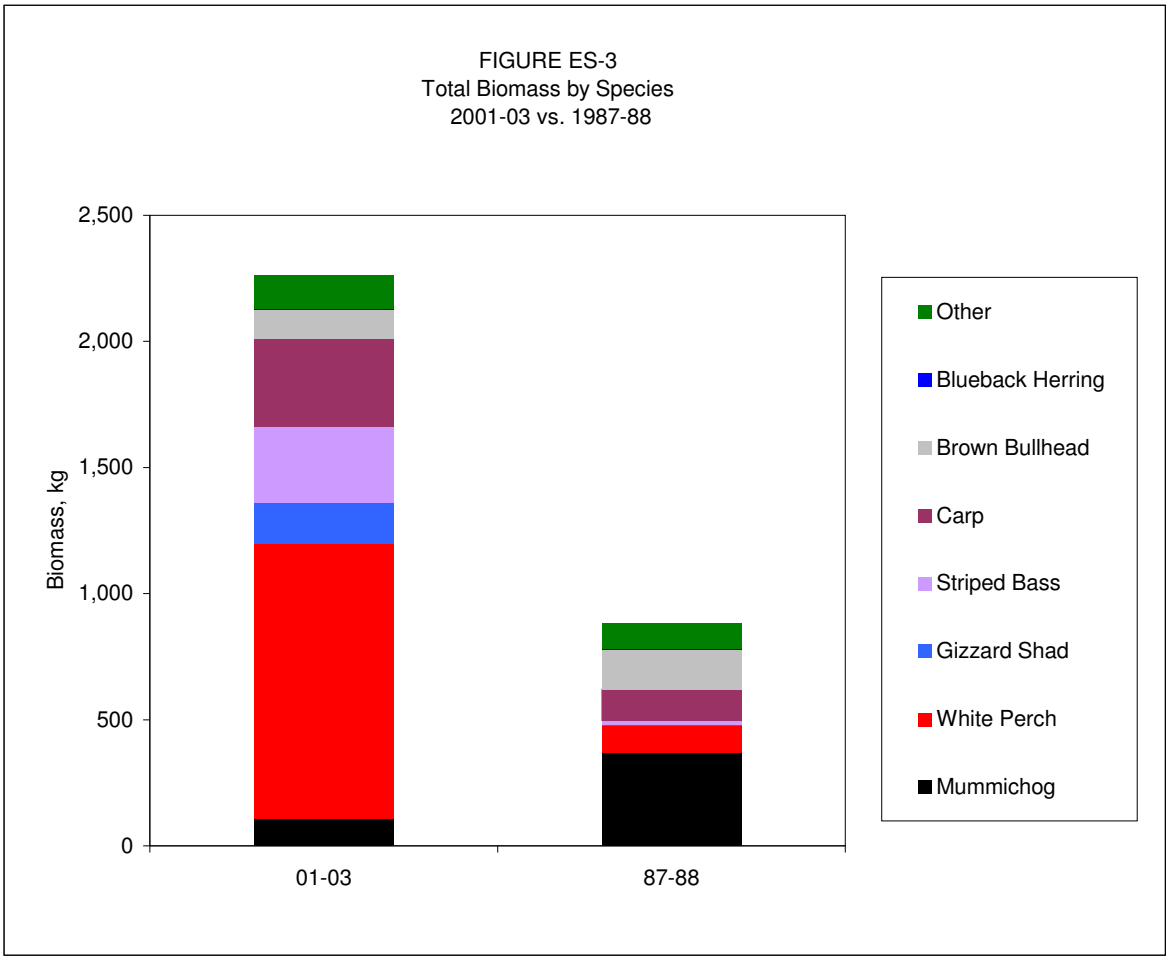
The data collected during the current investigation were compared to a similar fish inventory conducted during 1987-1988 by the NJMC. During the 1987-88 study, a total of 433 collections were made, and a total of 61,718 fish from 36 species were collected. Figure ES-1 shows a comparison of the relative abundance of the 10 most abundant species collected during the 2001-03 study versus the 1987-1988 study. This comparison reveals that a change in the community structure has occurred during the 15 years between the two studies. The mummichog was overwhelmingly dominant in 1987-88, comprising over 85% of all fish caught. Although the mummichog remained the most common fish in 2001-2003, it comprised only about 40% of all fish. Other striking differences include the increase in the abundance of white perch (which increased from 1% of the catch during the 1987-88 study to 28% during the current study); the Atlantic silverside (which increased from 3% to 16%); the gizzard shad (which went from 0.1% to 4%); and the striped bass, (which increased from 0.1% to 3%). These results show that while many of the same species still use the River, there is a more even distribution amongst the most common species. The River is no longer overwhelmingly dominated by the mummichog (a pollution tolerant species) and the fish community has gained more desirable game species. The more even distribution of species within the fish community is a sign of increased community stability. This means the community has an increased ability to be unaffected (or less severely affected) should a disturbance of one or more of its components occur.



The frequency that each species was captured (i.e., the number of collections that yielded a particular species) during each of the two studies was also compared. Figure ES-2 shows a comparison of the percent frequency of occurrence of selected fish species (as well as blue crab and diamondback terrapin) for both time periods. From this chart it is easy to see the large differences in the frequency with which the white perch, striped bass, gizzard shad and blue crab were captured during the 2001-03 collections compared to the 1987-88 collections. For example, the white perch was captured in 320 of the 480 collections made during the 2001-03 investigation (67%), while it was only present in 93 of the 433 collections made during the 1987-88 study (21.5%). Figure ES-2 also clearly shows the difference in the frequency of the mummichog between the two studies. Some of the species that were captured more frequently in 1987-88 compared to 2001-03 include the Atlantic tomcod, blueback herring and pumpkinseed.



Although a larger total number of fish were collected during the 1987-88 study vs. the 2001-03 study, the large majority in 1987-88 were mummichogs. In contrast, many more large fish (e. g., striped bass, white perch, carp) were collected during the 2001-03 collections. Therefore, it is revealing to calculate and compare the biomass of fish captured (Figure ES-3). This comparison showed a very large (157%) increase in biomass in the current study. Desirable game species such as the white perch and striped bass (along with carp) comprised the largest percentages of biomass in 2001-03; by contrast, in 1987-88, mummichog, brown bullhead (a medium sized fish) and carp (all pollutant tolerant fish) comprised the largest percentages of biomass.



To determine if the change in the fish community between 2001-03 and 1987-88 was significant, we calculated several statistics of community structure (Simpson's diversity index, Shannon-Wiener diversity index and an evenness index) and these data were analyzed using an adapted t-test to statistically compare the fish community data. This analysis revealed that the difference between the 1987-88 and 2001-03 fish communities for all 21 locations combined was highly significant (at p=0.01). Further analysis compared pooled data from the lower, middle and upper sections of the River and from the tributaries. This analysis revealed that the fish community in the middle and upper portion of the River was significantly different in 2001-03, but the fish community in the tributaries and in the lower portion of the River was not.

The improvement seen in the fish community in the upper and middle River is likely related to changes in the industrial use of the River that have occurred since the 1987-88 study was completed. During 1995, PSE&G's Bergen Generating Station stopped withdrawing approximately 645 million gallons per day of water from Overpeck Creek. This withdrawal was used as once-through cooling water for the Station, with heated water discharged back into the Hackensack River. The discontinuation of this withdrawal has nearly completely eliminated the loss of fish and invertebrates by impingement and entrainment, and appears to have had a positive impact on the fish community in the upper (and even the middle) portion of the River, which is a spawning and nursery area for the white perch.

Another improvement in the upper portion of the River is related to a "beneficial re-use project" that was initiated around the same time as the power plant retrofit. The BCUA Little Ferry Sewage treatment plant began to send a portion of its effluent to the Bergen Generating Station for re-use as cooling water.

Unfortunately, in the lower portion of the River, the use of the River's water for industrial cooling and the legacy of contaminated industrial sites yet remain, and no improvement in the fish community was seen.

With regard to water quality, the following variables were measured near the water surface (and bottom) during each collection: temperature, salinity, dissolved oxygen and water clarity (depth to which a "Secchi disk" could be seen). The average values of the surface readings are graphed by site for 1987-88 and 2001-03 in Figure ES-4.

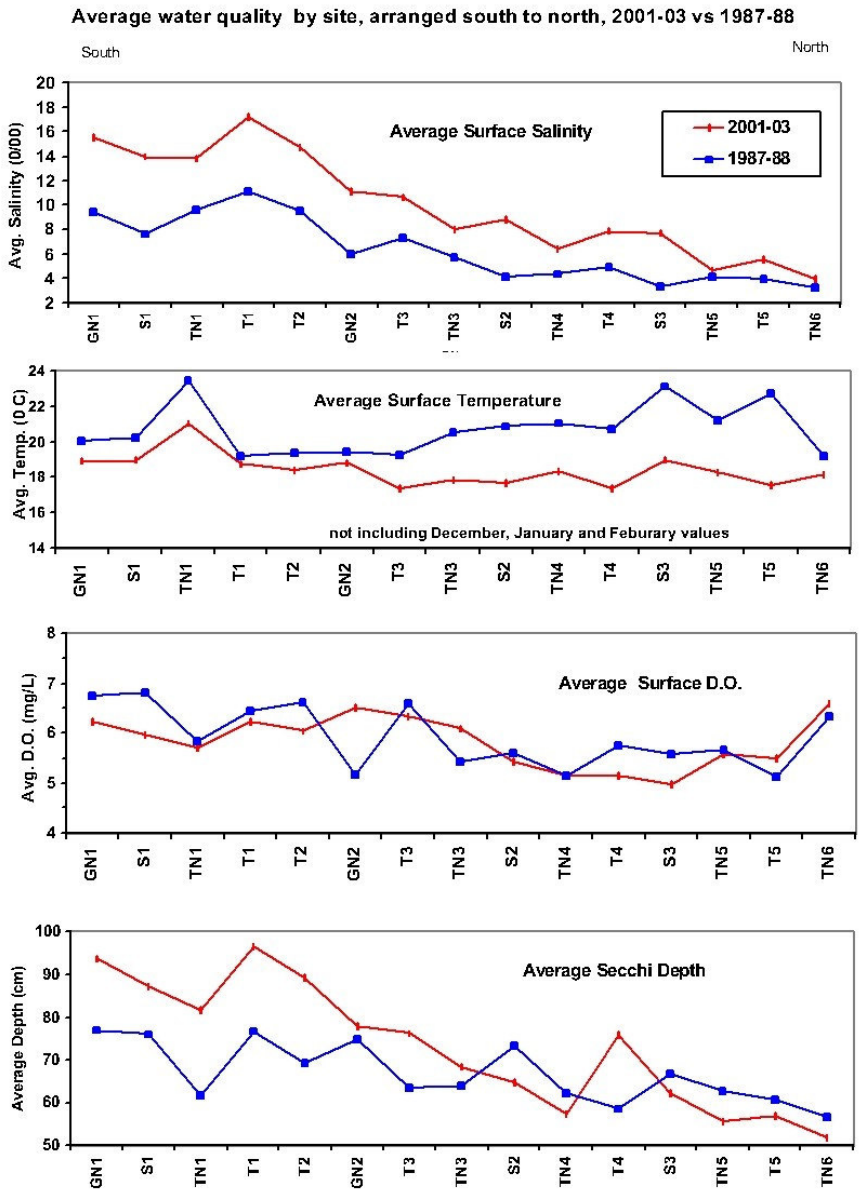
The average salinity was higher at all sites in 2001-03 vs. 1987-88, due to the drought that occurred from April 2001 - September 2002. The difference was most pronounced (about 6 parts per thousand, ppt, in the average) near the downriver (southern) boundary of the study. Overall, the average salinities in the Meadowlands remained in the medium-salinity or "mesohaline" range (i. e., 5 to 18 ppt) during both studies. Salinity decreases as one moves upriver, with the average salinity around 5 ppt at the northern end of the Meadowlands District in both studies.

A temperature spike at site TN1 near the southern end was observed during both studies, likely due to the discharge of heated water by the nearby power plant. In 1987-88, high temperatures were also observed in the upriver (northern) area (S3, TN5 and T5), again likely caused by a discharge from a nearby power plant. However, as mentioned above, this discharge was discontinued in the years between the two studies, and so, average temperature at T5, for example, was markedly lower (5C, 9F) in 2001-03. Elevated temperatures are undesirable because warmer water is not able to hold as much dissolved oxygen as cooler water can.

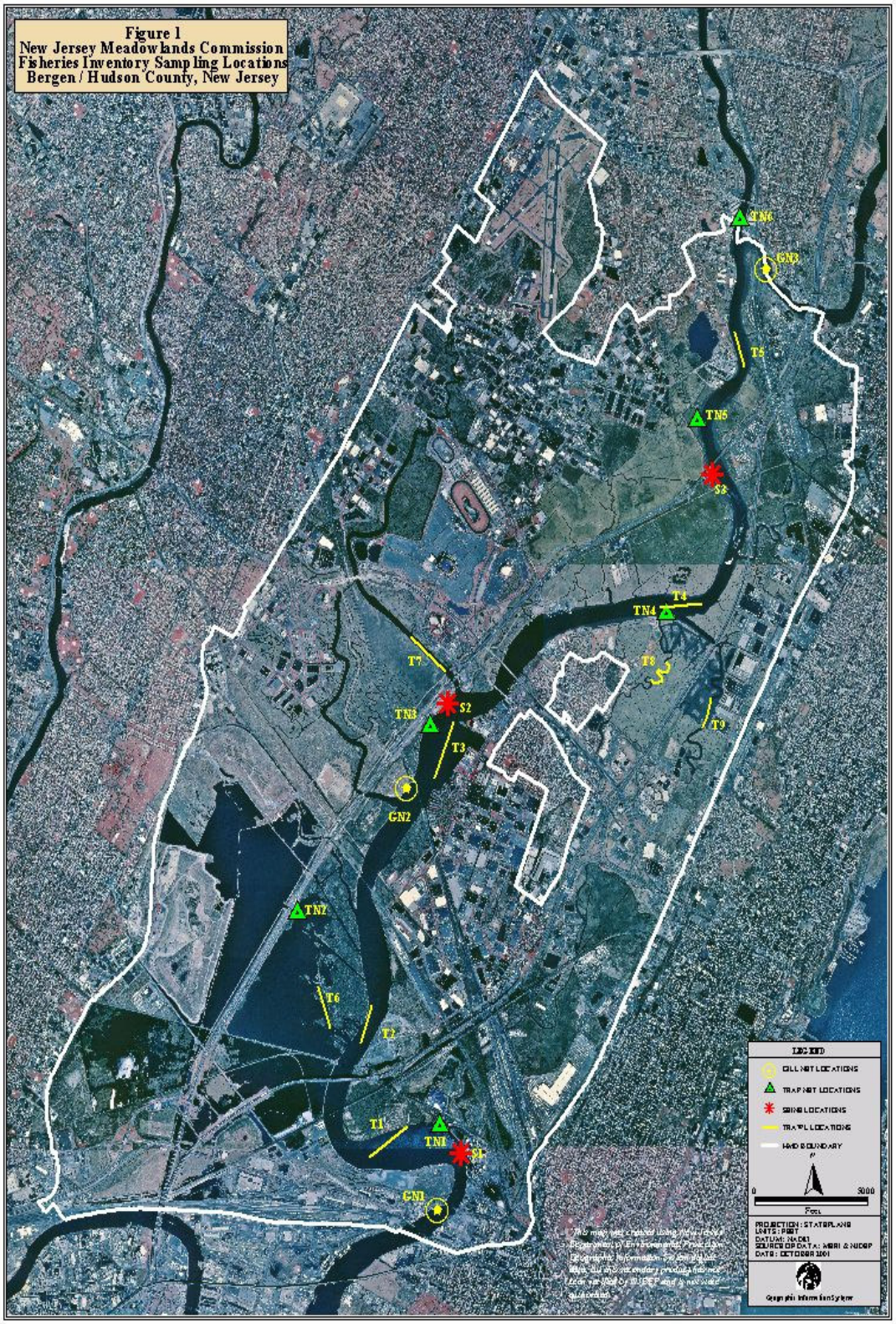
With regard to dissolved oxygen (DO), there was no consistent pattern in the differences between the two studies regarding average concentrations. However, DO concentration is a highly dynamic variable, varying widely throughout each day from photosynthesis of algae during daylight pumping oxygen into the water, and plant respiration consuming oxygen during the night. Given that sampling times were not highly controlled during the two studies, it is not tenable to make conclusive statements about how DO compares between the two studies. It is encouraging to note that, in 1987-88, 33% of all DO readings were less than the regulatory criteria of 4 mg/l, but this percentage fell to 23% for 2001-03.

No consistent pattern in the differences between the two studies was evident for water clarity. Water clarity was greater in 2001-03 vs. 1987-88 at the downriver sites, but was slightly more turbid at the upriver sites. However, there was a nearly consistent spatial pattern during both studies: water clarity decreases as one moves upriver.

Figure ES-4


Average water quality by site, arranged south to north, 2001-03 vs 1987-88
South
North
Average Surface Salinity
2001-03
1987-88
Avg. Salinity (0/00)
Average Surface Temperature
Avg. Temp. (0 C)
not including December, January and Feburary values
Average Surface D.O.
Avg. D.O. (mg/L)
Average Secchi Depth
Average Depth (cm)
GN1
S1
TN1
T1
T2
GN2
T3
TN3
S2
TN4
T4
S3
TN5
T5
TN6

Attachment A
Map of Fish Collection Locations



1.0 INTRODUCTION

Author and Meadowlands naturalist John Quinn once mused that it was a safe bet that the pre-Columbian "Meadowlands" were home to about 200 species of edible shell and finfish (Quinn, 1998). Between 1860 and 1920, the Hackensack River supported commercial fisheries for Atlantic tomcod, carp, rainbow smelt, American shad, bullhead catfish, river herring (alewife and blueback) and an occasional sturgeon. During the same time the River also supported recreational fisheries for American eel, yellow perch, white perch, bullhead catfish, striped bass, sunfish, and blue crab (Zeisel, 1989). According to Zeisel's review of the historical record, in 1900 the Hackensack estuary's commercial and recreational fisheries seemed entirely "normal." But by 1914, the fishery for migratory species had disappeared, and the fishery for resident species was in trouble. The decline affected the whole River, including the Meadowlands, where fishermen and residents reported the disappearance of shad and striped bass runs during the period of 1915 to 1920 (Zeisel, 1989). Over a period of some 60 years, the fishery resource of the Hackensack River had gone from bountiful to practically nonexistent.

The causes that led to this decline were many, and included the destruction of wetlands by filling, diking, ditching and draining, increased pollution of the River and its tributaries, and the alteration of the Rivers natural hydrology. Almost since the arrival of European settlers, people had attempted to "reclaim" the marshes. As early as 1815, the Meadowlands were subject to various attempts to ditch, dike and drain the marshes (Wright, 1988). Early 19th century reclamation attempts were mainly for agricultural purposes, and did not usually involve filling. On the other hand, the construction of railroads through the Meadowlands in the mid 19th century required vast quantities of fill in order to provide a stable roadbed for the rails. The fill not only destroyed the marsh, but due to the lack of concern given to the natural hydrology of the area, it also cut off creeks and marshes from the tides that formerly sustained them (Vermeule, 1897; Walden, 1914). During the early 20th century large portions of the Meadowlands were being filled (sometimes with sand or mud, but often with garbage) to provide sites on which to build industrial facilities and other commercial developments. Later in the 20th century, a large amount of filling of the Meadowlands marshes was done to provide land on which to build industrial, commercial and additional transportation facilities (e.g., the New Jersey Turnpike). In 1896, C.C. Vermeule, the consulting engineer to the Geological Survey of New Jersey estimated that there were 20,045 acres of marsh in the Hackensack Meadows (Vermeule, 1897). Today, approximately 5,784 acres of wetlands and 1,870 acres of open water remain in the 19,485-acre political subdivision known as the Hackensack Meadowlands District (HMD) (NJMC, 2003).

Early 20th century efforts to drain the Meadows were also undertaken to eliminate mosquito breeding. By 1924, the Bergen County mosquito commission had dug a million feet of drainage ditches on the salt marsh. Light-weight fuel oils were repeatedly sprayed on breeding areas that resisted man-made drainage (Wright, 1988). By the 1940's, most of the Meadowlands had been ditched and diked by the Hudson and Bergen County Mosquito Commissions, thereby cutting off most of the marshes from the flow of the tide.

With the advent of improved transportation (i.e., the railroads) from the outlying rural areas to places like Newark and New York City, the population of Hudson and Bergen Counties boomed, as

people moved out of the cities and established homes and businesses in what were formerly rural areas. Zeisel (1989), provided US Census data that showed the population of Bergen County increased 450% between 1890 and 1920, while the population of Hackensack rose by 420% in the 40 years between 1880 and 1920. The pollution of the River and its tributaries from the discharge of raw and minimally treated sewage that followed the population boom led to severe declines in the water quality of the creeks and the River. The increase in industrial development adjacent to the Passaic River and Newark Bay, and the increase in poorly or non-treated industrial discharges to the south of the Meadowlands also contributed to the declining water quality in the lower Hackensack River. As an example of the pollution that affected the Newark Bay and lower River, Goode (1887) mentions that as early as the 1880's, the fisheries of Newark Bay were said to have been greatly injured by coal oil.

The construction of the Oradell Reservoir was another factor that contributed to the decline of the Hackensack River fishery. In 1902, excavation of the Oradell Reservoir and construction of a low head dam cut off much of the freshwater flow to the tidal portion of the Hackensack River. Between 1911 and 1916 the Oradell Reservoir was enlarged by additional excavation and raising the height of the dam. It was enlarged again in 1921, when a concrete dam 22 feet high was constructed (Leiby, 1969), creating an insurmountable barrier to the upstream spawning migrations for anadromous species such as the American shad, alewife, blueback herring (Zich, 1977) and striped bass.

While the destruction of the Hackensack Meadowlands was occurring, there were many who called for some type of regional authority to take control of the area (Vermeule, 1897 and 1898; Oriol, 1956; Passaic Valley Citizens Planning Association, 1958). The situation had gotten so bad that, in a 1962 preliminary report on fish and wildlife resources to the US Army Corps of Engineers (ACOE), the US Fish and Wildlife Service (USFWS) had this to say about the Meadowlands:

> "The Hackensack Meadows are not at the present time of significance to fish or wildlife. Although waterfowl and rails do use certain localized areas, productivity of the meadows has all but been destroyed. Pollution of the waters has eliminated fish life. Encroachment by highways, and industrial, and recreational developments has destroyed large areas, and mosquito control activities have been instrumental in changing the plant composition to species of little value to wildlife." (USFWS, 1962).

In 1964 the US Congress authorized a planning grant to study the region. The ACOE was directed to study the basin for flood control and reclamation. One of the final recommendations of that study was that a State agency should be created to coordinate activities in the lower Hackensack River basin.

In 1968, the NJ Legislature enacted the Hackensack Meadowlands Reclamation Act (N.J.S.A. 13:17-1 et. seq.), which created the Hackensack Meadowlands Development Commission (HMDC). The HMDC was given broad regulatory, administrative and financial powers that directly affected the 14 municipalities in two counties that were included in the HMD. The HMDC was given five mandates, chief among them were:

- To support orderly economic development in the Hackensack Meadowlands District (HMD),

- To plan for the disposal of all solid waste from the communities then dumping in the District, and
- To protect the delicate balance of nature.

By 1970, the HMDC had completed a comprehensive study of the District and prepared draft zoning regulations. These zoning regulations were finalized in 1972 (N.J.A.C. 19:4-1 et. seq.).

Since the inception of the HMDC, the view of the District has changed. It is no longer considered a dumping ground and heavy industrial region. The Hackensack River is no longer considered to be dead, and its marshes are no longer considered as a good place to fill for development of commercial, industrial and/or solid waste facilities. Instead, the River and its associated marshes are correctly viewed as an important urban estuary that provides ecologically valuable habitat, nursery and refuge areas for many species of fish and wildlife, which is increasingly being used for scientific study and recreation. The recently adopted NJMC Master Plan (NJMC, 2003) recognizes that this estuary is worthy of protection, as it calls for the preservation of the District's remaining wetlands.

However, in the 1970's and 1980's increasing development pressures put additional demands on the River and its tributaries. The HMDC realized that these pressures, which would result in the loss of even more wetlands, could affect the fisheries resources of the River. Due to a lack of data pertaining to this issue, in 1987 the HMDC initiated a two-year fishery study of the lower Hackensack River. The purpose of the study was to provide an inventory of the fishery resources within the boundaries of the HMD. The data was used to asses the fish population that was using the River, and to determine the extent to which the River and its tributaries provided habitat and refuge for those species in a programmatic Draft Environmental Impact Statement for the District (the Special Area Management Plan Draft EIS; EPA, 1995). The data from the 1987-88 study was presented in the HMDC's 1989 fishery resource inventory report (HMDC, 1989), which was frequently requested by the State and Federal resource agencies, environmental consultants and the public.

The HMDC, which was renamed the New Jersey Meadowlands Commission on August 29, 2001 (PL 2001, c.232) had always envisioned repeating the fishery inventory periodically to determine whether the fish community would respond to perceived water quality improvements that were occurring within the District. Therefore, in 2001, the NJMC began a new fishery resource inventory of the Hackensack River, the goal of which was to repeat the earlier study and compare the results. Rather than simply repeat the inventory, the NJMC decided that additional studies would be beneficial. Therefore, in addition to performing the fisheries inventory, several sub-studies were added. The sub-investigations included: an investigation of selected contaminants in fish tissue; a study of the reproductive health of the white perch; a food habits study of the white perch; an investigation of the benthic invertebrates that live in and on the river bottom; and a chemical and textural analysis of the river bottom sediments. The results of each of these companion studies are reported under separate cover, and can be obtained from the MERI library. This report focuses solely on the fisheries resource inventory.

2.0 MATERIALS AND METHODS

A total of 21 sampling locations were established during the 1987-1988 fisheries study (HMDC, 1989). The locations were selected with the assistance of the New Jersey Department of Environmental Protection (NJDEP) Bureau of Marine Fisheries. Sites were selected based on their spatial distribution along the River (within the HMD) and the suitability of deploying and retrieving each of the gear types in order to sample subtidal and shallow inshore areas of the River. The gear types were selected to match what the NJDEP Bureau of Marine Fisheries used in making collections for other fisheries studies in estuarine waters around the State (e.g., see NJDEP, 1984). The same 21 locations were sampled during the 2001-2003 fisheries study (Figure 1). Due to changes in site conditions during the intervening 13 years, two sampling sites (T9 and TN1, described in Section 2.5) were slightly re-located from their original 1987-1988 locations.

2.1 Sampling Gear

The four types of fishing gear used during this (and the 1987-1988) study were similar, and are described in the following sections.

2.1.1 Trawl

A 16-foot otter trawl, (constructed using ¾-inch square body mesh, 5/8-inch square cod-end mesh, with a ¼ -inch mesh cod-end liner) was towed for three minutes at approximately 2,400 r.p.m. at nine sites. Two duplicate tows were made each time we sampled a trawl location. A 20-foot commercial Privateer outfitted with a 115 horsepower Honda four-stroke outboard motor was used to tow the trawls. The trawl was towed using ½ inch nylon ropes fastened to either side of the transom of the vessel. The trawl was deployed with the vessel in forward motion, with tension on the towropes and (in all but a very few cases) against the prevailing current. A minimum 5:1 ratio of towrope length to station depth was maintained. The trawl was deployed and retrieved by hand.

2.1.2 Seine

A 60-foot long by six foot high by ¼ inch mesh bag seine was fished at three sites. One end of the seine was held stationary on shore, and the other end of the seine was walked out into the River (to a depth of approximately 4 feet) with the offshore end of the net being hauled in a semi-circular arc about the shoreline. When the offshore end of the net was brought in to the shoreline, both ends of the net were hauled up onto the beach.

2.1.3 Gill Net

A 200-foot long by eight-foot high experimental sinking gill net made-up of four 50-foot panels of ¾-inch, 1¾-inch, 3½-inch, and 4-inch square mesh was fished at three locations. The gill nets were anchored using one (or sometimes two) cinder blocks attached to either end of the lead line. A large white Styrofoam buoy (i.e., a crab pot marker) was attached to each cinder block via an appropriate length of ½ inch polydacron rope to mark the location of each end of the net. These buoy lines also served as a means of retrieving the nets, which were deployed and retrieved by hand. In order to limit damage to and/or loss of the gill nets, they were generally deployed during neap tides, when the range of tidal fluctuations are smaller, with correspondingly lower tidal velocity. In almost all cases, the inshore (shallow) end of the net was deployed first, and the net was payed out as the boat moved in reverse at a very slow speed. The nets were usually set during a rising tide, so that the boat was moving upriver (in

reverse) “with the current”, rather than against it. The gill nets were retrieved the following day, after being left to fish for an approximately 24-hour set.

2.1.4 Trap Net

An Indiana Trap Net was fished at six sites. The net consisted of two rectangular steel frame braces each three feet high and six feet wide, and three 30-inch diameter steel hoops constructed using ½-inch square mesh. Each trap net also had a three foot high by 50-foot long leader (also constructed using ½-inch square mesh) affixed to the center of the first frame brace. The trap nets were deployed during neap tides, at or near the predicted time of low water. Each net was staked into the mud using three round wooden poles 1 5/8-inches in diameter and between 16 to 18 feet long, one at the free end of the leader and two at the first frame brace. In order to keep the net from being moved by the tidal currents, a cinder block was attached to the cod-end of the net. The nets were generally set as follows; the cod-end was tied securely and the net leader was checked to make sure it was not twisted. The boat was moved inshore over the mudflat (at or near the time of predicted low water) as far as possible (usually in approximately one to two feet of water) and the free end of the leader was staked into the mud. The boat was then slowly reversed, with the leader being payed out over the port side of the boat. As the leader was almost fully extended, the boat was turned and the remainder of the net dropped into the water so that the leader would be taut and perpendicular to the frames of the net, at which point the first frame brace of the leader was staked into the mud (usually in approximately two to five feet of water) using a pole on each side of the first frame. The boat was then slowly reversed until the second frame brace and the four hoops were pulled taut by means of a buoy line attached to the cod-end cinder block. While keeping the net taut, the cinder block was allowed to sink into the mud, thereby anchoring the cod-end. After an approximately 24-hour set, the nets were retrieved in the reverse order.

2.2 Sampling Frequency

In an attempt to get an overall picture of the fish community that utilizes the river within the Hackensack Meadowlands, both studies were designed to sample the fish community over a two-year period. Intensive monthly fishery collections were made at each sampling location during the first year of the present study (August 2001 to July 2002). A total of 30 collections were made each month, consisting of 18 trawl tows (i.e., two replicate tows at each of the nine trawling locations), six trap net sets, three gill net sets, and three seine hauls. A total of 360 fishery collections were made between August 2001 and July 2002.

During the second year of the study, the River was sampled on a less intensive seasonal basis. Thirty collections were made each season, beginning with the autumn collections (October and November 2002). The remaining second year fishery collections were performed during winter 2002-2003 (March 2003), spring 2003 (May and June), and summer 2003 (end of July to mid-September). A total of 120 fishery collections were made during the second year of the study, resulting in an overall total of 480 collections over the course of the two-year study. Collections were made under NJDEP scientific collection permit number 0152 (during 2001), 0206 (during 2002) and 0325 (during 2003).

2.3 Water Quality Measurements

During each fishery collection conventional water quality was determined using a Hydrolab multi-parameter mini-sonde with a Hydrolab Surveyor 4a data logger/display terminal. The following water quality parameters were measured: temperature, dissolved oxygen, conductivity, salinity, pH, and oxidation-reduction potential. The mini-sonde was periodically calibrated according to the

manufacturers specifications. Additionally, water clarity was measured at each sampling location using an 8-inch diameter secchi disc. When sampling using active gear (i.e., the otter trawl and the seine), water quality measurements were taken just prior to the deployment of the gear. When sampling using passive gear (i.e., the gill and trap nets) the water quality measurements were made just prior to retrieving the nets. Water quality measurements from the surface and bottom were recorded during otter trawl and gill net collections. Samples of bottom water were collected approximately one foot off of the bottom using a 2.2 liter clear acrylic horizontal Alpha sampling bottle. Only surface measurements were recorded during the seine and trap net collections, owing to the very shallow water depths (generally one to four feet) encountered while fishing these two gear types.

2.4 Sampling Location Descriptions

See Figure 1 for the map that depicts the 21 sampling locations, each of which are described below. Any reference to river mile (RM) with regard to the position of each sampling location along either the mainstem of the river or any of its tributaries has been scaled from nautical chart 12337 – Passaic and Hackensack Rivers (NOAA, 1984), and are expressed in nautical miles.

2.4.1 Trawls

Trawl 1 (T1) – was in the mainstem of the Hackensack River. The downstream end of the trawl began at approximately river mile (RM) 3.7, approximately 300 yards upstream of the mouth of Penhorn Creek. The trawl began in the shallows near the mouth of a small-unnamed tidal creek, and continued out into deeper water adjacent to the Malanka Landfill. Based on a visual examination, the substrate at this location was hard-packed sand and hard mud. This site is located in Secaucus, Hudson County.

Trawl 2 (T2) – was located on the western side of the Hackensack River, upstream of the mouth of Sawmill Creek, at approximately RM 5.4. The shoreline consisted of saltmarsh cordgrass (*Spartina alterniflora*) along the edge of the river, which graded into a thin band of common reed (*Phragmites australis*), behind which was an extensive tidal marsh dominated by saltmarsh cordgrass. The substrate at T2 was hard clay and hard-packed sand. This site was located in Lyndhurst, Bergen County.

Trawl 3 (T3) – was located on the eastern side of the River, between the NJ Transit Bergen County Line railroad bridge and red nun buoy #18, at RM 7.0, in Secaucus, Hudson County. The downstream end of this trawl was just offshore from one of the protrusions of fill that supports a number of Harmon Cove town homes that front the river just upstream (i.e., north of) the railroad bridge. The substrate at T3 ranged from soft black mud to hard clay.

Trawl 4 (T4) – was located on the eastern side of the River, between the mouths of Mill and Cromakill Creeks, at RM 9.2 in Secaucus, Hudson County. The substrate at T4 consisted of mud, clay and occasionally rubble.

Trawl 5 (T5) – was located in the main stem of the River at approximately RM 11.4, adjacent to the Bergen County Utility Authority (BCUA) Little Ferry sewage treatment plant. The shallow end of this trawl began in Ridgefield, progressing towards the deep end in the middle of the River, which forms the boundary between Ridgefield and Little Ferry, Bergen County. The shoreline along either side of the river was either developed (i.e., the BCUA sewage plant), or was dominated by thick stands of *Phragmites*. The substrate at T5 was soft black mud.

Trawl 6 (T6) – was located in the Sawmill Creek Wildlife Management Area (WMA), in the center of Sawmill Creek, which forms the boundary between Kearny, Hudson County and Lyndhurst, Bergen

County. The lower end of the site was approximately 0.3 nautical miles upstream from the mouth of Sawmill Creek. The shoreline on either side of the creek consisted of a thin band of *Spartina alterniflora*, which graded into a thin band of *Phragmites* (along the natural creek bank levee), behind which was either an extensive area of mudflat/open water (depending on the level of the tide) south of the creek, or tidal *Spartina alterniflora* marsh (along the north side of the creek). The bottom of Sawmill Creek consisted of hard gray clay. There are no deposits of fine sediments in the trawl area due to the large amount of tidal flushing that occurs twice each day between the Sawmill Creek and its associated marshes and the Hackensack River.

Trawl 7 (T7) – was located in Berry's Creek Canal, a man-made canal that was dug by the Erie Railroad circa 1910 in order to maintain navigability between the Hackensack River and upper Berry's Creek without having to build a drawbridge over Berry's Creek. The lower end of T7 was approximately 0.3 nautical miles above the mouth of the Canal. Both sides of Berry's Creek Canal were vegetated with thick stands of *Phragmites*. The substrate in the area of T7 was soft black mud that contained a large amount of *Phragmites* canes, leaves and other organic debris (tree limbs, etc.). T7 was located in East Rutherford, Bergen County.

Trawl 8 (T8) – was located in Mill Creek, approximately 0.6 nautical miles from its mouth. The substrate at T8 was a mixture of hard clay, soft brown mud, live platform mussels (*Congeria leucopheata*) and a hash of their shells, and *Phragmites* stalks and leaves. In the area adjacent to T8, an approximately 140 acre former *Phragmites*-dominated marsh on the eastern side of Mill Creek was restored by the NJMC in 1999. The interior of this marsh consisted of large patches of *Spartina alterniflora*, mudflats/open water (depending on the level of the tide), and upland trails and islands created as part of the restoration project. Mudflats dominated the area directly adjacent to the creek. Portions of the mudflats were vegetated with dwarf spikerush (*Eleochris parvula*), salt marsh fleabane (*Pluchea purpurecsens*), and horned pondweed (*Zannichellia palustris*). The western side of Mill Creek was not restored and consisted of a thick monoculture of *Phragmites*. During the 1987-1988 study, either side of Mill Creek consisted of *Phragmites* marsh, and there were no mudflats adjacent to Mill Creek. T8 was located in Secaucus, Hudson County.

Trawl 9 (T9) – was located in Cromakill Creek, approximately 0.4 nautical miles from its confluence with the Hackensack River (on the eastern side of the NJ Turnpike's eastern spur), in North Bergen, Hudson County. The substrate at T9 was soft black mud, which often contained *Phragmites* leaves and stems. On either side of the Cromakill Creek channel at T9 were mudflats/open water (depending on the tidal stage) with sparse clumps of saltmarsh cordgrass (*Spartina alterniflora)* and large areas of dwarf spikerush. During the 1987-1988 study, T9 was located further upstream, approximately 0.8 nautical miles from the mouth, on the straight reach just upstream of the two large meanders in the creek. During 1987-1988, both banks of the entire Cromakill Creek drainage were dominated by dense monocultures of *Phragmites*. The location of T9 was moved after the first collection of the 2001-2003 study (August 2001) due to the shallow depths found in the former area of T9 and the fact that Cromakill Creek was not accessible during high tide due to the low clearance of the NJ Turnpike's Eastern Spur bridge crossing of the creek. Due to this logistical problem, the "new" location of T9 was generally sampled on a falling tide, approximately two to three hours after high water.

2.4.2 Trap Nets

Trap Net 1 (TN1) – was located on a mudflat adjacent to the northern bank of the Hackensack River, at RM 3.7, approximately 250 yards upstream from the mouth of Penhorn Creek, in Secaucus, Hudson County. The leader of TN1 was generally set within approximately 20 to 30 feet of the river bank,

which was dominated by *Phragmites*. Just downstream of TN1 was the mouth of a small tidal creek that fed a small area of mixed *Spartina*/*Phragmites* marsh. The substrate in the area of TN1 consisted of soft black mud approximately one to three feet deep, underlain by hard clay. During 1987-88, TN1 was set closer to the mouth of Penhorn Creek (at RM 3.6).

Trap Net 2 (TN2) – was located in the Sawmill Creek WMA, within a shallow tidal embayment/mudflat on the northern side of Sawmill Creek, approximately 1.1 nautical miles above the mouth of the creek, just downstream from the NJ Turnpike's Western Spur crossing of Sawmill Creek, in Lyndhurst, Bergen County. The substrate at TN2 was soft mud, underlain by hard clay**.** The shoreline at TN2 consisted of scattered clumps of *Spartina alterniflora*, behind which was a stand of *Phragmites*, which extended to the NJ Turnpike.

Trap Net 3 (TN3) – was located on the western side of the Hackensack River, north of the NJ Transit Bergen Line railroad crossing in East Rutherford, Bergen County at approximate RM 7.1. TN3 was set just downstream of a drainage ditch that conveys tidal water underneath the adjacent NJ Turnpike's Western Spur (which eventually connects with Fish Creek, a tributary of Berry's Creek). The substrate at TN3 consisted of a one to three foot thick layer of soft mud, underlain by hard clay. The shoreline was dominated by a stand of *Phragmites*.

Trap Net 4 (TN4) – was located on the eastern shore of the Hackensack River, on the mudflat just upstream from (i.e., north of) the mouth of Mill Creek, at RM 9.2 in Secaucus, Hudson County. The substrate at TN4 was soft mud. The riverbank at TN4 was dominated by a dense stand of *Phragmites*, behind which was the Western Brackish Marsh, a former *Phragmites*-dominated marsh that was restored to tidal flow circa 1988. The restored marsh now consists of open water channels, mudflats, stands of *Spartina alterniflora*, and upland islands that were constructed during the restoration project.

Trap Net 5 (TN5) – was located on the western shore of the river, on the mudflat just downstream from the mouth of the Losen Slote (formerly known as Eckel's Creek), at approximately RM 10.9, in South Hackensack, Bergen County. The substrate at TN5 was soft black mud, and the riverbank was dominated by a dense stand of *Phragmites*.

Trap Net 6 (TN6) – was located on the western shore of the river, just upstream (north) of the U.S. Route 46 bridge crossing in Little Ferry, Bergen County. TN6 was approximately 12.5 RM from the mouth of the Hackensack River. The substrate at TN6 was soft black mud, the riverbank consisted of a thin band of *Phragmites* with a few small trees.

2.4.3 Gill Nets

Gill Net 1 (GN1) – was located on the western side of the river, just downstream from the NJ Transit Morristown Line railroad crossing (a.k.a. the Morris & Essex Line) of the lower Hackensack River, at RM 3.0, in Kearny, Hudson County. Due to the high velocity of the tidal currents that occur further offshore, GN1 was generally set close to the western shore of the river, in an eddy that forms below the railroad bridge. Also due to the large volume of water that passed this point in the river, GN1 was only fished during neap tides. The substrate at GN1 consists of rubble, sand, soft mud and hard clay. The shoreline is mainly riprap, although there is a small area of mudflat that contains sparse clumps of *Spartina alterniflora* to the south of the inshore (or downstream) end of where the gill net was set.

Gill Net 2 (GN2) – was located on the western side of the river, just downstream from the NJ Transit Bergen Line railroad crossing, at RM 6.8 in Rutherford, Bergen County. The location of GN2 was adjacent to the Hackensack River frontage of the old Rutherford landfill. The inshore (shallow) end of the net was set approximately 60 feet upstream (north) from the mouth of Berry's Creek, and the net extended diagonally from the shoreline upstream (northward) out into deeper water, with care taken not to set the offshore end of the net too close to the navigation channel. GN2 was normally fished during neap tides. The shoreline was dominated by riprap that was placed along the face of the landfill circa 1990. The landfill was vegetated with *Phragmites*, herbaceous vegetation, and small to medium sized trees. The substrate at GN2 consisted of rubble, soft mud, clay and in some areas, refuse that had at one time likely been contained within the landfill.

Gill Net 3 (GN3) – was located in Overpeck Creek, which forms the boundary between Ridgefield and Ridgefield Park, Bergen County. The inshore (shallow) end of the net was set approximately 60 to 80 feet upstream from the eastern or inner span of the two adjacent non-functional railroad drawbridges that cross the mouth of Overpeck Creek. The net was extended diagonally across the channel of Overpeck Creek. Due to the presence of the two non-functioning drawbridges across the mouth of the creek (New York, Susquehanna and Western drawbridge on the west and Penn Central/Conrail drawbridge on the east), we could only gain access during low water (from approximately two hours before to two hours after the time of low water). Therefore, all GN3 sets and retrievals were done around the predicted time of low water, generally during neap tides.

2.4.4 Seines

Seine 1 (S1) – was located on the eastern shore of the Hackensack River, in front of the Public Service Electric & Gas Company (PSE&G) Hudson Generating Station at RM 3.5, in Jersey City, Hudson County. Riprap and developed areas of the Generating Station dominated the shoreline. The substrate consisted of smaller pieces of riprap and other debris in a muddy sand matrix. The location where the seine hauls were made was approximately 250 feet upstream from the location of the Hudson Station's cooling water intake structure. This site was generally sampled close to the predicted time of low water.

Seine 2 (S2) – was located on the western shore of the river, approximately 600 feet downstream from the mouth of Berry's Creek Canal, at RM 7.4 in East Rutherford, Bergen County. The shoreline is dominated by *Phragmites*, with a small patch of sandy beach between the *Phragmites* and the river. The substrate at S2 grades from sand fill from the NJ Turnpike (high up on the shore), to sandy mud, to very soft mud in the subtidal portion of this location.

Seine 3 (S3) – was located on the western shore of the river, on the downstream (southern) side of the NJ Turnpike Western Spur crossing, in Carlstadt, Bergen County, at approximately RM 10.6. (It is important to note that the location of S3 during the 2001-2003 study is the same as location S4 from the 1987-1988 fisheries study). The shoreline at S3 was dominated largely by bare sand and rock filled gabions (fill from the construction of the NJ Turnpike, which supports the overhead roadway crossing), with a stand of *Phragmites* at the downstream end of the site. As with S2, the substrate at site S3 grades from sand at the upper reaches of the intertidal zone, to sandy mud, to very soft thick black mud in the lower intertidal to subtidal zone. A wide mudflat that is exposed at this location during the time of mid to low water makes this site inaccessible during that portion of the tidal cycle. Therefore, S3 was normally sampled at or close to the predicted time of high water. Directly to the south and west of S3 was a channel that led directly to the mouth of Mudabock Creek, which is cut off from the River by an old earthen dike and tide gate.

2.5 Sample Processing

After each collection, all fish and the invertebrate by-catch were identified, sorted by species into separate buckets of water, and counted. With the exception of the blue crab (all of which were counted), visual estimates of large invertebrate by-catches were made. On several occasions (e.g. during August 2001 trap net and seine hauls) large catches of mummichog (*Fundulus heteroclitus*) and/or silverside (*Menidia menidia* and *Menidia beryllina*) were also estimated by sub-sampling, as follows; a calibrated cup was filled and the number of mummichog (or silverside) from three cups were counted. We calculated the average number per cup and then multiplied by the total number of cups to arrive at an estimate of the number of that species for that collection. For fish, a representative sub-sample of 20 individuals of each species were weighed and measured in the field. Fish and blue crabs (*Callinectes sapidus*) were measured to the nearest millimeter (total length for fishes, carapace width for blue crabs) and weighed using either an Ohaus CS-5000 portable electronic balance (5,000 gram capacity), a series of Pesola hanging scales (10 g, 30g, 100 g, 300 g, 1,000 g capacity), or for large specimens such as carp (*Cyprinus carpio*) or large striped bass (*Morone saxatilis*), a Chatillion model IN-25 hand-held spring scale (11.3 kg capacity). For invertebrates, only the blue crabs were measured and sexed. Incidental captures of diamondback terrapins (*Malaclemys t. terrapin*) were usually measured (carapace length), weighed, sexed, and an estimate of their age made by counting scute rings. Most specimens were returned to the River. However, some fish were retained, either for further identification, as voucher specimens, or for laboratory tissue analysis.

2.6 Data Analysis

2.6.1 Fishery Catch Analysis

All data related to each of the 2001-03 fishery collections (date, time, location, gear, water quality data, number of each species captured, length and weight of specimens measured, etc.) were recorded directly onto pre-printed data forms on the boat, during the processing of each collection (Figure 2). The data were subsequently entered into computer spreadsheets to facilitate data summary, analysis and presentation. Although this report contains extensive data summaries, Tables which contain detailed information for each of the 480 collections made during 2001-03 (which include the time and date of collection, water quality data, tidal stage, number and size ranges of all fish and the number of all incidental invertebrates and reptiles captured) are presented in Appendix A, Tables A1 through A21.

One of the main goals of the 2001-03 fishery inventory was to compare the results with those from the 1987-88 study. Unfortunately, the data from the 1987-88 study were not available in an electronic format. Therefore, all of the data from the 1987-88 study were also entered into computer spreadsheets. Any errors that were inadvertently published in the data tables from the 1987-88 fishery inventory report (HMDC, 1989) were corrected and the corrected electronic data were checked against the original 1987-88 data sheets to insure accuracy. In addition to correcting typographical errors, many specimens from the 1987-88 study were re-examined to insure that any questionable identifications were positively identified (mainly clupeids and silversides). Once the newly revised data tables had been checked for accuracy, the catch and size information from the 1987-88 study was compiled, summarized and compared to the data from the 2001-03 study. Since some of the data used in these comparisons is slightly different than that which was published in the 1989 report (HMDC, 1989), the newly revised 1987-88 fishery collection data tables are included in Appendix B, Tables B1 to B21. Summaries of these data by gear type are included as Tables B22 to B25.

2.6.2 Biomass Analysis

We calculated biomass for each species for which the number of fish collected was greater than 30 in either the 1987-88 or 2001-03 study. Calculating total biomass for the 2001-03 study was fairly straightforward. During this study, fish were individually measured and weighed. If less than 20 fish of an individual species were collected in a single collection, all were weighed and measured. If over 20 fish of a particular species were collected, then a representative sub-sample of 20 were weighed and measured. The total number of fish weighed varied widely by species, ranging from over a thousand for common species (e. g., mummichog, 1,008; white perch, 2,491) to as few as six for less common species. Mean mass per fish was computed using the mass data for each species. Total biomass for each species was computed by multiplying the mean mass by the total number collected (for that species).

Calculation of biomass for the 1987-88 study was more complicated because only the length of the fish caught was recorded (i.e., the fish were not weighed). The mass for each individual fish was computed by regression with the measured length for that fish, with the regression parameters determined using the 2001-03 data for the corresponding species. Once a mass was computed for each fish that was measured, we computed an average mass for each species and multiplied the average mass by the total number of fish caught of that species, as was done for the 2001-03 study.

Regression was performed according to the equation;

$$\mathbf{mass = a * length^{b}}$$

using a log-transformed linear regression. Of the 24 regressions calculated, most were excellent: 17 had correlation coefficients (r^2) over 0.9, and all (expect one) were over 0.75. The values of the exponent (b) were around 3 in all cases (2.71 to 3.42), which corresponded with our expectation that the mass would be directly related to volume, which should vary with the cube of the length.

The weakest regression was for Atlantic tomcod (*Microgadus tomcod*). Only 5 tomcod were caught in 2001-03 and all were very small (53mm TL or less); this was not comparable to the 1987-88 study, when 468 were captured, which had an average length of 167mm TL. Furthermore, the length-weight correlation was poor (r^2 = 0.51), and the exponent (b=1.6) was not close to 3. Therefore, we used alternative length-weight data for the Atlantic tomcod regression (Scott and Crossman, 1973). The r^2 for the Scott and Crossman data was 0.99, with an exponent of 3.2.

In the biomass calculation, species with less than 30 specimens collected in both studies were combined into an "other species" category. To calculate biomass for the “other species” for 2001-03, we computed the average mass for all of the fish in the “other species” together (n=55), then multiplied by the number of fish. For the 1987-88 study, we computed the average mass per fish for all of the regressed species, and took that as an estimate of the average mass for fish in “other species” (n=50). For both studies, only 0.1% of the total biomass was comprised by the “other species,” so any error introduced into total biomass by these calculations was considered negligible.

2.6.3 Ecological Indices Analysis

In the simplest of terms, species diversity can be expressed as species richness (S), which is the number of species in the community. However, this simple measure fails to consider species evenness (the

distribution of the number of individuals across all species within the community). Consideration of the species richness weighted by species evenness gives a better measure, or index, of the species diversity of the community. We calculated two of the most commonly used indices to compare species diversity, Simpson's Index (D) and the Shannon-Wiener Index (H'). Higher values of D and H' represent greater diversity. Both indices are calculated using the proportions (p_i) of individuals in the total sample (N_{total}) that are represented by a given species (i), so that

$$p_i = n_i / N_{total}$$

Simpson's Index (D) gives little weight to rare species in comparison to the abundant species. This index has a range between 0 and (1-1/S). Simpson's Index was calculated using the equation;

$$D = 1 / \Sigma p_i^2$$

The Shannon-Wiener index (H') takes into consideration species richness and evenness. The Shannon-Wiener index was calculated using the equation;

$$H' = - \Sigma [p_i * \log (p_i)]$$

Once H' was known, we used it to calculate an evenness index, Shannon's equitability (E_H), using the equation;

$$\mathbf{E_H = H'/H'_{max}}$$

where $H'_{max} = \ln S$ (the natural logarithm of the total number of species).

We then used an adaptation of the t-test to statistically compare the Shannon-Wiener indices calculated for the 2001-03 fish community data (H'_1) to that calculated using the fish community data collected during the 1987-88 fish inventory (H'_2) (Florida International University, 2004). The equation used for this comparison is;

$$t = (H'_1 - H'_2) / S_d$$

In order to calculate the standard deviation (S_d), the variance (s^2) of the Shannon-Wiener index for each time period was first calculated using the following equation:

$$S^2 = \{(\Sigma[n_i * \log (n_i)] - (\Sigma [n_i * \log (n_i)]^2 / N_{total})\} / N_{total}$$

Then, the standard deviation was calculated using:

$$S_d = \sqrt{(S_1^2 + S_2^2)}$$

And finally, the comparison of the H' values required calculation of specialized degrees of freedom, calculated using the following equation;

$$df = [(S_1^2 + S_2^2)^2] / \{[(S_1^2)^2 / N_1] + [(S_2^2)^2 / N_2]\}$$

If the calculated t-value was greater than the value found on the t-table under the specified confidence interval (95%, or p=0.05) and calculated degrees of freedom, then the fish communities were significantly different between the two time periods.

3.0 RESULTS

3.1 Fish Community

3.1.1 Overview

A phylogenetic listing of the fishes captured during the 2001-2003 collections is presented in Table 1, which lists the family, and common and scientific name of each species (according to Nelson, et. al., 2004). In subsequent tables, the fish are only listed by common name. Table 1 also provides information on the pattern of utilization for each species (i.e., do they typically inhabit marine, estuarine, and/or fresh water, based on Able, 1999). A total of 24 families were represented by 39 species that were identified during the study.

A summary of the species composition, total and relative abundance and percent frequency of occurrence for fishes and selected by-catch (blue crab, diamondback terrapin and snapping turtle) captured by each gear type during the two-year study is presented (ranked by total abundance) in Table 2. A total of 40,940 fish were identified in our 480 collections. A total by-catch of 2,131 blue crab, 126 diamondback terrapin and seven snapping turtles were also identified in these collections. The 10 numerically dominant species collected were: mummichog (40.7% of the total number); white perch, *Morone americana* (28.0%); Atlantic silverside, *Menidia menidia* (15.5%); gizzard shad, *Dorosoma cepedianum* (4.0%); striped killifish, *Fundulus majalis* (3.0%); striped bass (2.7%); blueback herring, *Alosa aestivalis* (0.9%); brown bullhead, *Amierus nebulosus* (0.9%); inland silverside, *Menidia beryllina* (0.9%) and Atlantic menhaden, *Brevoortia tyrannus* (0.8%). When combined, the other 29 species collected made up the remaining 2.6% of the catch.

As expected in a brackish estuary, the mummichog was the most abundant species, although it was not the most frequently encountered species in our collections (Table 2). While second in terms of its abundance, the white perch was the most frequently occurring species, captured in 66.7% of all collections (i.e., the white perch was taken in 320 out of our 480 collections). The striped bass, which is closely related to the white perch, was captured in 45% of our collections. Although the total number of striped bass collected was approximately one-tenth that of the white perch, the striped bass was the second most frequently occurring species. The percent frequency data shows that striped bass were generally collected in low numbers in many (n=216) collections. The mummichog was the third most frequently occurring species, captured in 27.3% of all collections. The percent frequency of occurrence also shows that although the number of blueback herring and brown bullhead collected were almost identical (371 vs. 370, respectively), the percent frequency of occurrence for brown bullhead was almost twice that of the blueback herring (10.8% and 5.6%, respectively). This means that almost twice as many blueback herring were captured in approximately one-half of the collections when compared to the brown bullhead (an average of 13.7 blueback herring in 27 collections vs. an average of 7.1 brown bullhead in 52 collections). This makes sense given the migratory nature of the blueback herring, which generally occurs in high numbers during the spring migration into and fall migration out of the estuary, while the brown bullhead is a permanent resident, generally found in the upper (i.e., fresher) portion of the River. Conversely, both the weakfish, *Cynoscion regalis* (n=242) and the alewife, *Alosa pseudoharengus* (n=138) occurred in 10.6% of all collections (51 out of 480), but higher numbers of weakfish were captured in each collection.

Figure 3 shows the total number of fish collected by month (first year) and season (second year) for the top ten species. The data from each month or season consisted of 30 fishery collections. Large catches of mummichog were taken in August and September 2001, June 2002, autumn 2002 and summer 2003. Large numbers of Atlantic silverside and white perch were also taken during our August 2001 and summer 2003 collections. White perch were also collected in high numbers during all months except during the winter. Examination of the same data in a different way (Figure 4) shows the monthly and seasonal percent contribution, based on the total number of fish collected, of the 10 most abundant fish species. Figure 4 clearly shows the dominance of the mummichog and white perch in our collections.

An overview of the monthly occurrence for all 39 species identified during the current fishery resource inventory is provided in Table 3. Species that were collected during the second year of the study (seasonal collections) have been accounted for in this table by including them under the month during which they were collected. Resident freshwater and estuarine species such as the goldfish (*Carassius auratus*), black crappie (*Pomoxis nigromaculatus*), white perch, striped killifish, mummichog and inland silverside were collected during every month of the year. The Altantic silverside and brown bullhead, also considered resident species, were collected during 11 out of 12 months. The striped bass, usually regarded as an anadromous species (the adults of which ascend rivers to spawn in freshwater during the spring, normally moving back into marine waters in the autumn), now appears to be a resident species, as it was also collected during every month of the year. Another anadromous species, the alewife, was collected during every month except February and July.

In contrast, marine transients, such as the lookdown (*Selene vomer*) and striped searobin (*Prionotus evolans*) were collected during only one month of the year. Other typically marine species, such as the bluefish (*Pomatomus saltatrix*) and weakfish, the young of which seek food and refuge from predators in the estuary, were collected during a portion of the year. Young bluefish were collected during July through October, while juvenile and a few adult weakfish were taken from May through November. As expected, the winter collections produced the fewest number of species, with 14 species collected during December, and January, and only 11 species collected in February. The influx of spring migrants raised the number of species collected to 19 during March, 23 during April, peaking at 24 species collected during May (Table 3).

An overview of the spatial distribution of the 39 species collected is provided in Table 4, where all of the mainstem river sampling locations are arranged by river mile, from our downstream-most site (GN1 at RM 3.0) to our upstream-most site (TN6 at RM 12.5). Collections made within tributary creeks have been segregated, in order to see at a glance which species are using which tributaries. Only one species, the white perch, was collected at each of the 21 sampling locations. The striped bass and gizzard shad were collected at the same 20 of our 21 collection locations, both being absent only from site S3. The most abundant species collected (the mummichog) was captured at 14 of our 21 locations. While mummichog would not normally be expected to be captured by the gill nets, they were also absent from our lower river trawl locations (T1, T2, T3 and T6). Similarly, another abundant forage species, the Atlantic silverside, was absent from our lower and middle river trawl collections. As also shown in Table 4, the number of species captured ranged from lows of seven (GN2) and eight (GN1), to highs of 18 at TN3 and 19 at TN5 and TN6.

Overall, trap nets captured the highest number of fish. The trawls captured many fewer fish, however these two gear types produced the highest species richness (n=29 species each) during the study (as shown in Table 2). The differences in catch between the gear types are directly related to the selectivity of the gear types used. For example, our gill nets were efficient at capturing medium to large sized fish

swimming within eight feet of the River bottom (e.g., white perch and striped bass), but captured few of the most abundant fish in the estuary, the mummichog, a small fish which typically frequents shallow inshore areas. The mummichog and other small forage fish typically found in shallow, nearshore waters such as striped killifish and Atlantic and inland silverside were effectively sampled by the siene. Therefore, summaries of our collection data by gear type are presented in the following paragraphs.

3.1.2 Trap Net Catch

A summary of the percent frequency of occurrence, relative abundance, mean number of fish per collection and total catch per unit effort (CPUE – for trap nets the total number of fish caught/the total number of hours all trap nets were fished) for all of the trap net collections is presented in Table 5. Six species (mummichog, white perch, gizzard shad, striped bass, brown bullhead and blueback herring) comprised 97% of the total trap net catch. The mummichog was the most abundant fish caught by the trap net (48.4% of the total), followed by white perch (37.5%). Although the mummichog was the most abundant species in these collections, it was the second most frequently captured (in 63.5% of the 96 trap net sets), as compared to the white perch, which was captured in 88.5% of our trap net collections. While the striped bass only comprised 1.9% of the total trap net catch, they were taken in 54% of all trap net collections. The trap nets also collected large numbers of blue crab (n=1,092), which occurred in 61.5% of all trap net collections, and it was the only gear in which the diamondback terrapin (n=126) was collected.

A summary of the catch data (including all of the by-catch) for each trap net location is presented in Table 6. The total number of species collected at each trap net location ranged from 16 at TN1 to 19 at TN5 and TN6. The total number of fish collected was lowest at TN1 (n=240), and increased moving upriver to TN6, where 7,668 fish were collected. Table 6 also shows that the number of blue crab and diamondback terrapin decrease as you move upriver, which would be expected as the River's salinity decreases. Additionally, large numbers of amphipods were collected at TN4 and TN5. Amphipods, a large component in the diet of Hackensack River white perch (Weis, 2005) are considered an indicator species, as they are among the first taxa to disappear from benthic communities impacted by pollution and have been shown to be more sensitive to contaminated sediments than several other major invertebrate taxa (ASTM, 1990).

The CPUE for the six most abundant trap net species were calculated for each trap net location (Figure 5). The CPUE by trap net location was calculated as the total number of each species/total number of hours that the trap nets were fished at that location. White perch dominated the catch at the three lower trap net locations. Although the white perch were also present at the three upriver trap net locations, the mummichog was more abundant there, especially at TN5 and TN6.

A temporal view of the CPUE for the same selected species is shown in Figure 6, which shows that the highest CPUE was in August, (due to an unusually high catch of mummichog at TN4, TN5, and TN6). During September, October and November 2001, and April, May and July 2002 white perch was a prevalent component of the TN catch. Figure 6 also shows the overall decline in catch during the winter months.

3.1.3 Trawl Catch

A summary of all trawl collections is presented in Table 7. The following seven species made up 92% of the catch: white perch, striped bass, mummichog, gizzard shad, weakfish, blueback herring, and

alewife. White perch were the most abundant species collected in the Trawl (58% of the total trawl catch), followed by striped bass (12.3%) and mummichog (8.9%). The white perch was captured in 59.4% of our 288 Trawl hauls. Although the striped bass only made up 12.3% of the total trawl catch, it was the second most frequently occurring species, being taken in 40.3% of all trawl collections. The blue crab was captured in 52.8% of the trawl collections.

The catch data for each trawl location are summarized in Table 8. The total number of species captured by trawl ranged from 11 at T6 (Sawmill Creek) to 17 at T7 (Berry's Creek Canal). The lowest total number of fish captured by trawl was in the lower River at T1 (n=155), and the highest total number of fish (due to large catches of white perch and striped bass) was collected at T4 (n=813), near the mouth of Mill Creek. Since the otter trawl is dragged along the bottom of the river, approximately 20 species of invertebrates (the "by-catch") were collected during the fishery collections. Table 8 also shows that large numbers of amphipods were collected at locations T4, T7, and T8. Locations T8, T9, T4, and T5 also provided suitable habitat for platform mussels. Locations T7, T8, and T9 had large numbers of white fingered mud crabs. The blue crab was collected at all trawl locations, with the largest number taken in Mill Creek (T8).

The CPUE (total number of fish captured/ total number of trawl minutes for each location) for the seven most abundant species taken by trawl are shown by trawl location in Figure 7. As with the trap net, the trawl CPUE data show an increasing trend as we move upriver from T1 to T4, with a slight decrease in CPUE at T5. A similar pattern is seen in the tributaries, with the catch increasing as we ascended from the lowermost tributary sampled (T6-Sawmill Creek) to Mill Creek (T8). However, there is a decrease in the trawl CPUE in Cromakill Creek (T9). In almost all cases, the trawl catch was dominated by white perch. Exceptions were at T3, where weakfish, striped bass and gizzard shad contributed to the catch, and at T9 where the mummichog made up a large portion of the catch.

The CPUE expressed on a monthly and seasonal basis is shown in Figure 8. With the exception of August and November 2001 and February 2002, monthly trawl CPUE was also dominated by white perch. The seasonal influx of the blueback herring is evident during February and March. Another typical spring migrant, the alewife, was taken in small numbers during March, April and May 2002 and during Spring 2003. Fewer alewife were collected during September through December, when they were leaving the estuary.

3.1.4 Seine Catch

A total of twenty-one species were captured by seine (Table 9). Five species comprised 99% of all fish taken by seine. As one might expect from gear that sampled shallow, inshore estuarine waters, mummichog were the most abundant (46% of the total seine catch), followed by Atlantic silverside (37%), striped killifish and white perch (both 7%) and inland silverside (2%). The mummichog was captured in 75% of all seine hauls, while the Atlantic silverside occurred in 65% of our seine collections. Although the striped bass made up only 0.4% of the total seine catch, they were present in 29% of seine collections. The highest species richness in the seine collections was recorded at S2 (n=15 species), while the 16 collections at S3 produced the most fish (n=8,258)(Table 10). The blue crab was collected at all seine locations, with the highest number collected at the mid-District location (S2).

The CPUE (total number of fish per seine haul) for the five most abundant species captured by seine are shown by seine location in Figure 9. At the lower river seine location (S1), Atlantic silverside dominated the catch, while upriver at S3 the mummichog was extremely abundant. The CPUE at the

mid-District seine location (S2) was almost evenly split between Atlantic silverside, mummichog, striped killifish and white perch. The high CPUE of the Atlantic silverside evident in Figure 9 at location S1 is due to large captures of this species during the August 2001 and summer (August) 2003 (see Table A-16 in Appendix A).

The monthly seine CPUE is shown in Figure 10, where the high catches of Atlantic silverside during August 2002 and Summer 2003 are evident. Also evident from this Figure is the large number of mummichog taken during September 2001, and the drop-off in catch during the winter.

3.1.5 Gill Net Catch

The gill nets collected 14 species, which represents the lowest species richness of any gear type sampled (Table 11). White perch, gizzard shad, striped bass and Atlantic menhaden made up 93% of the total gill net catch. White perch were the most abundant species taken by gill net (57.6% of the total catch). Gizzard shad (21.5%), striped bass (8.3%) and Atlantic menhaden (6.0%) were also relatively common. In addition to being the most abundant species, the white perch was also the most frequently occurring (collected in 87.5% of all gill net sets). Although the striped bass only made up 8.3% of the total gill net catch, they were captured in 71% of all gill net collections. Table 12 provides a summary of the catch for each gill net location. The gill net farthest downstream (GN1) captured the lowest number of fish (n=489), while the location farthest upstream (GN3, in Overpeck Creek) displayed both the highest number (n=798 fish) and the highest richness (n=10 species) of the three gill net locations. The blue crab was collected at each gill net location, with the number decreasing as we moved upriver. The other incidental invertebrates shown on Table 12 captured during our gill net collections were either associated with debris that was pulled in with the nets, or had drifted into the nets during their 24-hour set (i.e., comb jellies).

The CPUE (total number of each species/total hours that each gill net was set) for the four most abundant species captured in the gill nets is shown by location in Figure 11. The trend of increasing numbers of fish as we moved upstream into the fresher portion of the river is evident here, as it was with the trap net catch. White perch composed the majority of the lower and mid-river gill net collections (GN1 and GN2, respectively). By virtue of large captures during August and September 2001, the gizzard shad was the most abundant species collected in Overpeck Creek at GN3 (see Table 12 and A-21).

The monthly and seasonal CPUE for the gill net collections are shown in Figure 12. The high CPUE of gizzard shad seen during August and September 2001 are due to the catch at GN3. The white perch comprised the majority of the gill net catch during the rest of the study, with striped bass being taken by gill net during almost all months. Atlantic menhaden made up a small portion of the gill net catch during September to November 2001, during March and July 2002, and during summer 2003.

3.2 Biomass

Section 2.6.2 describes how the biomass data were analyzed. Table 13 provides a summary of the total number of fish collected, measured and weighed, along with the minimum, maximum and average lengths and weights, and the total calculated biomass for 24 individual species. For the purposes of the biomass calculations the other 15 species that were caught in very low numbers were combined into an "other species" category. The R^2 values for each of the regressions calculated to derive the total

biomass values for each species are also shown in Table 13. With the exception of the value for the Atlantic tomcod (see Section 2.6.2), the R^2 values were very high, ranging from 0.81 to 0.99.

The biomass distribution was very different from the abundance distribution during 2001-03 (Figure 13). While the average size of the white perch was not amongst the largest of the 39 species collected, the large number of white perch captured (n=11,451) along with their average weight of 95.4 g made this species the largest contributor to the total biomass. Although second in terms of numerical abundance, the white perch comprised the largest percentage (48.1%) of the total biomass (Table 13 and Figure 13). The carp, almost all of which were very large, comprised only 0.2% of the total number of fish captured, but contributed 15.3% to the total biomass. Striped bass (2.7% of the total catch) contributed 13.4% to the total biomass, while the gizzard shad (4.0% of the total catch) made up 7.0% of the total biomass. The brown bullhead (0.9% of the catch) comprised 5.2% of the total biomass. Due to its small size, the most numerically abundant species, the mummichog (40.7% of the total catch) only contributed 5.2% of the total biomass. When combined, the aforementioned six species comprised 93.7% of the total calculated biomass of 2,266 kg (4,996 lbs.).

3.3 Water Quality

The water quality data recorded during each collection is provided in Appendix A, Tables A-1 through A-21. Brief summaries of the ranges in water quality parameters measured during the recent study are provided here. Overall, surface salinity ranged from a low of 0.23 $^{o}/_{oo}$ at T5 (August 2003) to 22.8 $^{o}/_{oo}$ at GN1 during November 2001. Bottom salinity ranged from 0.24 $^{o}/_{oo}$ (T5, August 2003 and GN3, June 2003) to 23.3 $^{o}/_{oo}$ at GN1 in November 2001. Surface water temperatures ranged from 1.77 ^{o}C at S2 (January 2002) to 30.8 ^{o}C at S1 during July 2002. Bottom water temperatures ranged from 1.7 ^{o}C during January 2001 to 30.4 ^{o}C during August 2001 (both at GN2). Dissolved oxygen (D.O.) at the surface ranged from a low of 2.1 mg/l at T4 during November 2001 to 13.6 mg/l at TN6 during March 2003. A total of 330 surface D.O. measurements were made during the study, of which 50 (15%) were below the NJDEP water quality criteria of 4.0 mg/l. Bottom water D.O. levels ranged from 1.30 mg/l at GN3 during August 2001 to 10.53 mg/l at T7 during April 2002. A total of 186 bottom D.O. measurements were recorded, with 23% falling below the 4.0 mg/l State criteria. Surface water pH measurements ranged from a low of 4.65 during August 2003 at GN3 to a high of 8.55 at TN4 during April 2002. Bottom water pH measurements ranged from 4.58 at GN3 (August 2003) to 8.13 at T6 (June 2002). Secchi depths, a measure of water clarity, ranged from a low of 25 cm at TN5 (September 2001) to a high of 175 cm at S1 (December 2001).

The water quality data recorded during each fishery collection was organized so that spatial (Table 14) and temporal (Table 15) trends could be examined. To provide spatial trends, mean values for all surface and bottom salinity, temperature, pH, D.O. and the secchi depth were arranged by RM starting with the downstream-most site (GN1 at RM 3.0), ascending to the upstream-most site (TN6, near RM 12.5) (Table 14). For the purposes of examining the water quality data, sampling locations that were within tributaries (T6, TN2, T7, T8, T9, and GN3) were placed according to the order of where the tributary joined the river (e.g., the mouth of Sawmill Creek, where site T6 is located, is at RM 5.1) in Table 14.

The water quality data from the 12 sampling locations where both surface and bottom readings were obtained (i.e. trawl and gill net locations) were extracted from Table 14 and are shown graphically in Figure 14. As expected in an estuarine system, the highest average salinities occurred downriver (at

GN1 and T1), and decreased as we moved upriver to GN3. The salinity chart within Figure 14 also shows that the average bottom salinities are generally slightly higher than the average surface salinities. Exceptions occur at sites T8 and T9, where the average surface and bottom salinities are almost identical, due to the shallow depths of the tributary creeks that were sampled at these locations (Mill Creek and Cromakill Creek, respectively). The chart showing average pH values within Figure 14 shows a trend moving from south to north. Average pH values were lowest at the gill net locations, and were highest at the tributary trawl locations (T6-Sawmill Creek, T7-Berry's Creek Canal, T8-Mill Creek and T9-Cromakill Creek). The average Secchi depths show that water clarity was highest at the southernmost sampling locations (GN1, T1), and decreased as we moved upriver. A similar pattern is seen in the temperature graph, with the highest average water temperatures (between 16.5 to 17.0 ^{o}C) occurring downriver between GN1 and GN2. Moving upriver from GN2, the average water temperature decreases, and levels out between 15.5 and 16.0 ^{o}C between sites T3 and GN3. At all locations except T1 the average bottom water temperatures are slightly lower than the average surface water temperatures. At site T1, the average surface and bottom water temperatures are almost identical. This is likely due to the proximity of site T1 to a canal that discharges heated effluent from a nearby power plant.

On a spatial basis, average D.O. levels do not fall below the NJDEP's water quality criteria for saline waters of 4.0 mg/l (see dissolved oxygen chart in Figure 14). However, the D.O. criteria is based on minimum, rather than average values. The percentage of individual surface D.O. measurements that were below the criteria ranged from 0% (at TN2) to 38% at S2. Bottom D.O. measurements below the criteria ranged from 7% at T1 and T2 to 56% at T5, which is adjacent to the BCUA sewage treatment plant. As expected, the average bottom D.O. levels were always lower than the average surface D.O. levels.

The water quality data were also examined on a temporal basis by calculating monthly averages using the data from the 16 collections performed at each of the 21 sampling locations (Table 15). Graphic representations of these data are presented in Figure 15. An examination of the average monthly salinity chart (within Figure 15) shows that, averaged across the Meadowlands District, the lowest salinities during our study period occurred during May and June, and the highest salinities were during December. Normally, the highest salinities would be expected to occur during the summer months, when freshwater input to the River (i.e., water released by the Oradell Reservoir) is usually at a minimum and evaporation is at its maximum. That the highest salinities occurred during the winter is likely attributable to the drought that affected Northern New Jersey during 2001. The average bottom water salinity was always slightly higher than the surface salinity (similar to the pattern seen in the spatial salinity chart in Figure 14). The average monthly pH values were lowest during the winter and highest during May and June. The difference between the average monthly surface and bottom pH values was generally very small. As expected, the average monthly water temperatures were lowest during the winter and highest during the summer. On a monthly basis, the temperature chart shows that there was little difference between the average surface and bottom water temperatures. Also as expected, the average monthly D.O. values were lowest during the summer (June, July and August), and were highest during the winter (January, February and March). The average surface D.O. was always above the 4.0 mg/l State criteria. However, the number of individual measurements that fell below the criteria ranged from 0% during January, February and March to 57% during August. Average bottom D.O. levels dipped slightly below the State criteria during June, July and August. Individual bottom D.O. measurements below the criteria ranged from 0% (January through April) to 75% (during August). Since D.O. levels vary inversely with rising water temperature, the low D.O. levels would be expected to occur during the summer. The highest average temperatures were measured in July and August. In

terms of water clarity, the average monthly secchi depths show that the River's clarity was highest during the winter, decreasing to its summertime low in July.

Based on the salinity, pH, temperature and D.O. charts shown in Figure 15, it appears that the water column of the Hackensack River within the Meadowlands District is well mixed, rather than being stratified.

4.0 DISCUSSION

Since one of the main goals of the 2001-03 fishery inventory was to compare the newly collected data to that collected during the previous study, this section will focus on the comparison. A direct comparison of the abundance data (by gear type) from each study period for each species collected is presented in Table 16. During the 1987-88 inventory, 433 collections produced 36 species and a total of 61,718 fish. The 480 collections made during the 2001-03 study yielded 40,490 fish from 39 species. Six species were collected (in low numbers) during 1987-88 that were not encountered during the 2001-03 collections. The conger eel (*Conger oceanus*), rainbow smelt (*Osmerus mordax*), seaboard goby (*Gobiosoma ginsburgi*), and white catfish (*Ameiurus catus*) were each represented by one specimen, while three windowpane (*Scophthalmus aquosus*) and eight golden shiner (*Notemigonus crysoluecus*) were also collected. During the course of making the 2001-03 fishery collections, nine species were collected that were absent from the 1987-88 collections. All were collected in low numbers. The alligator gar (*Atractosteus spatula*), a species native to the Mississippi river basin and the Gulf coastal plain from Florida to Mexico, which was likely dumped into the river by an aquarium hobbyist who could no longer accommodate this large and voracious predator, was represented by one fish. The striped searobin and the lookdown (a tropical species that occasionally is carried this far north by the Gulf Stream), were each represented by one specimen. The Atlantic croaker (*Micropogonias undulatus*), hogchoker (*Trinectes maculatus*), and the naked goby (*Gobiosoma bosc*) were each represented by two specimens. A total of four summer flounder (*Paralichthys dentatus*), five largemouth bass (*Micropterous salmoides*), and six threespine stickleback (*Gasterosteus aculeatus*) were also collected during the 2001-03 collection effort. In such a gross overview there does not appear to be an improvement in the fish community over the 15 years between studies. However, examination of the data in greater detail provides a better picture of the changes in the fish community that has occurred between the 1988 and 2003.

Using the data in Table 16 to calculate the relative abundance of each species captured during the two studies is one way to examine the data in greater detail. Figure 16 shows a comparison of the relative abundance of the 10 most abundant species collected during 2001-03 versus their abundance during 1987-1988. This comparison reveals a change in the community structure over the 15 years between the two studies. The mummichog was numerically dominant in 1987-88, comprising just over 86% of all fish caught. Although the mummichog continues to be the most abundant fish, it comprised only about 41% of all fish collected in 2001-03. Other striking differences in abundance include the increase in white perch (from 1% of the catch during the 1987-88 study to 28% during the current study); the Atlantic silverside (from 3% to 16%); the gizzard shad (from 0.1% to 4%); and the striped bass, (from 0.1% to 3%). These results show that while many of the same species still use the River, there is a more even distribution amongst the most common species. The river is no longer almost completely dominated by the mummichog and the fish community has higher numbers of other forage species as well as more desirable game species. The more even distribution of species within the fish community is a sign of increased community stability. This means the fish community will be less severely affected should a disturbance of one or more of its components occur.

The frequency with which each species was captured (i.e., the number of collections that yielded a particular species) during each of the two studies was also compared. Figure 17 shows a comparison of the percent frequency of occurrence of selected fish species (as well as blue crab

and diamondback terrapin) for both study periods. From this chart it is easy to see the large differences in the frequency with which the white perch, striped bass, gizzard shad and blue crab were captured during the 2001-03 collections compared to the 1987-88 collections. For example, the white perch was captured in 320 of the 480 collections made during the 2001-03 investigation (67%), while it was only present in 21.5% of the collections made during the 1987-88 study. However, some species were caught more frequently during the 1987-88 study, including the Atlantic tomcod, blueback herring and pumpkinseed (*Lepomis gibbosus*). Figure 17 also clearly shows the large difference in the frequency with which the mummichog was collected between the two studies.

Although a greater number of fish were collected during the 1987-88 study vs. the 2001-03 study, the large majority in 1987-88 were mummichogs. In contrast, many more large fish (e. g., striped bass and white perch) were collected during the 2001-03 collections. Therefore, it is revealing to compare the biomass of fish captured. The data used to calculate the biomass from 2001-03 was previously presented in Table 13. A summary of the data used to calculate the biomass for fishes captured during the 1987-88 study is shown in Table 17. The biomass comparison (Figure 18) showed a very large (157%) increase in biomass in the current study. Desirable game species such as the white perch and striped bass comprised the largest percentages of biomass in 2001-03; by contrast, in 1987-88, mummichog (42% of total calculated biomass), brown bullhead (18%), carp (14%), and white perch (12%) comprised the largest percentages of biomass.

In order to examine the data from the two studies in greater detail, and to repeat the manner with which the 2001-03 results were presented in Section 3, a comparison of the catch data from the two studies are presented by gear type.

4.1 Comparison of Trap Net Collections

Table 18 presents a summary comparison of the percent frequency of occurrence, relative abundance, mean number collected per net set, total CPUE and total abundance for all trap net collections. Compared to the 1987-88 collections, when 81 trap net collections were made, the mummichog occurred less frequently (63.5% of 2001-03 trap net collections vs. 93.8% of all 1987-88 trap net collections) and in lower numbers during the 96 trap net sets made during the 2001-03 collection effort. On the other hand, the 2001-03 trap net collections produced about 10 times the number of white perch and striped bass. Although the 1987-88 trap net collections produced many more crevalle jack (*Caranx hippos*)(approximately 14 times that of the 2001-03 collections), the percent frequency of occurrence was similar between studies. The number and percent frequency of occurrence for pumpkinseed were both much higher during the 1987-88 study, when the pumpkinseed was collected throughout the HMD. This is likely due to the lower salinities in the River during the 1987-88 study (see Section 4.5). Another freshwater centrarchid, the black crappie, was collected much more frequently (14.6% vs. 4.9%) and in higher numbers (93 vs. 9) in trap nets during the 2001-03 study, even though this species was restricted to the upper portion of our study area, and was captured at only two of our trap net locations (TN5 and TN6). In terms of trap net by-catch, the number of blue crab collected during 2001-03 was seven times higher than that collected during the 1987-88 collections, and the percent frequency of occurrence for blue crab increased from 35% of all 1987-88 trap net collections to 62% of the 2001-03 collections. As another sign of the general improvement in the health of the river, about twice as many diamondback terrapin were collected during 2001-03.

A direct comparison of the total abundance (total number of fish collected) and species richness (total number of species collected) at each trap net location is presented in Figure 19. During the 1987-88 trap net collections, both the abundance and the species richness were higher at TN1 in the lower River. All other trap net locations had higher species richness during the 2001-03 study. With the exception of TN1 and TN4, the other trap net sites produced either the same or higher total abundance in 2001-03, with the largest increases in abundance observed at TN5 and TN6 in the upper portion of our study area. The larger total abundance during 1987-88 at TN4 is attributable to the very high numbers of mummichog collected at this site. A summary of the abundance data for the 1987-88 trap net collections is provided in Appendix B, Table B-22.

Figure 20 presents the comparison of CPUE for selected species at each trap net location during each study period. Figure 20 shows that the white perch has replaced the mummichog as the most abundant species in the lower to mid-River trap net collections (TN1, TN2, and TN3) and also shows that the mummichog was the still main component of the trap net catch at TN4, TN5, and TN6. However, the white perch, striped bass and gizzard shad also contributed to the overall trap net catch in the upper part of the study area. During 1987-88, the mummichog was the most abundant species collected at each trap net site.

4.2 Comparison of Trawl Collections

Similar to the trap net collections, a comparison of the trawl collections (Table 19) for each study period shows striking differences in the abundance and frequency of occurrence for white perch, striped bass, and mummichog. The frequency of occurrence and abundance of mummichog was much higher during the 1987-88 study. Similarly, the abundance of bay anchovy (*Anchoa mitchelli*), spot (*Leiostomus xanthurus*), Atlantic tomcod, and winter flounder (*Pseudopleuronectes americanus*) were also much higher during the 1987-88 study. The lower numbers of these species during 2001-03 may be due to the cyclical highs and lows in abundance that some fish populations typically exhibit. A brief anecdote regarding the spot illustrates the point. In his "History of the Tidal Hackensack River Fisheries", Zeisel (1989) relates the story of why the spot is locally known as lafayette in the New York City/Staten Island area, as follows; in 1826 the Marquis de Lafayette visited the United States on a sentimental tour of the country he helped to gain independence. During that same year vast schools of *Leiostomus* appeared in one of their occasional visits to the Hudson River estuary, and the locals immediately called the fish the lafayette. Reports from a much later period indicate that in years when the fish was especially plentiful in the Hudson River, it would run all the way up the Hackensack River to City of Hackensack (Zeisel, 1989).

In addition to the white perch and striped bass, other game species that were captured in higher numbers by trawl during the 2001-03 study include weakfish, with twice as many collected in the recent study, and the bluefish, the abundance of which was 12 times the number collected by trawl during 1987-88. In the by-catch, the blue crab occurred more frequently (in more than half of all trawl collections) and in greater numbers (over 3.5 times the number) compared to the previous study.

A direct comparison of the species richness and total abundance at each trawl location is shown in Figure 21. In the lower River, species richness was higher at T1, T2, and T3 during 1987-88, while at location T1 the total abundance was also higher during 1987-88. At T4, species richness was the same during the two study periods (n=14 species), but the total abundance was higher

during the 1987-88 study (mainly due to the preponderance of the mummichog). In the upper portion of our study area, at T5, the species richness increased from seven to 12 species and the total abundance was also higher during 2001-03.

In each of the tributaries sampled, the total abundance in the trawl collections were higher during the 1987-88 study. The summary of 1987-88 trawl collections in Appendix B, Table B-23 shows that this was due to high numbers of mummichogs collected at T6, T8, and T9, and by bay anchovy and mummichog at T7. Nonetheless, the species richness in all tributaries sampled (T6 through T9) was higher during the 2001-03 study. In Mill Creek (T8) and Cromakill Creek (T9), species richness increased by more than a factor of three, as the number of species collected in Mill Creek increased from 4 to 14, while in Cromakill Creek the number of species taken rose from 4 to 13.

The CPUE for some of the commonly collected species in the trawl are shown by site location in Figure 22. With the exception of locations T1 and T2, the 1987-88 trawl collections were dominated by mummichog. Compared to the 1987-88 data, the CPUE data for 2001-03 shows a shift from a community dominated by mummichog to one dominated by white perch and other desirable game (weakfish and striped bass) and forage species (alewife, blueback herring and gizzard shad). Notable differences can be seen in the River trawl sites T3, T4, and T5 and in all of the tributaries, where the white perch has replaced the mummichog as the most abundant species.

4.3 Comparison of Seine Collections

The comparisons of the seine collection data are shown in Table 20. Overall, more than twice as many fish were captured by seine during the 1987-88 collections, when the mummichog comprised 91% of the total seine catch. While the mummichog continued to be the most abundant fish collected by this gear type, the total number of mummichog collected during 2001-03 was about 4.6 fold fewer than that collected during 1987-88. The inland silverside is another species that was more abundant and collected more frequently during the 1987-88 collections. This is likely due to the lower salinity in the River during the 1987-88 collections (see Section 4.5). Conversely, the relative abundance, percent frequency of occurrence, and total CPUE for Atlantic silverside, striped killifish, striped bass, bluefish and white perch were much higher during the 2001-03 study. Similarly, the seine by-catch of blue crab was almost six times higher during 2001-03. The blue crab was captured in almost 40% of the 2001-03 seine collections, compared to 13% of the 1987-88 collections.

Direct comparisons of the total abundance and species richness at each seine location show that the overall abundance was greater at each location during the 1987-88 collections (Figure 23). Again, this was due to the high numbers of mummichog at location S2 and S3, and by the mummichog and Atlantic silverside at S1. For a summary of all seine collections from the 1987-88 study, see Appendix B, Table B-24. The species richness at all seine locations was greater during the 2001-03 study, with the largest increase seen at S3, where six species were taken during 1987-88, compared to 10 species during the 2001-03 seine collections.

The comparison of CPUE (number of fish per seine haul) for the most commonly collected species at each of the seine locations (Figure 24) shows the shift in the species composition at S1, where large catches of Atlantic silverside collected during August 2001 and 2003 have replaced

the mummichog as the most abundant species at this location. A decrease in abundance of mummichog and a much more even distribution of the more abundant species at S2 during the 2001-03 collections is also evident in this figure. At S3, the mummichog is still the most abundant species collected by seine, but the Atlantic silverside, white perch and striped killifish also contributed to the fish community at this location.

4.4 Comparison of Gill Net Collections

The comparisons for percent frequency, relative abundance, mean number of fish per net, total CPUE (total number of each species/total gill net sampling time) and total abundance for all gill net collections are presented in Table 21. Overall, the gill nets captured almost six times more fish during the 2001-03 collections compared to 1987-88. This can be partially attributed to the fact that during the 1987-88 collections, the gill nets were frequently fouled with garbage and/or organic debris (*Phragmites* leaves, bryozoans, wooden timbers, etc.), which often resulted in low gill net catches. Fouling of the gill nets was very infrequent during the 2001-03 collections. The total number of white perch, gizzard shad, striped bass, carp, and bluefish were much higher in the 2001-03 gill net collections. Although the number of striped bass taken in the 2001-03 gill net collections (n=158) was about six times higher than that taken in the 1987-88 collections (n=26), the relative abundance was similar (8.3% of the total gill net catch in 2001-03 vs. 7.5% in 1987-88). However, the frequency of occurrence of striped bass was much higher during the 2001-03 study (70.8% vs. 11.9%).

Similar to the trawl collections, the white perch was the most abundant species taken in our 2001-03 gill net collections, and comprised almost 58% of the gill net catch. Although during much of the first year of our recent study northern New Jersey was suffering from a drought, resulting in higher salinities throughout the Meadowlands, the numbers and percent frequency of occurrence of several species of freshwater fishes (gizzard shad, carp, brown bullhead, and black crappie) were much higher during the recent study. When compared to the 1987-88 collections, slightly over 3.5 times as many blue crab were collected in 2001-03.

One species that was collected in much higher numbers during the 1987-88 study was the Atlantic tomcod, which made up about 29% of the total gill net catch in the 1987-88 gill net collections. A summary of all 1987-88 gill net collections is provided in Appendix B, Table B-25. No tomcod were captured by gill net during 2001-03. Similar to the spot, the reason for this difference is attributable to the cyclical nature of the population dynamics of the Atlantic tomcod. The tomcod population was depressed, resulting in low catches of tomcod throughout its range during 2001-02, when our monthly sampling occurred (personal communitcation, Chris Chambers, NOAA Sandy Hook Field Office).

The comparison of total abundance and species richness for each gill net site is shown in Figure 25. The larger total abundances at GN1 and GN2 during 2001-03 compared to the 1987-88 collections are due to the high numbers of white perch collected at these locations. At GN3, the gizzard shad was responsible for much of the increase in abundance. This was primarily due to the high numbers of gizzard shad collected during August and September 2001 (see Appendix A, Table A-21). Comparing the overall species richness at the gill net locations shows that the same number of species was collected at GN1 (n=8), while during 2001-03 one additional species was collected at GN2. The diversity is at GN3 more than doubled, from four species collected during 1987-88 to 10 species collected during the 2001-03 study.

The average CPUE for the five most commonly collected species taken by gill net are shown in Figure 26. During the current study, white perch was most abundant at GN1 and GN2, where the striped bass and Atlantic menhaden also composed a portion of the catch. As mentioned above, the gizzard shad made up a large portion of the catch at GN3 during 2001-03.

4.5 Water Quality

The average values of the surface readings measured during 1987-88 and during 2001-03 for salinity, temperature, D.O., and secchi depth are graphed by site (in ascending order, from our downstream-most location) in Figure 27.

The average salinity was higher at all sites in 2001-03 vs. 1987-88, due to the drought that New Jersey experienced from April 2001 - September 2002. The difference was most pronounced (about 6 parts per thousand, ppt, in the average) near the downriver (southern) boundary of the study area. Overall, the average salinities in the Meadowlands mainly remained in the medium-salinity or "mesohaline" range (i. e., 5 to 18 ppt) during both studies. Salinity decreases as one moves upriver, with the average salinity around 5 ppt at the northern end of the Meadowlands District in both studies.

Since no trap net collections were made in December, January or February during the 1987-88 study, the December, January and February temperature data were removed from the 2001-03 data set to avoid the false impression that there were higher average temperatures at the trap net locations during 1987-88. Nonetheless, a temperature spike at site TN1 near the southern end was still observed during both studies, likely due to the discharge of heated water by the nearby power plant. In 1987-88, high temperatures were also observed in the upriver (northern) area (S3, TN5 and T5), again likely caused by a discharge from a nearby power plant. However, this discharge was discontinued in the years between the two studies, and so, average temperature at T5, for example, was markedly lower (5^0C, 9^0F) during 2001-03. Elevated water temperatures are undesirable because warmer water is not able to hold as much dissolved oxygen as cooler water.

With regard to dissolved oxygen (DO), there was no consistent pattern in the differences between the two studies regarding average concentrations. However, DO concentration is a highly dynamic variable, varying widely throughout each day from photosynthesis of algae during daylight pumping oxygen into the water, and plant respiration consuming oxygen during the night. Given that sampling times were not highly controlled during the two studies (i.e., water quality measurements were not made during the same stage of the tide), it is not tenable to make conclusive statements about how DO compares between the two studies. It is encouraging to note that, in 1987-88, 77% of all surface DO readings (n=272) were above the regulatory criteria of 4 mg/l. The percentage of surface DO measurements above the State criteria rose to 85% (based on 330 measurements) during 2001-03. A similar, although less dramatic improvement was noted in the bottom DO measurements. A total 70% of the bottom DO measurements (n=202) were above 4 mg/l during 1987-88. During 2001-03, the number of DO measurements above 4 mg/l rose to 77% (n=186 measurements).

No consistent pattern in the differences between the two studies was evident for water clarity. Water clarity was greater in 2001-03 vs. 1987-88 at the downriver sites, but was slightly more

turbid at the upriver sites. However, there was a nearly consistent spatial pattern during both studies: water clarity decreases as one moves upriver.

Although it is difficult to discern large differences in water quality from the direct comparison of the water quality data measured during the two studies, several events have taken place within the Meadowlands since the 1987-88 study was conducted that have lead to water quality improvements in the 15 years between fishery resource inventories. Among these are;

- Proper closure of several landfills, which has sent approximately 1.5 billion gallons of leachate to sewage treatment plants instead of the river and its wetlands
- Four small sewage treatments plants have been closed down. Rather than discharging their minimally treated sewage into small creeks that lead into the river, the sewage from these plants is now sent to two large, regional sewage treatment plants.
- The two large regional sewage treatment plants have been upgraded, and now discharge effluent that is "cleaner" than in the past.
- Eight wetland restoration projects have restored approximately 600 acres of formerly tide restricted *Phragmites* dominated wetlands to full tidal inundation. These restoration projects have allowed fish and invertebrates renewed access to these marshes.
- Cessation of approximately 645 million gallons per day of once-through non-contact cooling water from the PSE&G Bergen Generating Station. We suspect that the removal of this thermal impact to the upper river, along with the elimination of the losses of fish and invertebrates formerly associated with this large withdrawal of water is a key factor in the improvements to the fish community seen in the upper river.
- Beneficial re-use of treated sewage effluent. A portion of the effluent that would normally be discharged directly to the river by the BCUA Little Ferry Treatment Plant is now sent to the PSE&G Bergen Generating Station for re-use as cooling water in a closed-loop cooling system.

4.6 Analysis of Ecological Indices

To determine if the change in the fish community between 2001-03 and 1987-88 was significant, the statistics of community structure calculated were analyzed using an adapted t-test to statistically compare the fish community data (see Section 2.6.3). This analysis revealed that the difference between the 1987-88 and 2001-03 fish community for the river as a whole (i.e., all 21 locations combined) was highly significant (at p=0.01). Further analysis compared pooled data from the lower, middle and upper portions of the river and from the tributaries (Table 22). For each river section, the species richness and abundance data from one location sampled by each gear type were combined and compared with its 1987-88 counterpart. For the lower river, species richness and abundance data from sampling locations GN1, S1, TN1 and T1 were used. Sampling locations used for the middle river included GN2, T3, TN3 and S2, while the data used for the upper river consisted of S3, TN5, T5 and GN3. This is similar to the way the fish community was examined (without the statistical analysis) during the 1987-88 fishery resource inventory (Bragin, 1988). Comparing the data in this way revealed that the fish community in both the middle and upper portions of the river were significantly different (p=0.01) between the two studies. However, no difference in the fish community was discerned between 2001-03 and 1987-88 for the pooled tributary data or in the lower portion of the river.

In an effort to determine which sites contributed to the significant differences between the pooled data sets, we applied the t-test described in Section 2.6.3 to the paired data sets for each of the 21 site locations. The results of the ecological index calculations by individual site locations (grouped by gear type) are presented in Table 23. A graphical comparison of the species richness (total number of species) and the Shannon-Wiener diversity index calculated for each sampling location for each collection period is provided in Figure 28. The comparison on a site-by-site basis revealed that the Shannon-Wiener diversity index was significantly different at only four sites between the studies (S2, TN4, T5, and T9). Since the data from sites TN4 and T9 were not included in the analysis of the three river zones mentioned above, we conclude that the fish community within the middle river was significantly different due to the data from site S2. The difference is clearly related to the number of fish collected, as during the 1987-88 collections 16,231 more fish (mainly mummichog) were collected at S2, while the species richness only increased by one species in 2001-03 (seen in the upper graph in Figure 28). The 2001-03 abundance data were much more evenly distributed amongst the 15 species collected at S2. For the upper river, T5 appears to be the driving force behind the difference in the fish community. Although the total number of fish collected was similar between studies (with only 151 more fish captured in 2001-03), species richness increased from seven during 1987-88 to 12 during 2001-03. A more even distribution of the 678 fish collected at T5 during 2001-03 is responsible for the difference.

4.7 Summary

A comparison of two fishery resource inventory studies of the lower Hackensack River conducted 15 years apart has shown that although many of the same fish species still use the river, there was a significant difference between the fish communities that use the upper and middle portions of the river (within the Hackensack Meadowlands District). No difference was seen in the fish community within the lower, more industrial portion of the river. Although the water quality data collected during the two studies was not designed to rigorously test for significant differences in water quality, the data show an improvement in the water temperature in the upper portion of the river, as well as improvements to the dissolved oxygen levels throughout the Meadowlands District portion the river. Over the 15 years that has elapsed between studies, large increases in the abundance of desirable game species, such as white perch, striped bass, weakfish and bluefish, and forage fish (gizzard shad, striped killifish, and Atlantic silverside) as well as an important invertebrate, the blue crab, have occurred. There has also been an increase in the numbers of diamondback terrapin that inhabit the river. All of this, in addition to the large increases in the numbers of pollution sensitive amhipods collected as by-catch during the fisheries collections attest to the improvements in water quality that have slowly occurred between the 1987-88 and 2001-03 studies.

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TABLES

TABLE 1
Phylogenetic Checklist of Fishes Captured Within the Hackensack Meadowlands District
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

Family	Scientific Name	Common Name	Pattern of Utilization*
Lepisostidae	*Atractosteus spatula*	Alligator Gar	F
Anguillidae	*Anguilla rostrata*	American Eel	D
Clupeidae	*Alosa aestivalis*	Blueback Herring	D
	Alosa pseudoharengus	Alewife	D
	Alosa sapidissima	American Shad	D
	Brevoortia tyrannus	Atlantic Menhaden	D
	Dorosoma cepedianum	Gizzard Shad	D
Engraulidae	*Anchoa mitchilli*	Bay anchovy	E, M
Cyprinidae	*Carassius auratus*	Goldfish	F
	Cyprinus carpio	Carp	F
Ictaluridae	*Ameiurus nebulosus*	Brown Bullhead	F
Phycidae	*Urophycis regia*	Spotted Hake	M,E
Gadidae	*Microgadus tomcod*	Atlantic Tomcod	D
Fundulidae	*Fundulus heteroclitus*	Mummichog	E
	Fundulus majalis	Striped Killifish	E
Atherinopsidae	*Menidia beryllina*	Inland Silverside	E, F
	Menidia menidia	Atlantic Silverside	E, M
Gasterosteidae	*Gasterosteus aculeatus*	Threespine stickleback	E
Syngnathidae	*Syngnathus fuscus*	Northern Pipefish	E
Triglidae	*Prionotus evolans*	Striped Searobin	M, E
Moronidae	*Morone americana*	White Perch	E, D
	Morone saxatilis	Striped Bass	D
Centrarchidae	*Lepomis cyanellus*	Green Sunfish	F
	Lepomis gibbosus	Pumpkinseed	F
	Lepomis macrochirus	Bluegill	F
	Micropterus salmoides	Largemouth Bass	F
	Pomoxis nigromaculatus	Black Crappie	F
Percidae	*Perca flavescens*	Yellow Perch	F
Pomatomidae	*Pomatomus saltatrix*	Bluefish	M,E
Carangidae	*Caranx hippos*	Crevalle Jack	M
	Selene vomer	Lookdown	M
Sciaenidae	*Cynoscion regalis*	Weakfish	E, M
	Leiostomus xantharus	Spot	E, M
	Micropogonias undulatus	Atlantic Croaker	E, M
Mugilidae	*Mugil cephalus*	Striped Mullet	E, M
Gobiidae	*Gobiosoma bosc*	Naked Goby	E
Paralichthyidae	*Paralichthys dentatus*	Summer Flounder	M, E
Pleuronectidae	*Pseudopleuronectes americanus*	Winter Flounder	M, E
Achiridae	*Trinectes maculatus*	Hogchoker	E, M

* NOTES: D=Diadromous; E= Estuarine; F=Freshwater; M=Marine. Source; Able, 1999. Phyologenetic classification and names per Nelson, et. al. 2004.

TABLE 2

Ranked Overall Species Composition, Total Abundance, Relative Abundance and Percent Frequency of Occurrence

NJMC/MERI Hackensack River Fishery Resource Inventory

August 2001 - September 2003

Gear Type: / Number Of Collections:	Gill Net 48	Seine 48	Trap Net 96	Trawl 288	Total Abundance (total #) 480	Relative Abundance (% of total)	Percent Frequency of Occurrence
Mummichog		7,803	8,438	403	**16,644**	40.65%	27.3%
White Perch	1,102	1,196	6,533	2,620	**11,451**	27.97%	66.7%
Atlantic Silverside		6,278	58	7	**6,343**	15.49%	11.0%
Gizzard Shad	411	23	1,011	198	**1,643**	4.01%	15.6%
Striped Killifish		1,211	37	1	**1,249**	3.05%	8.8%
Striped Bass	158	70	339	556	**1,123**	2.74%	45.0%
Blueback Herring	4		240	127	**371**	0.91%	5.6%
Brown Bullhead	12		300	58	**370**	0.90%	10.8%
Inland Silverside		361	3	2	**366**	0.89%	5.2%
Atlantic Menhaden	115	35	144	26	**320**	0.78%	9.2%
Weakfish	6		49	187	**242**	0.59%	10.6%
Alewife	5	3	52	78	**138**	0.34%	10.6%
Bluefish	33	18	6	49	**106**	0.26%	7.9%
Black Crappie	7		93	2	**102**	0.25%	4.4%
Bay Anchovy		21	2	72	**95**	0.23%	4.8%
American Eel			42	50	**92**	0.22%	9.0%
Carp	58	6	19	6	**89**	0.22%	6.5%
Spot	1	5		32	**38**	0.09%	2.9%
Goldfish		1	33		**34**	0.08%	2.9%
Crevalle Jack		19	7	4	**30**	0.07%	1.9%
American Shad			1	15	**16**	0.04%	1.7%
Northern Pipefish		7		4	**11**	0.03%	1.7%
Pumpkinseed			6	3	**9**	0.02%	1.3%
Spotted Hake			7	2	**9**	0.02%	1.0%
Winter Flounder		5	3	1	**9**	0.02%	1.3%
Striped Mullet		6			**6**	0.01%	0.4%
Threespine Stickleback			5	1	**6**	0.01%	1.3%
Atlantic Tomcod		2		3	**5**	0.01%	0.6%
Largemouth Bass			5		**5**	0.01%	0.6%
Summer Flounder		1		3	**4**	0.01%	0.6%
Unidentified Clupeidae		1	1		**2**	<0.01%	0.4%
Atlantic Croaker				2	**2**	<0.01%	0.4%
Hogchoker		2			**2**	<0.01%	0.4%
Naked Goby				2	**2**	<0.01%	0.2%
Alligator Gar	1				**1**	<0.01%	0.2%
Bluegill			1		**1**	<0.01%	0.2%
Green Sunfish			1		**1**	<0.01%	0.2%
Lookdown			1		**1**	<0.01%	0.2%
Striped Searobin	1				**1**	<0.01%	0.2%
Yellow Perch			1		**1**	<0.01%	0.2%
Total Number of Fish	**1,914**	**17,074**	**17,438**	**4,514**	**40,940**	100.00%	
Total Number of Taxa*	**14**	**21**	**29**	**29**	**39**		
Blue Crab	216	102	1,092	721	**2,131**	--	51.7%
Diamondback Terrapin			126		**126**	--	6.0%
Snapping Turtle			6	1	**7**	--	1.0%

* Unidentified Clupeidae not counted as a distinct taxa.

TABLE 3
Checklist of Temporal Species Occurrence
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 - September 2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	No. of months
Alewife	▒		▒	▒	▒	▒		▒	▒	▒	▒	▒	**10**
Alligator Gar						▒							**1**
American Eel			▒	▒	▒	▒	▒	▒	▒	▒	▒		**9**
American Shad			▒	▒					▒		▒	▒	**5**
Atlantic Croaker		▒									▒		**2**
Atlantic Menhaden			▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**10**
Atlantic Silverside	▒	▒	▒	▒	▒		▒	▒	▒	▒	▒	▒	**11**
Atlantic Tomcod					▒								**1**
Bay Anchovy	▒			▒	▒	▒	▒	▒	▒	▒			**8**
Black Crappie	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**12**
Blueback Herring		▒	▒	▒	▒	▒				▒			**6**
Bluefish							▒	▒	▒	▒			**4**
Bluegill							▒						**1**
Brown Bullhead	▒		▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**11**
Carp			▒	▒	▒	▒	▒	▒	▒	▒	▒		**9**
Crevalle Jack							▒	▒	▒	▒			**4**
Gizzard Shad	▒		▒	▒		▒	▒	▒	▒	▒	▒	▒	**10**
Goldfish	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**12**
Green Sunfish						▒							**1**
Hogchoker				▒	▒								**2**
Inland Silverside	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**12**
Largemouth Bass								▒				▒	**2**
Lookdown									▒				**1**
Mummichog	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**12**
Naked Goby			▒										**1**
Northern Pipefish				▒	▒	▒				▒	▒		**5**
Pumpkinseed			▒		▒			▒		▒	▒		**5**
Spot					▒	▒	▒				▒		**4**
Spotted Hake				▒	▒								**2**
Striped Bass	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**12**
Striped Killifish	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**12**
Striped Mullet				▒			▒						**2**
Striped Searobin							▒						**1**
Summer Flounder	▒			▒	▒								**3**
Threespine Stickleback		▒	▒										**2**
Weakfish					▒	▒	▒	▒	▒	▒	▒		**7**
White Perch	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	**12**
Winter Flounder	▒				▒	▒				▒			**4**
Yellow Perch				▒									**1**
Total # of species	**14**	**11**	**19**	**23**	**24**	**21**	**21**	**20**	**20**	**22**	**20**	**14**	

Notes: ▒ denotes that the species was captured during that month.

TABLE 4
Checklist of Species Distribution by Site Location/Rivermile
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 - September 2003

	Hackensack River															Tributaries						Total # of
Sampling Location	**GN1**	**S1**	**TN1**	**T1**	**T2**	**GN2**	**T3**	**TN3**	**S2**	**TN4**	**T4**	**S3**	**TN5**	**T5**	**TN6**	**T6**	**TN2**	**T7**	**T8**	**T9**	**GN3**	collection
River Mile/Tributary	**3.0**	**3.5**	**3.6**	**3.8**	**5.4**	**6.8**	**7.0**	**7.1**	**7.4**	**9.2**	**9.3**	**10.6**	**10.9**	**11.4**	**12.5**	**SMC**	**SMC**	**BCC**	**MC**	**CC**	**OC**	locations
Alewife					X											X			X			15
Alligator Gar																					X	1
American Eel			X																			12
American Shad								X														3
Atlantic Croaker					X		X															2
Atlantic Menhaden		X						X														15
Atlantic Silverside					X													X		X		14
Atlantic Tomcod																						2
Bay Anchovy																						9
Black Crappie														X					X			5
Blueback Herring																			X			13
Bluefish								X											X			17
Bluegill													X									1
Brown Bullhead											X									X		10
Carp					X	X		X									X					10
Crevalle Jack																	X					5
Gizzard Shad	X	X						X												X		20
Goldfish												X										3
Green Sunfish			X																			1
Hogchoker																						1
Inland Silverside										X												6
Largemouth Bass																						2
Lookdown																	X					1
Mummichog																						14
Naked Goby																						1
Northern Pipefish																X		X	X	X		5
Pumpkinseed										X								X				5
Spot	X										X							X				7
Spotted Hake								X														4
Striped Bass																						20
Striped Killifish																		X				9
Striped Mullet																						1
Striped Searobin	X																					1
Summer Flounder		X																				2
Threespine Stickleback			X					X		X			X		X					X		6
Weakfish						X														X		17
White Perch																						21
Winter Flounder			X	X						X							X					5
Yellow Perch															X							1
Total # of species	**8**	**13**	**16**	**13**	**12**	**7**	**12**	**18**	**15**	**17**	**14**	**10**	**19**	**12**	**19**	**11**	**17**	**17**	**14**	**13**	**10**	

Notes: denotes that the species was captured at that site location.
An "X" behind the stipple pattern denotes occurrence based on only one specimen collected at that location.
SMC=Sawmill Creek, BCC=Berry's Creek Canal, MC=Mill Creek, CC=Cromakill Creek, OC=Overpeck Creek

TABLE 5
Ranked Species Composition for All Trap Net Collections
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001-September 2003

Gear Type: / **Number Of Collections:** / **Species**	**TRAP NET** **96** Percent frequency of occurrence	Relative abundance (% of total)	Mean # of fish per Trap Net	Total CPUE (# fish / hour)	Total number collected
Mummichog	63.5	48.4%	87.90	3.57	8,438
White Perch	88.5	37.5%	68.05	2.77	6,533
Gizzard Shad	24.0	5.8%	10.53	0.43	1,011
Striped Bass	54.2	1.9%	3.53	0.14	339
Brown Bullhead	30.2	1.7%	3.13	0.13	300
Blueback Herring	12.5	1.4%	2.50	0.10	240
Atlantic Menhaden	9.4	0.8%	1.50	0.06	144
Black Crappie	14.6	0.5%	0.97	0.04	93
Atlantic Silverside	17.7	0.3%	0.60	0.02	58
Alewife	14.6	0.3%	0.54	0.02	52
Weakfish	15.6	0.3%	0.51	0.02	49
American Eel	21.9	0.2%	0.44	0.02	42
Striped Killifish	14.6	0.2%	0.39	0.02	37
Goldfish	13.5	0.2%	0.34	0.01	33
Carp	13.5	0.1%	0.20	<0.01	19
Crevalle Jack	6.3	0.0%	0.07	<0.01	7
Spotted Hake	3.1	0.04%	0.07	<0.01	7
Bluefish	3.1	0.0%	0.06	<0.01	6
Pumpkinseed	4.2	0.03%	0.06	<0.01	6
Largemouth Bass	3.1	0.03%	0.05	<0.01	5
Threespine Stickleback	5.2	0.03%	0.05	<0.01	5
Inland Silverside	3.1	0.02%	0.03	<0.01	3
Winter Flounder	3.1	0.02%	0.03	<0.01	3
Bay Anchovy	1.0	0.01%	0.02	<0.01	2
Unid. Clupeidae	1.0	0.01%	0.01	<0.01	1
American Shad	1.0	0.01%	0.01	<0.01	1
Bluegill	1.0	0.01%	0.01	<0.01	1
Green Sunfish	1.0	0.01%	0.01	<0.01	1
Lookdown	1.0	0.01%	0.01	<0.01	1
Yellow Perch	1.0	0.01%	0.01	<0.01	1
Totals:		100%	181.65	7.38	17,438
Total Number of Taxa:					29
Blue Crab	61.5		11.38	0.46	1,092
Diamondback Terrapin	30.2		1.31	0.05	126
Snapping Turtle	5.2		0.06	<0.01	6

Percent Frequency of Occurrence = % of collections that captured each species
Relative Abundance = total # of the individual species/total # of fish collected
Total CPUE = total # of fish / total # of hours Trap Nets were fished

TABLE 6
Summary of Species Composition and Abundance by Trap Net Location
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

SITE	TN 1	TN 2	TN 3	TN 4	TN 5	TN 6	
Approximate River Mile	**3.7**	**SMC**	**7.1**	**9.2**	**10.9**	**12.5**	
Mean Surface Salinity (ppt)	**14.7**	**12.9**	**8.4**	**7.0**	**5.3**	**4.5**	**TOTALS**
No. of Collections	**16**	**16**	**16**	**16**	**16**	**16**	**96**
FISH							
Unidentified Clupeidae			1				1
Alewife		6	12	22	8	4	52
American Eel	1	14	2	8	8	9	42
American Shad			1				1
Atlantic Menhaden		10	1	8	6	119	144
Atlantic Silverside	2	16	7	20	10	3	58
Bay anchovy	2						2
Black Crappie					44	49	93
Blueback Herring	5	31	134	5	37	28	240
Bluefish	3	2	1				6
Bluegill					1		1
Brown Bullhead			9	3	170	118	300
Carp		1	1	2	5	10	19
Crevalle Jack	3	1	3				7
Gizzard Shad	4	2	1	6	40	958	1,011
Goldfish					30	3	33
Green Sunfish	1						1
Inland Silverside				1		2	3
Largemouth Bass					2	3	5
Lookdown		1					1
Mummichog	5	28	121	1,272	2,533	4,479	8,438
Pumpkinseed				1	2	3	6
Spotted Hake	4	2	1				7
Striped Bass	31	39	35	48	155	31	339
Striped Killifish	9	7	8	10	3		37
Threespine stickleback	1		1	1	1	1	5
Weakfish	2	2	8	10	13	14	49
White Perch	166	1,229	1,300	796	1,209	1,833	6,533
Winter Flounder	1	1		1			3
Yellow Perch						1	1
Total # of Taxa Collected*	**16**	**17**	**18**	**17**	**19**	**19**	**29**
Total # of Fish Collected	**240**	**1,392**	**1,647**	**2,214**	**4,277**	**7,668**	**17,438**
INVERTEBRATES							
Amphipods			221	115,210	10,000	1,420	126,851
Sand Shrimp	7			1	1		9
Blue Crab	248	236	265	129	130	84	1,092
Isopod	6	4	1				11
Grass Shrimp	1			1		1	3
White-fingered mud crab	3	1	8	48	5	14	79
REPTILES							
Snapping Turtle			1	1	1	3	6
Diamond Back Terrapin	44	35	43	4			126

* Unidentified Clupeidae not counted as a separate taxa.

SMC - denotes that TN2 was located in Sawmill Creek, approx. 1.1 nautical miles from its mouth.

TABLE 7
Ranked Species Composition for All Trawl Collections
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001-September 2003

Gear Type:	**TRAWLS**				
Number Of Collections:	**288**				
Species	Percent frequency of occurrence	Relative abundance (% of total)	Mean # of fish per Trawl	Total CPUE (# fish / minute)	Total number collected
White Perch	59.4	58.0%	9.10	3.04	2,620
Striped Bass	40.3	12.3%	1.93	0.64	556
Mummichog	11.8	8.9%	1.40	0.47	403
Gizzard Shad	12.8	4.4%	0.69	0.23	198
Weakfish	10.8	4.1%	0.65	0.22	187
Blueback Herring	4.5	2.8%	0.44	0.15	127
Alewife	11.5	1.7%	0.27	0.09	78
Bay Anchovy	6.6	1.6%	0.25	0.08	72
Brown Bullhead	6.3	1.3%	0.20	0.07	58
American Eel	7.6	1.1%	0.17	0.06	50
Bluefish	8.0	1.1%	0.17	0.06	49
Spot	3.8	0.7%	0.11	0.04	32
Atlantic Menhaden	4.5	0.6%	0.09	0.03	26
American Shad	2.4	0.3%	0.05	0.02	15
Atlantic Silverside	1.7	0.2%	0.02	0.01	7
Carp	1.7	0.1%	0.02	0.01	6
Crevalle Jack	0.7	0.1%	0.01	<0.01	4
Northern Pipefish	1.4	0.1%	0.01	<0.01	4
Atlantic Tomcod	0.7	0.1%	0.01	<0.01	3
Pumpkinseed	0.7	0.1%	0.01	<0.01	3
Summer Flounder	0.7	0.1%	0.01	<0.01	3
Atlantic Croaker	0.7	0.0%	0.01	<0.01	2
Black Crappie	0.7	0.0%	0.01	<0.01	2
Inland Silverside	0.3	0.0%	0.01	<0.01	2
Naked Goby	0.3	0.0%	0.01	<0.01	2
Spotted Hake	0.7	0.0%	0.01	<0.01	2
Striped Killifish	0.3	0.0%	0.00	<0.01	1
Threespine Stickleback	0.3	0.0%	0.00	<0.01	1
Winter Flounder	0.3	0.0%	0.00	<0.01	1
Totals:		100%	15.67	5.23	4,514
Total Number of Taxa:					29
Blue Crab Diamondback Terrapin Snapping Turtle	52.8		2.50	0.84	721

Percent Frequency of Occurrence = % of collections that captured each species
Relative Abundance = total # of the individual species/total # of fish collected
Total CPUE = total # of fish / total # of minutes Trawls were fished

TABLE 8
Summary of Species Composition and Abundance by Trawl Location
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

SITE	T1	T2	T3	T4	T5	T6	T7	T8	T9	
Approximate River Mile	**3.7**	**5.4**	**7.0**	**9.2**	**11.4**	**SMC**	**BCC**	**MC**	**CC**	
Mean Surface Salinity (ppt)	**17.2**	**14.8**	**10.7**	**7.9**	**5.5**	**14.8**	**10.2**	**8.4**	**7.6**	**TOTALS**
No. of Collections	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**288**
FISH										
Alewife	7	1	21	18	2	1	27	1		78
American Eel				23	9	2	9	2	5	50
American Shad	12			3						15
Atlantic Croaker		1	1							2
Atlantic Menhaden			8	4	4		10			26
Atlantic Silverside		1			2		1	2	1	7
Atlantic Tomcod			3							3
Bay Anchovy	15	17	13	11		2	14			72
Black Crappie					1			1		2
Blueback Herring	5		35	2		62	22	1		127
Bluefish	11	4	11	6	4	2	5	1	5	49
Brown Bullhead				1	48		2	6	1	58
Carp		1							5	6
Crevalle Jack	4									4
Gizzard Shad	8	24	110	14	13	7	15	6	1	198
Inland Silverside									2	2
Mummichog				8	198		8	29	160	403
Naked Goby		2								2
Northern Pipefish						1	1	1	1	4
Pumpkinseed							1	2		3
Spot		8	19	1		3	1			32
Spotted Hake	2									2
Striped Bass	36	79	142	148	41	46	19	4	41	556
Striped Killifish							1			1
Summer Flounder	3									3
Threespine Stickleback									1	1
Weakfish	6	6	140	3	2	3	22	4	1	187
White Perch	45	252	224	571	354	267	303	396	208	2,620
Winter Flounder	1									1
Total # of Taxa Collected	**13**	**12**	**12**	**14**	**12**	**11**	**17**	**14**	**13**	**29**
Total # of Fish Collected	**155**	**396**	**727**	**813**	**678**	**396**	**461**	**456**	**432**	**4,514**
INVERTEBRATES										
Amphipoda	19	143	345	2,480	695	10	2,711	2,481	381	9,265
American Oyster	3	4				8				15
Baltic Macoma (Clam)		1								1
Bay Barnacle	400	1,926		320	1,450	1,310	220	770	545	6,941
Blue Crab	55	73	80	92	40	41	75	176	89	721
Comb jelly	1,100	40		2,000		215				3,355
Grass Shrimp	18	20	1	19	57	4	96	79	48	342
Isopoda	2									2
Little surf clam									1	1
Midge larvae				1				30	30	61
Mysid shrimp	20	300	30							350
Platform Mussel		10		3,870	1,788	10	125	126,710	26,340	158,853
Polychaete worm									1	1
Ribbed Mussel		7				1				8
Sand Shrimp	22	49	3	6		27	29			136
Sea Slug		2	2			4				8
Sea squirts	21	135								156
Slender isopod				1						1
Soft clam	4					1				5
White-fingered mud crab	6	49	4	41	54	19	640	572	127	1,512
REPTILES										
Snapping Turtle								1		1

Notes: SMC = Sawmill Creek (mouth at RM 5.1); BCC = Berry's Creek Canal (mouth at RM 7.5);
MC = Mill Creek (mouth at RM 9.2); CC = Cromakill Creek (mouth at RM 9.4).

TABLE 9
Ranked Species Composition for All Seine Collections
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001-September 2003

Gear Type:	**SEINE**			
Number Of Collections:	**48**			
Species	Percent frequency of occurrence	Relative abundance (% of total)	Total CPUE (mean # / haul)	Total number collected
Mummichog	75.0	45.7%	162.56	7,803
Atlantic Silverside	64.6	36.8%	130.79	6,278
Striped Killifish	56.3	7.1%	25.23	1,211
White Perch	45.8	7.0%	24.92	1,196
Inland Silverside	43.8	2.1%	7.52	361
Striped Bass	29.2	0.4%	1.46	70
Atlantic Menhaden	12.5	0.2%	0.73	35
Gizzard Shad	6.3	0.1%	0.48	23
Bay Anchovy	6.3	0.1%	0.44	21
Crevalle Jack	2.1	0.1%	0.40	19
Bluefish	12.5	0.1%	0.38	18
Northern Pipefish	8.3	0.04%	0.15	7
Carp	4.2	0.04%	0.13	6
Striped Mullet	4.2	0.04%	0.13	6
Spot	4.2	0.03%	0.10	5
Winter Flounder	4.2	0.03%	0.10	5
Alewife	2.1	0.02%	0.06	3
Atlantic Tomcod	2.1	0.01%	0.04	2
Hogchoker	4.2	0.01%	0.04	2
Unidified Clupeidae	2.1	0.01%	0.02	1
Goldfish	2.1	0.01%	0.02	1
Summer Flounder	2.1	0.01%	0.02	1
Totals:		100%	355.71	17,074
Total Number of Taxa:				21
Blue Crab	39.6		2.13	102

Percent Frequency of Occurrence = % of collections that captured each species
Relative Abundance = total # of the individual species/total # of fish collected
Total CPUE = total # of fish / total # of seine hauls

TABLE 10
Summary of Species Composition and Abundance by Seine Location
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

SITE	S1	S2	S3	
Approximate River Mile	**3.5**	**7.4**	**10.6**	
Mean Surface Salinity (ppt)	**14.0**	**8.8**	**7.7**	**TOTALS**
No. of Collections Made	**16**	**16**	**16**	**48**
FISH				
Unidentified Clupeidae		1		1
Alewife		3		3
Atlantic Menhaden	1	5	29	35
Atlantic Silverside	4,707	669	902	6,278
Atlantic Tomcod	2			2
Bay anchovy	6	15		21
Bluefish	3	9	6	18
Carp			6	6
Crevalle Jack		19		19
Gizzard Shad	1	22		23
Goldfish			1	1
Hogchoker		2		2
Inland Silverside	9	42	310	361
Mummichog	15	1,157	6,631	7,803
Northern Pipefish	7			7
Spot		5		5
Striped Bass	21	49		70
Striped Killifish	20	1,002	189	1,211
Striped Mullet			6	6
Summer Flounder	1			1
White Perch	77	941	178	1,196
Winter Flounder		5		5
Total # of Taxa Collected*	**13**	**15**	**10**	**21**
Total # of Fish Collected	**4,870**	**3,946**	**8,258**	**17,074**
INVERTEBRATES				
American Oyster	5			5
Sand Shrimp	73	60		133
Blue Crab	36	61	5	102
White-fingered mud crab	1	1		2
Slender isopod		1		1
Grass Shrimp	539	1,150	3,193	4,882

* Unidentified Clupeidae not counted as a distinct taxa.

TABLE 11
Ranked Species Composition for All Gill Net Collections
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001-September 2003

Gear Type: / **Number Of Collections:**	**GILL NET** **48**				
Species	Percent frequency of occurrence	Relative abundance (% of total)	Mean # of fish per collection	Total CPUE (# fish / hour)	Total number collected
White Perch	87.5	57.6%	22.96	0.95	1,102
Gizzard Shad	25.0	21.5%	8.56	0.35	411
Striped Bass	70.8	8.3%	3.29	0.14	158
Atlantic Menhaden	33.3	6.0%	2.40	0.10	115
Carp	22.9	3.0%	1.21	0.05	58
Bluefish	12.5	1.7%	0.69	0.03	33
Brown Bullhead	10.4	0.6%	0.25	0.01	12
Black Crappie	10.4	0.4%	0.15	<0.01	7
Weakfish	10.4	0.3%	0.13	<0.01	6
Alewife	6.3	0.3%	0.10	<0.01	5
Blueback Herring	4.2	0.2%	0.08	<0.01	4
Alligator Gar	2.1	0.1%	0.02	<0.01	1
Spot	2.1	0.1%	0.02	<0.01	1
Striped Searobin	2.1	0.1%	0.02	<0.01	1
Totals:		100%	39.88	1.65	1,914
Total Number of Taxa:					14
Blue Crab	37.5		4.50	0.19	216

Percent Frequency of Occurrence = % of collections that captured each species
Relative Abundance = total # of the individual species/total # of fish collected
Total CPUE = total # of fish / total # of hours Gill Nets were fished

TABLE 12
Summary of Species Composition and Abundance by Gill Net Location
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

SITE	GN1	GN2	GN3	
Approximate River Mile	**3.0**	**6.8**	**OC**	
Mean Surface Salinity (ppt)	**15.5**	**11.1**	**4.4**	**TOTALS**
No. of Collections Made	**16**	**16**	**16**	**48**
FISH				
Alewife			5	5
Alligator Gar			1	1
Atlantic Menhaden	24	81	10	115
Black Crappie			7	7
Blueback Herring			4	4
Bluefish	2	31		33
Brown Bullhead			12	12
Carp		1	57	58
Gizzard Shad	1	7	403	411
Spot	1			1
Striped Bass	66	45	47	158
Striped Searobin	1			1
Weakfish	5	1		6
White Perch	389	461	252	1,102
Total # of Taxa Collected	**8**	**7**	**10**	**14**
Total # of Fish Collected	**489**	**627**	**798**	**1,914**
INVERTEBRATES				
Amphipods	100	100	200	400
American Oyster	3			3
Bay Barnacle		30		30
Blue Crab	98	78	40	216
White-fingered mud crab		1	3	4
Comb jelly	many			many
Sea Squirts	40			40
Isopods	75		50	125

Note: OC denotes that GN3 was set in Overpeck Creek,
the mouth of which is approximately at River Mile 12.5.
Comb jellies were too damaged to make an accurate estimate of their numbers.

TABLE 13
Summary of Length and Weight Data Used for Biomass Analysis
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

Species	Total # collected	Total # measured	% measured	Length (mm TL) Min	Max	Mean	St. Dev.	Total # weighed	Weight (g) Min	Max	Mean	St. Dev.	R^2 for $m=a*L^b$	Biomass (kg) (calculated)	% of total Biomass	% of total # collected
Alewife	138	113	82%	46	289	129	50	113	1	240	27.9	43.2	0.96	3.86	0.2%	0.3%
American Eel	92	92	100%	65	1,100	404	200	91	0.1	1,130	222.3	243.1	0.95	20.45	0.9%	0.2%
American Shad	16	15	94%	62	165	113	24	15	2	26.5	11.8	6.6	0.97	0.19	0.0%	0.0%
Atlantic Silverside	6,343	460	7%	32	132	80	20	458	0.2	14	3.4	2.6	0.90	21.70	1.0%	**15.5%**
Atlantic Menhaden	320	221	69%	32	408	177	130	214	0.1	704	167.7	224.7	0.98	53.65	2.4%	0.8%
Atlantic Tomcod	5	5	100%	39	53	47	6	5	0.6	1	0.9	0.2	NA	0.00	0.0%	0.0%
Bay Anchovy	95	91	96%	23	92	58	19	91	0.05	8	1.8	1.7	0.81	0.17	0.0%	0.2%
Black Crappie	102	90	88%	34	309	95	49	90	0.6	552	26.7	67.1	0.95	2.72	0.1%	0.2%
Blueback Herring	371	225	61%	70	320	102	39	225	2	302	12.3	27.8	0.98	4.56	0.2%	0.9%
Bluefish	106	102	96%	82	308	186	49	102	5	288	69.1	46.4	0.93	7.32	0.3%	0.3%
Brown Bullhead	370	298	81%	55	386	265	75	298	1	845	316.2	199.3	0.99	117.00	5.2%	0.9%
Carp	89	87	98%	141	730	588	101	87	43	8,100	3,892.2	1,708.3	0.93	346.40	**15.3%**	0.2%
Crevalle Jack	30	30	100%	39	129	65	30	30	1	38	7.7	11.6	0.89	0.23	0.0%	0.1%
Gizzard Shad	1,643	366	22%	59	532	158	82	363	1	1,944	96.9	301.9	0.92	159.16	7.0%	4.0%
Goldfish	34	34	100%	29	291	84	40	34	0.35	400	20.1	67.4	0.95	0.68	0.0%	0.1%
Inland Silverside	366	150	41%	20	76	51	12	150	0.05	3.5	0.9	0.6	0.92	0.35	0.0%	0.9%
Mummichog	16,644	1,373	8%	16	122	69	20	1,370	0.1	54	6.5	5.7	0.85	107.51	4.7%	**40.7%**
Pumpkinseed	9	9	100%	43	139	85	38	9	2.3	54.5	21.4	23.9	0.98	0.19	0.0%	0.0%
Spot	38	38	100%	26	216	98	44	38	0.1	156	23.0	27.9	0.95	0.88	0.0%	0.1%
Striped Bass	1,123	999	89%	47	850	230	127	997	0.83	5,700	270.8	728.1	0.92	304.10	**13.4%**	2.7%
Striped Killifish	1,249	364	29%	25	148	85	25	364	0.25	44	9.8	8.2	0.92	12.19	0.5%	3.1%
Weakfish	242	192	79%	16	437	106	66	191	0.05	740	34.3	85.6	0.95	8.31	0.4%	0.6%
White Perch	11,451	3,542	31%	28	348	164	61	3,536	0.2	810	95.4	95.1	0.97	1,091.89	**48.1%**	**28.0%**
Winter flounder	9	9	100%	42	132	67	33	9	1	26	6.1	8.6	0.94	0.05	0.0%	0.0%
Other species	55	55	100%	20	529	130	89	55	0.03	874	52.1	145.4		2.71	0.3%	0.1%
TOTALS	**40,940**	**8,960**	**22%**					**8,935**						**2,266.28**	**100%**	

NOTE:
Other species includes Alligator Gar(1), Atlantic Croaker(2), Bluegill(1), Green Sunfish(1), Hogchoker(2), Largemouth Bass(5), Lookdown(1), Naked Goby(2), Northern Pipefish(11), Spotted Hake(9), Striped Mullet(6), Striped Searobin(1), Summer Flounder(4), Threespine Stickleback(6), Unid. Clupeidae(2), Yellow Perch(1).

TABLE 14
Average Surface and Bottom Salinity, Temperature, Dissolved Oxygen, pH and Secchi Depths - By River Mile
NMJC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

Approx		Surface Salinity (0/00)				Bottom Salinity (0/00)			
RM	Site	Min	**Mean**	Max	n	Min	**Mean**	Max	n
3.0	**GN1**	5.7	**15.5**	22.8	16	5.8	16.6	23.3	16
3.5	**S1**	9.2	**14.0**	18.3	16				
3.7	**TN1**	10.0	**14.7**	20.1	16				
3.7	**T1**	10.8	**17.2**	22.5	15	11.0	17.9	22.8	15
5.1	**T6**	6.8	**14.8**	20.1	15	8.0	15.5	20.2	15
5.2	**TN2**	7.9	**12.9**	17.3	16				
5.4	**T2**	7.8	**14.8**	20.5	15	9.2	15.5	20.6	15
6.8	**GN2**	2.5	**11.1**	17.6	16	3.1	12.1	18.1	16
7.0	**T3**	2.7	**10.7**	14.7	16	4.6	11.8	18.1	16
7.1	**TN3**	3.8	**8.8**	13.4	16				
7.4	**S2**	5.5	**8.8**	14.1	14				
7.5	**T7**	3.9	**10.2**	15.9	16	4.6	11.2	16.7	16
9.2	**TN4**	2.5	**7.0**	10.3	16				
9.2	**T8**	4.2	**8.4**	12.9	16	4.3	8.7	13.2	16
9.3	**T4**	0.7	**7.8**	12.8	16	2.2	9.0	14.3	16
9.4	**T9**	3.4	**7.6**	12.3	16	3.4	7.6	12.5	16
10.6	**S3**	1.5	**7.6**	12.7	16				
10.9	**TN5**	1.1	**5.3**	9.0	16				
11.4	**T5**	0.2	**5.5**	10.3	16	0.2	6.3	11.0	16
12.2	**GN3**	0.2	**4.4**	8.4	16	0.2	5.1	9.2	16
12.5	**TN6**	0.6	**4.5**	8.2	16				

	Surface Temperature (C)				Bottom Temperature (C)			
Site	Min	**Mean**	Max	n	Min	**Mean**	Max	n
GN1	4.8	**17.0**	29.8	16	4.9	**16.6**	29.6	16
S1	2.0	**16.5**	30.8	16				
TN1	9.8	**19.4**	29.1	16				
T1	5.0	**16.7**	29.2	16	4.9	**16.7**	27.7	15
T6	5.5	**16.7**	28.2	16	5.0	**16.3**	28.3	16
TN2	3.8	**15.6**	27.9	16				
T2	4.9	**16.5**	28.0	16	5.0	**16.3**	28.0	16
GN2	2.1	**16.6**	29.8	16	1.7	**16.5**	30.4	16
T3	4.8	**15.6**	27.9	16	4.5	**15.5**	27.5	16
TN3	4.2	**15.7**	27.9	16				
S2	1.8	**15.3**	28.8	16				
T7	4.6	**15.8**	28.0	16	4.0	**15.3**	27.4	16
TN4	5.0	**16.5**	30.2	16				
T8	2.4	**15.6**	28.8	16	1.8	**15.2**	27.8	16
T4	2.2	**15.5**	27.4	16	1.8	**15.2**	27.2	16
T9	2.5	**15.5**	27.5	16	2.2	**15.4**	27.3	16
S3	4.7	**17.0**	27.0	16				
TN5	5.1	**16.2**	29.7	16				
T5	3.2	**15.7**	26.4	16	2.9	**15.3**	26.4	16
GN3	3.8	**15.9**	30.8	16	3.9	**15.4**	28.1	16
TN6	4.0	**16.0**	28.7	16				

Approx		Surface pH				Bottom pH			
RM	Site	Min	**Mean**	Max	n	Min	**Mean**	Max	n
3.0	**GN1**	5.7	**7.2**	8.1	16	6.7	**7.3**	8.1	16
3.5	**S1**	6.2	**7.3**	8.2	16				
3.7	**TN1**	6.5	**7.3**	7.9	16				
3.7	**T1**	6.7	**7.3**	8.1	14	6.8	**7.4**	8.1	14
5.1	**T6**	6.7	**7.4**	8.1	14	6.8	**7.4**	8.1	14
5.2	**TN2**	6.7	**7.5**	8.2	16				
5.4	**T2**	6.6	**7.4**	8.1	14	6.9	**7.4**	8.1	14
6.8	**GN2**	6.3	**7.2**	8.1	16	6.6	**7.3**	8.1	16
7.0	**T3**	6.4	**7.3**	8.0	14	6.6	**7.3**	8.0	14
7.1	**TN3**	5.8	**7.3**	8.2	16				
7.4	**S2**	6.2	**7.2**	7.9	16				
7.5	**T7**	6.5	**7.5**	8.1	15	6.8	**7.4**	8.1	15
9.2	**TN4**	6.3	**7.3**	8.6	16				
9.2	**T8**	6.7	**7.4**	8.0	16	6.5	**7.3**	7.9	16
9.3	**T4**	6.8	**7.3**	7.7	14	6.8	**7.3**	7.7	14
9.4	**T9**	6.8	**7.4**	8.2	15	6.9	**7.4**	8.1	15
10.6	**S3**	6.6	**7.3**	8.2	16				
10.9	**TN5**	6.7	**7.4**	8.1	16				
11.4	**T5**	6.8	**7.3**	8.1	14	6.9	**7.2**	7.9	14
12.2	**GN3**	4.7	**7.2**	7.9	16	4.6	**7.1**	7.9	16
12.5	**TN6**	6.8	**7.4**	7.9	16				

	Surface Dissolved Oxygen (mg/L)				Bottom Dissolved Oxygen (mg/L)			
Site	Min	**Mean**	Max	n	Min	**Mean**	Max	n
GN1	3.6	**6.2**	8.0	16	3.1	**5.6**	7.7	16
S1	3.0	**6.0**	9.8	16				
TN1	3.6	**5.9**	9.7	16				
T1	3.8	**6.2**	8.7	14	3.3	**5.6**	7.8	14
T6	2.2	**6.2**	9.9	14	2.5	**5.7**	7.8	14
TN2	4.7	**7.6**	12.5	16				
T2	3.6	**6.0**	7.5	14	2.5	**5.7**	7.5	14
GN2	4.4	**6.5**	9.6	16	3.4	**5.4**	7.9	16
T3	2.2	**6.3**	10.4	16	2.5	**5.7**	8.6	16
TN3	3.6	**6.2**	9.3	16				
S2	3.3	**5.4**	8.4	16				
T7	2.2	**6.3**	11.3	16	1.8	**5.6**	10.5	16
TN4	2.7	**5.3**	8.7	16				
T8	3.4	**6.0**	8.9	16	2.4	**5.3**	7.3	16
T4	2.1	**5.1**	8.7	16	2.1	**4.9**	7.6	16
T9	3.7	**6.5**	9.3	16	3.4	**6.0**	8.7	16
S3	2.1	**5.0**	7.5	16				
TN5	3.0	**5.6**	10.2	16				
T5	3.4	**5.5**	9.0	16	2.5	**4.5**	8.2	16
GN3	3.8	**7.1**	11.3	16	1.3	**5.1**	10.1	16
TN6	3.7	**6.6**	13.6	16				

Approx		Secchi Disk Depths (cm)			
RM	Site	Min	**Mean**	Max	n
3.0	**GN1**	60	**93.6**	150	16
3.5	**S1**	45	**87.3**	175	16
3.7	**TN1**	45	**86.3**	150	16
3.7	**T1**	60	**96.6**	140	16
5.1	**T6**	45	**85.3**	120	16
5.2	**TN2**	35	**65.2**	130	16
5.4	**T2**	60	**89.2**	145	16
6.8	**GN2**	40	**77.9**	140	15
7.0	**T3**	50	**76.3**	110	16
7.1	**TN3**	45	**72.1**	110	16
7.4	**S2**	35	**64.7**	130	16
7.5	**T7**	45	**70.3**	110	16
9.2	**TN4**	40	**59.7**	90	16
9.2	**T8**	45	**71.3**	105	15
9.3	**T4**	40	**75.7**	120	15
9.4	**T9**	35	**57.8**	105	16
10.6	**S3**	40	**62.2**	85	16
10.9	**TN5**	25	**58.9**	90	16
11.4	**T5**	30	**56.8**	90	15
12.2	**GN3**	25	**64.4**	100	16
12.5	**TN6**	30	**52.3**	80	16

NOTE: 1) No bottom water quality data were collected at Seine or Trap Net locations.
2) Sampling locations from within tributaries (T6, TN2, T7, T8, T9 and GN3) were placed in the order of the location of the tributary mouth along the river.

TABLE 15
Average Monthly Surface and Bottom Salinity, Temperature, Dissolved Oxygen, pH and Secchi Depths
NMJC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

Monthly Surface Salinity (0/00)

Surf Sal	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**10.34**	**10.69**	**10.44**	**12.42**	**14.26**	**12.53**	**13.41**	**7.46**	**9.79**	**6.59**	**6.23**	**10.39**
Min	0.23	4.92	3.98	2.44	6.53	5.74	7.33	0.61	4.12	1.22	0.24	2.26
Max	20.49	20.46	19.52	22.78	22.46	22.01	20.98	15.32	17.56	11.74	12.21	20.29
n=	31	25	34	29	21	21	21	39	21	40	23	28

Monthly Bottom Salinity (0/00)
(No bottom measurements at TN & S locations)

Bottom Sal	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**11.80**	**12.19**	**11.70**	**14.46**	**16.27**	**14.30**	**15.16**	**8.21**	**10.79**	**7.17**	**7.07**	**12.27**
Min	0.24	5.65	4.54	4.94	8.27	6.44	7.76	1.22	4.43	1.73	0.24	7.26
Max	20.62	20.63	21.50	23.30	22.76	22.06	21.63	16.09	17.95	11.94	13.28	21.02
n=	20	16	21	15	12	12	12	21	12	23	13	12

Monthly Surface Temperature (C)

Surf Temp	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**27.52**	**23.91**	**16.22**	**11.79**	**11.45**	**4.67**	**6.63**	**7.54**	**16.28**	**16.77**	**23.42**	**27.50**
Min	25.88	19.57	11.95	9.89	4.96	1.77	4.34	2.24	10.42	14.48	16.80	25.21
Max	29.75	26.24	20.38	13.59	14.17	11.68	14.49	16.84	22.28	21.08	29.05	30.83
n=	31	25	34	29	21	21	21	42	21	40	23	28

Monthly Bottom Temperature (C)
(No bottom measurements at TN & S locations)

Bottom Temp	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**27.19**	**23.96**	**15.33**	**12.10**	**12.55**	**4.17**	**5.22**	**6.95**	**14.69**	**16.03**	**22.86**	**27.25**
Min	25.70	22.22	11.79	9.85	6.19	1.74	4.02	1.82	13.20	14.43	16.72	24.90
Max	30.35	25.37	20.00	13.58	13.79	5.33	6.74	10.73	20.42	17.30	25.18	29.64
n=	20	16	21	15	12	12	12	23	12	23	13	12

Monthly Surface Dissolved Oxygen (mg/L)

Surf DO	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**4.80**	**5.72**	**4.89**	**5.41**	**5.07**	**7.68**	**7.54**	**8.09**	**6.55**	**6.57**	**5.23**	**5.30**
Min	2.19	2.11	2.69	2.06	2.41	5.84	6.13	5.53	3.38	3.59	2.60	3.60
Max	8.91	9.85	7.19	8.96	6.97	9.84	10.36	13.56	11.25	11.29	9.63	11.26
n=	31	25	34	29	21	21	21	39	21	37	23	28

Monthly Bottom Dissolved Oxygen (mg/L)
(No bottom measurements at TN & S locations)

Bottom DO	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**3.91**	**5.07**	**4.56**	**4.97**	**4.67**	**7.71**	**7.53**	**7.03**	**6.86**	**5.64**	**3.94**	**3.66**
Min	1.30	2.64	2.98	2.92	3.73	6.30	6.77	4.70	5.24	3.55	2.05	2.51
Max	7.05	8.66	5.94	6.46	5.61	10.14	8.42	9.77	10.53	7.84	7.35	4.95
n=	20	16	21	15	12	12	12	21	12	20	13	12

Monthly Surface pH measurements

Surf. pH	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**7.27**	**7.35**	**7.26**	**7.06**	**6.71**	**7.17**	**7.20**	**7.39**	**7.41**	**7.77**	**7.78**	**7.29**
Min	4.65	6.77	6.68	6.42	6.34	6.16	5.75	6.28	6.21	7.02	7.06	6.71
Max	8.00	8.17	7.52	7.73	7.11	7.74	7.66	7.95	8.55	8.22	8.22	8.23
n=	28	25	34	29	21	21	21	39	21	32	23	28

Monthly Bottom pH measurements

Bottom pH	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**7.15**	**7.41**	**7.28**	**7.12**	**6.84**	**7.26**	**7.38**	**7.42**	**7.37**	**7.73**	**7.75**	**7.05**
Min	4.58	6.95	6.87	6.61	6.75	6.59	7.01	6.95	6.93	6.46	6.98	6.74
Max	7.82	7.86	7.52	7.57	6.94	7.69	7.64	7.92	8.01	8.12	8.13	8.08
n=	15	16	21	15	12	12	12	21	12	16	13	13

Monthly Secchi Disk Depths (cm)

Secchi	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
AVG	**62.74**	**62.95**	**86.00**	**82.72**	**102.38**	**87.62**	**88.25**	**73.45**	**62.38**	**61.73**	**58.26**	**53.04**
Min	35.00	25.00	60.00	45.00	60.00	40.00	45.00	40.00	40.00	30.00	30.00	25.00
Max	90.00	85.00	150.00	150.00	175.00	140.00	145.00	120.00	90.00	100.00	100.00	90.00
n=	31	22	34	29	21	21	20	42	21	40	23	28

TABLE 16

Summary of Abundance Data for All Collections

NJMC/MERI Hackensack River Fishery Resource Inventory

February 1987 to December 1988 vs. August 2001 - September 2003

Gear Type:	GILL NET		SEINE		TRAP NET		TRAWL		TOTALS	
Collection Period:	87/88	01/03	87/88	01/03	87/88	01/03	87/88	01/03	87/88	01/03
Total Number Of Collections:	**42**	**48**	**45**	**48**	**81**	**96**	**265**	**288**	**433**	**480**
Common Name										
Unidentified Clupeidae				**1**	1	**1**			1	**2**
Alewife	6	**5**		**3**	46	**52**	57	**78**	109	**138**
Alligator Gar		**1**								**1**
American Eel					79	**42**	77	**50**	156	**92**
American Shad					93	**1**	20	**15**	113	**16**
Atlantic Croaker								**2**		**2**
Atlantic Menhaden	97	**115**		**35**	4	**144**	5	**26**	106	**320**
Atlantic Silverside			1,821	**6,278**	5	**58**	25	**7**	1,851	**6,343**
Atlantic Tomcod	101			**2**	9		358	**3**	468	**5**
Bay Anchovy			18	**21**	1	**2**	1,279	**72**	1,298	**95**
Black Crappie		**7**			9	**93**	1	**2**	10	**102**
Blueback Herring	4	**4**	5		232	**240**	179	**127**	420	**371**
Bluefish	1	**33**	3	**18**	9	**6**	4	**49**	17	**106**
Bluegill					2	**1**	1		3	**1**
Brown Bullhead	2	**12**			405	**300**	5	**58**	412	**370**
Carp	2	**58**	2	**6**	76	**19**		**6**	80	**89**
Conger Eel							1		1	
Crevalle Jack			2	**19**	97	**7**	1	**4**	100	**30**
Gizzard Shad	37	**411**	6	**23**	19	**1,011**	14	**198**	76	**1,643**
Golden Shiner	1				6		1		8	
Goldfish			1	**1**		**33**			1	**34**
Green Sunfish					13	**1**			13	**1**
Hogchoker				**2**						**2**
Inland Silverside			1,390	**361**		**3**	1	**2**	1,391	**366**
Largemouth Bass						**5**				**5**
Lookdown						**1**				**1**
Mummichog			36,126	**7,803**	12,377	**8,438**	4,756	**403**	53,259	**16,644**
Naked Goby								**2**		**2**
Northern Pipefish			2	**7**	1		1	**4**	4	**11**
Pumpkinseed			17		155	**6**	6	**3**	178	**9**
Rainbow Smelt							1		1	
Seaboard Goby							1		1	
Spot	13	**1**		**5**	46		259	**32**	318	**38**
Spotted Hake					8	**7**	3	**2**	11	**9**
Striped Bass	26	**158**	6	**70**	35	**339**	18	**556**	85	**1,123**
Striped Killifish	1		244	**1,211**	58	**37**	11	**1**	314	**1,249**
Striped Mullet			1	**6**					1	**6**
Striped Searobin		**1**								**1**
Summer Flounder				**1**				**3**		**4**
Threespine Stickleback						**5**		**1**		**6**
Weakfish		**6**	1		10	**49**	83	**187**	94	**242**
White Catfish					1				1	
White Perch	54	**1,102**	10	**1,196**	663	**6,533**	47	**2,620**	774	**11,451**
Windowpane			1		1		1		3	
Winter Flounder	1		1	**5**	5	**3**	31	**1**	38	**9**
Yellow Perch					2	**1**			2	**1**
Total Number of Fish	346	**1,914**	39,657	**17,074**	14,468	**17,438**	7,247	**4,514**	61,718	**40,940**
Total Number of Taxa	14	**14**	19	**21**	30	**29**	30	**29**	36	**39**
Blue Crab	60	**216**	18	**102**	154	**1,092**	202	**721**	434	**2,131**
Diamondback Terrapin					66	**126**			66	**126**
Eastern Painted Turtle					2				2	
Snapping Turtle					4	**6**		**1**	4	**7**

TABLE 17
Summary of Length and Weight Data Used for Biomass Analysis
NJMC/MERI Hackensack River Fishery Inventory
February 1987 to December 1988

Species	Total # collected	Total # measured	% measured	Length (mm TL)				Mass (g) (By Regression)		Biomass (kg) (calculated)	% of total Biomass	% of total # collected
				Min	Max	Mean	St. Dev.	Mean	St. Dev.			
Alewife	109	80	73%	80	285	130.3	43.6	24.1	31.4	2.63	0.3%	0.2%
American Eel	156	131	84%	57	360	394.1	147.5	166.1	127.3	25.92	2.9%	0.3%
American Shad	113	22	19%	81	228	128.5	43.6	19.3	19.5	2.18	0.2%	0.2%
Atlantic Silverside	1,851	84	5%	30	140	77.9	17.2	2.9	2.2	5.46	0.6%	**3.0%**
Atlantic Menhaden	106	53	50%	140	368	255.0	38.0	186.7	81.7	19.79	2.2%	0.2%
Atlantic Tomcod	468	292	62%	32	272	167.3	38.6	36.5	21.2	17.08	1.9%	0.8%
Bay Anchovy	1,298	116	9%	20	92	47.0	16.2	1.0	0.9	1.24	0.1%	2.1%
Black Crappie	10	10	100%	120	190	147.8	27.6	50.8	32.6	0.51	0.1%	0.0%
Blueback Herring	420	112	27%	75	272	139.9	43.1	26.4	32.3	11.09	1.3%	0.7%
Bluefish	17	16	94%	50	455	133.9	90.7	66.6	207.3	1.13	0.1%	0.0%
Brown Bullhead	412	224	54%	68	380	287.6	62.3	380.1	184.5	156.58	17.7%	0.7%
Carp	80	70	88%	167	800	487.3	95.5	1,544.3	1,437.4	123.55	**13.9%**	0.1%
Crevalle Jack	100	22	22%	46	125	75.4	21.4	8.3	8.0	0.83	0.1%	0.2%
Gizzard Shad	76	47	62%	83	282	132.1	38.9	29.3	34.1	2.23	0.3%	0.1%
Goldfish	1	1	100%	--	--	53.0	NA	2.3	NA	0.00	0.0%	0.0%
Inland Silverside	1,391	141	10%	23	102	54.3	12.1	1.1	0.7	1.52	0.2%	2.3%
Mummichog	53,259	1,100	2%	19	172	70.5	24.6	7.0	6.7	371.37	41.9%	**86.3%**
Pumpkinseed	178	166	93%	39	135	86.7	17.0	15.4	9.9	2.74	0.3%	0.3%
Spot	318	171	54%	110	176	131.6	11.3	37.2	10.9	11.82	1.3%	0.5%
Striped Bass	85	71	84%	90	575	209.0	130.3	199.0	346.6	16.92	**1.9%**	0.1%
Striped Killifish	314	101	32%	34	140	92.0	26.4	11.7	8.2	3.68	0.4%	0.5%
Weakfish	94	94	100%	35	182	86.3	26.0	8.6	9.4	0.81	0.1%	0.2%
White Perch	774	348	45%	44	340	193.6	56.7	137.8	111.4	106.68	**12.0%**	**1.3%**
Winter flounder	38	38	100%	63	150	102.7	20.6	13.7	8.0	0.52	0.1%	0.1%
Other species	50	49	96%	--	--	127.2	51.4	15.6	NA	0.78	0.1%	0.1%
TOTALS	**61,718**	**3,559**	**6%**							**887.03**	**100%**	**100%**

NOTE:
Other species includes Golden Shiner(8), Northern Pipefish(4), Striped Mullet(1), Windowpane(3), Rainbow Smelt(1), Conger Eel(1), Goldfish(1), Spotted Hake(11), Seaboard Goby(1), Bluegill(3), Green Sunfish(13), White Catfish(1), Yellow Perch(2).

TABLE 18
Comparison of Percent Frequency of Occurrence, Relative Abundance, Mean #, Total CPUE and Total # For All Trap Net Collections
NJMC/MERI Hackensack River Fishery Resource Inventory
2001-03 vs. 1987-88

Sampling Period:	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88
Number Of Collections:	96	81	96	81	96	81	96	81	96	81
	Percent Frequency of occurrence		Relative Abundance (% of total)		Mean # / Trap Net		Total CPUE (# / hour)		Total Number Collected	
Mummichog	63.5	93.8	48.4%	85.5%	87.90	152.80	3.57	6.51	8,438	12,377
White Perch	88.5	69.1	37.5%	4.6%	68.05	8.19	2.77	0.35	6,533	663
Gizzard Shad	24.0	4.9	5.8%	0.1%	10.53	0.23	0.43	0.01	1,011	19
Striped Bass	54.2	13.6	1.9%	0.2%	3.53	0.43	0.14	0.02	339	35
Brown Bullhead	30.2	44.4	1.7%	2.8%	3.13	5.00	0.13	0.21	300	405
Blueback Herring	12.5	25.9	1.4%	1.6%	2.50	2.86	0.10	0.12	240	232
Atlantic Menhaden	9.4	2.5	0.8%	0.0%	1.50	0.05	0.06	<0.01	144	4
Black Crappie	14.6	4.9	0.5%	0.1%	0.97	0.11	0.04	<0.01	93	9
Atlantic Silverside	17.7	3.7	0.3%	0.0%	0.60	0.06	0.02	<0.01	58	5
Alewife	14.6	18.5	0.3%	0.3%	0.54	0.57	0.02	0.02	52	46
Weakfish	15.6	3.7	0.3%	0.1%	0.51	0.12	0.02	0.01	49	10
American Eel	21.9	29.6	0.2%	0.5%	0.44	0.98	0.02	0.04	42	79
Striped Killifish	14.6	9.9	0.2%	0.4%	0.39	0.72	0.02	0.03	37	58
Goldfish	13.5		0.2%		0.34		0.01		33	
Carp	13.5	33.3	0.1%	0.5%	0.20	0.94	<0.01	0.04	19	76
Crevalle Jack	6.3	7.4	0.04%	0.7%	0.07	1.20	<0.01	0.05	7	97
Spotted Hake	3.1	1.2	0.04%	0.1%	0.07	0.10	<0.01	<0.01	7	8
Bluefish	3.1	3.7	0.03%	0.1%	0.06	0.11	<0.01	<0.01	6	9
Pumpkinseed	4.2	46.9	0.03%	1.1%	0.06	1.91	<0.01	0.08	6	155
Largemouth Bass	3.1		0.03%		0.05		<0.01		5	
Threespine Stickleback	5.2		0.03%		0.05		<0.01		5	
Inland Silverside	3.1		0.02%		0.03		<0.01		3	
Winter Flounder	3.1	4.9	0.02%	0.03%	0.03	0.06	<0.01	<0.01	3	5
Bay Anchovy	1.0	1.2	0.01%	0.01%	0.02	0.01	<0.01	<0.01	2	1
Unid. Clupeidae	1.0	1.2	0.01%	0.01%	0.01	0.01	<0.01	<0.01	1	1
American Shad	1.0	6.2	0.01%	0.6%	0.01	1.15	<0.01	0.05	1	93
Bluegill	1.0	2.5	0.01%	0.01%	0.01	0.02	<0.01	<0.01	1	2
Green Sunfish	1.0	11.1	0.01%	0.1%	0.01	0.16	<0.01	0.01	1	13
Lookdown	1.0		0.01%		0.01		<0.01		1	
Yellow Perch	1.0	1.2	0.01%	0.01%	0.01	0.02	<0.01	<0.01	1	2
Atlantic Tomcod		3.7		0.1%		0.11		<0.01		9
Golden Shiner		3.7		0.04%		0.07		<0.01		6
Northern Pipefish		1.2		0.01%		0.01		<0.01		1
Spot		8.6		0.3%		0.57		0.02		46
White Catfish		1.2		0.01%		0.01		<0.01		1
Windowpane		1.2		0.01%		0.01		<0.01		1
Totals:			100.0%	100.0%	181.65	178.59	7.38	7.61	17,438	14,468
Total Number of Taxa:									29	30
Blue Crab	61.5	34.6			11.38	1.90	0.46	0.08	1,092	154
Diamondback Terrapin	30.2	17.3			1.31	0.81	0.05	0.03	126	66
Snapping Turtle	5.2	2.5			0.06	0.05	<0.01	0.00	6	4

Total CPUE = total # of fish / total # of hours Trap Nets were fished

TABLE 19
Comparison of Percent Frequency of Occurrence, Relative Abundance, Mean #, Total CPUE and Total # For All Trawl Collections
NJMC/MERI Hackensack River Fishery Resource Inventory
2001-03 vs. 1987-88

Sampling Period:	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88
Number Of Collections:	288	265	288	265	288	265	288	265	288	265
	Percent Frequency of occurrence		Relative Abundance (% of total)		Mean # / Trawl		Total CPUE (# / minute)		Total Number Collected	
White Perch	59.4	7.5	58.0%	0.6%	9.10	0.18	3.04	0.06	2,620	47
Striped Bass	40.3	4.2	12.3%	0.2%	1.93	0.07	0.64	0.02	556	18
Mummichog	11.8	65.3	8.9%	65.6%	1.40	17.95	0.47	5.94	403	4,756
Gizzard Shad	12.8	1.5	4.4%	0.2%	0.69	0.05	0.23	0.02	198	14
Weakfish	10.8	8.3	4.1%	1.1%	0.65	0.31	0.22	0.10	187	83
Blueback Herring	4.5	6.4	2.8%	2.5%	0.44	0.68	0.15	0.22	127	179
Alewife	11.5	7.2	1.7%	0.8%	0.27	0.22	0.09	0.07	78	57
Bay Anchovy	6.6	9.8	1.6%	17.6%	0.25	4.83	0.08	1.60	72	1,279
Brown Bullhead	6.3	1.5	1.3%	0.1%	0.20	0.02	0.07	0.01	58	5
American Eel	7.6	16.6	1.1%	1.1%	0.17	0.29	0.06	0.10	50	77
Bluefish	8.0	1.5	1.1%	0.1%	0.17	0.02	0.06	0.01	49	4
Spot	3.8	6.8	0.7%	3.6%	0.11	0.98	0.04	0.32	32	259
Atlantic Menhaden	4.5	1.1	0.6%	0.1%	0.09	0.02	0.03	0.01	26	5
American Shad	2.4	2.3	0.3%	0.3%	0.05	0.08	0.02	0.03	15	20
Atlantic Silverside	1.7	0.8	0.2%	0.3%	0.02	0.09	0.01	0.03	7	25
Carp	1.7		0.1%		0.02		0.01		6	
Crevalle Jack	0.7	0.4	0.1%	0.01%	0.01	<0.01	<0.01	<0.01	4	1
Northern Pipefish	1.4	0.4	0.1%	0.01%	0.01	<0.01	<0.01	<0.01	4	1
Atlantic Tomcod	0.7	14.0	0.1%	4.9%	0.01	1.35	<0.01	0.45	3	358
Pumpkinseed	0.7	1.5	0.1%	0.1%	0.01	0.02	<0.01	0.01	3	6
Summer Flounder	0.7		0.1%		0.01		<0.01		3	
Atlantic Croaker	0.7		0.04%		0.01		<0.01		2	
Black Crappie	0.7	0.4	0.04%	0.01%	0.01	<0.01	<0.01	<0.01	2	1
Inland Silverside	0.3	0.4	0.04%	0.01%	0.01	<0.01	<0.01	<0.01	2	1
Naked Goby	0.3		0.04%		0.01		<0.01		2	
Spotted Hake	0.7	0.8	0.04%	0.04%	0.01	0.01	<0.01	<0.01	2	3
Striped Killifish	0.3	2.6	0.02%	0.2%	<0.01	0.04	<0.01	0.01	1	11
Threespine Stickleback	0.3		0.02%		<0.01		<0.01		1	
Winter Flounder	0.3	3.8	0.02%	0.4%	<0.01	0.12	<0.01	0.04	1	31
Bluegill		0.4		0.01%		<0.01		<0.01		1
Conger Eel		0.4		0.01%		<0.01		<0.01		1
Golden Shiner		0.4		0.01%		<0.01		<0.01		1
Rainbow Smelt		0.4		0.01%		<0.01		<0.01		1
Seaboard Goby		0.4		0.01%		<0.01		<0.01		1
Windowpane		0.4		0.01%		<0.01		<0.01		1
Totals:			100.0%	100.0%	15.67	27.37	5.23	9.05	4,514	7,247
Total Number of Taxa:									29	30
Blue Crab	52.8	20.0			2.50	0.76	0.84	0.25	721	202

Total CPUE = total # of fish / total # of minutes Trawls were fished

TABLE 20
Comparison of Percent Frequency of Occurrence, Relative Abundance, Total CPUE and Total # For All Seine Collections
NJMC/MERI Hackensack River Fishery Resource Inventory
2001-03 vs. 1987-88

Sampling Period:	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88
Number Of Collections:	48	45	48	45	48	45	48	45
	Percent Frequency of occurrence		Relative Abundance (% of total)		Total CPUE (# / haul)		Total Number Collected	
Mummichog	75.0	100.0	45.7%	91.1%	162.56	802.80	7,803	36,126
Atlantic Silverside	64.6	37.8	36.8%	4.6%	130.79	40.47	6,278	1,821
Striped Killifish	56.3	33.3	7.1%	0.6%	25.23	5.42	1,211	244
White Perch	45.8	17.8	7.0%	0.03%	24.92	0.22	1,196	10
Inland Silverside	43.8	64.4	2.1%	3.5%	7.52	30.89	361	1,390
Striped Bass	29.2	6.7	0.4%	0.02%	1.46	0.13	70	6
Atlantic Menhaden	12.5		0.2%		0.73		35	
Gizzard Shad	6.3	2.2	0.1%	0.02%	0.48	0.13	23	6
Bay Anchovy	6.3	8.9	0.1%	0.05%	0.44	0.40	21	18
Crevalle Jack	2.1	2.2	0.1%	0.01%	0.40	0.04	19	2
Bluefish	12.5	6.7	0.1%	0.01%	0.38	0.07	18	3
Northern Pipefish	8.3	2.2	0.04%	0.01%	0.15	0.04	7	2
Carp	4.2	2.2	0.04%	0.01%	0.13	0.04	6	2
Striped Mullet	4.2	2.2	0.04%	<0.01%	0.13	0.02	6	1
Spot	4.2		0.03%		0.10		5	
Winter Flounder	4.2	2.2	0.03%	<0.01%	0.10	0.02	5	1
Alewife	2.1		0.02%		0.06		3	
Atlantic Tomcod	2.1		0.01%		0.04		2	
Hogchoker	4.2		0.01%		0.04		2	
Unidified Clupeidae	2.1		0.01%		0.02		1	
Goldfish	2.1	2.2	0.01%	<0.01%	0.02	0.02	1	1
Summer Flounder	2.1		0.01%		0.02		1	
Blueback Herring		4.4		0.01%		0.11		5
Pumpkinseed		15.6		0.04%		0.38		17
Weakfish		2.2		<0.01%		0.02		1
Windowpane		2.2		<0.01%		0.02		1
Totals:			100.0%	100.0%	355.71	881.27	17,074	39,657
Total Number of Taxa:							21	19
Blue Crab	39.6	13.3			2.13	0.40	102	18

Total CPUE = total # of fish / total # of seine hauls

TABLE 21
Comparison of Percent Frequency of Occurrence, Relative Abundance, Mean #, Total CPUE and Total # For All Gill Net Collections
NJMC/MERI Hackensack River Fishery Resource Inventory
2001-03 vs. 1987-88

Sampling Period:	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88	2001-03	1987-88
Number Of Collections:	48	42	48	42	48	42	48	42	48	42
	Percent Frequency of occurrence		Relative Abundance (% of total)		Mean # / Gill Net		Total CPUE (# / hour)		Total Number Collected	
White Perch	87.5	21.4	57.6%	15.6%	22.96	1.29	0.95	0.05	1,102	54
Gizzard Shad	25.0	9.5	21.5%	10.7%	8.56	0.88	0.35	0.04	411	37
Striped Bass	70.8	11.9	8.3%	7.5%	3.29	0.62	0.14	0.02	158	26
Atlantic Menhaden	33.3	28.6	6.0%	28.0%	2.40	2.31	0.10	0.09	115	97
Carp	22.9	2.4	3.0%	0.6%	1.21	0.05	0.05	<0.01	58	2
Bluefish	12.5	2.4	1.7%	0.3%	0.69	0.02	0.03	<0.01	33	1
Brown Bullhead	10.4	4.8	0.6%	0.6%	0.25	0.05	0.01	<0.01	12	2
Black Crappie	10.4		0.4%		0.15		<0.01		7	
Weakfish	10.4		0.3%		0.13		<0.01		6	
Alewife	6.3	4.8	0.3%	1.7%	0.10	0.14	<0.01	0.01	5	6
Blueback Herring	4.2	7.1	0.2%	1.2%	0.08	0.10	<0.01	<0.01	4	4
Alligator Gar	2.1		0.1%		0.02		<0.01		1	
Spot	2.1	4.8	0.1%	3.8%	0.02	0.31	<0.01	0.01	1	13
Striped Searobin	2.1		0.1%		0.02		<0.01		1	
Atlantic Tomcod		28.6		29.2%		2.40		0.10		101
Golden Shiner		2.4		0.3%		0.02		<0.01		1
Striped Killifish		2.4		0.3%		0.02		<0.01		1
Winter Flounder		2.4		0.3%		0.02		<0.01		1
Totals:			100.0%	100.0%	39.88	8.24	1.65	0.33	1,914	346
Total Number of Taxa:									14	14
Blue Crab	37.5	23.8			4.50	1.43	0.19	0.06	216	60

Total CPUE = total # of fish / total # of hours Gill Nets were fished

TABLE 22
SUMMARY OF SPECIES INDEX CALCULATIONS - BY RIVER REGION
NJMC/MERI Hackensack River Fishery Resource Inventory
1987-88 vs. 2001-03 FISHERY RESOURCE INVENTORY STUDIES

SITE:	ALL SITES COMBINED	ALL RIVER SITES	ALL TRIB. SITES	LOWER RIVER	MIDDLE RIVER	UPPER RIVER
1987-88 # of Collections	**433**	**291**	**142**	**72**	**74**	**70**
2001-03 # of Collections	**480**	**320**	**160**	**80**	**80**	**80**
1987-88 # of Species	**36**	**36**	**24**	**26**	**25**	**16**
2001-03 # of Species	**39**	**37**	**26**	**25**	**25**	**23**
1987-88 # of Fish	**61,718**	**55,796**	**5,922**	**7,033**	**22,128**	**14,987**
2001-03 # of Fish	**40,940**	**37,005**	**3,935**	**5,754**	**6,947**	**14,011**
INDEX						
D_{1987}	1.339	1.282	1.970	1.800	1.309	1.100
D_{2001}	3.687	3.500	2.106	1.461	4.079	2.113
H'_{1987}	0.321	0.279	0.484	0.461	0.280	0.116
H'_{2001}	0.725	0.706	0.572	0.320	0.784	0.543
E_{1987}	0.090	0.077	0.152	0.141	0.087	0.042
E_{2001}	0.198	0.194	0.176	0.099	0.244	0.173
$H\ max_{1987}$	3.584	3.611	3.178	3.258	3.219	2.773
$H\ max_{2001}$	3.664	3.638	3.258	3.219	3.219	3.135
S^2_{1987}	0.009	0.007	0.020	0.017	0.011	0.007
S^2_{2001}	0.018	0.018	0.022	0.099	0.030	0.023
Sd	0.165	0.160	0.203	0.173	0.204	0.174
df	68.542	64.466	50.000	50.021	41.093	34.733
t	2.451	2.659	0.435	0.815	2.476	2.455
Significant at;	p=0.01	p=0.01	NS	NS	p=0.01	p=0.01

NOTES: D = Simpson's index; H' = Shannon-Wiener index; E = Evenness. NS = Not Significant.

TABLE 23
SUMMARY OF SPECIES INDEX CALCULATIONS BY INDIVIDUAL SITE LOCATION
NJMC/MERI Hackensack River Fishery Resource Inventory
1987-88 vs. 2001-03 FISHERY INVENTORY STUDIES

SITE:	GN1	GN2	GN3	S1	S2	S3	TN1	TN2	TN3	TN4	TN5	TN6	T1	T2	T3	T4	T5	T6	T7	T8	T9
1987-88 # of Collections	**15**	**15**	**12**	**15**	**15**	**15**	**14**	**13**	**14**	**14**	**13**	**13**	**28**	**30**	**30**	**30**	**30**	**30**	**30**	**27**	**30**
2001-03 # of Collections	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**
1987-88 # of Species	**8**	**9**	**4**	**12**	**14**	**6**	**22**	**15**	**17**	**15**	**14**	**14**	**17**	**15**	**16**	**14**	**7**	**10**	**15**	**4**	**4**
2001-03 # of Species	**8**	**7**	**10**	**13**	**15**	**10**	**16**	**17**	**18**	**17**	**19**	**19**	**13**	**12**	**12**	**14**	**12**	**11**	**17**	**14**	**13**
1987-88 # of Fish	**121**	**184**	**41**	**5,994**	**20,177**	**13,486**	**560**	**1,373**	**1,371**	**8,047**	**933**	**2,184**	**358**	**260**	**396**	**1,198**	**527**	**531**	**1,799**	**957**	**1,221**
2001-03 # of Fish	**489**	**627**	**798**	**4,870**	**3,946**	**8,258**	**240**	**1,392**	**1,647**	**2,214**	**4,277**	**7,668**	**155**	**396**	**727**	**813**	**678**	**396**	**461**	**456**	**432**
INDEX																					
D_{1987}	2.658	3.930	1.288	1.500	1.215	1.060	2.836	1.739	2.544	1.048	1.786	1.650	4.539	3.315	3.055	1.498	1.080	1.451	2.004	1.032	1.007
D_{2001}	1.530	1.770	2.748	1.070	4.247	1.517	2.006	1.280	1.573	2.174	2.305	2.413	5.984	2.217	5.061	1.893	2.691	2.028	2.247	1.312	2.630
H'_{1987}	0.539	0.650	0.217	0.257	0.179	0.049	0.576	0.350	0.478	0.048	0.291	0.225	0.488	0.471	0.403	0.125	0.036	0.195	0.346	0.031	0.006
H'_{2001}	0.307	0.390	0.560	0.089	0.692	0.324	0.436	0.200	0.252	0.405	0.397	0.445	0.665	0.437	0.545	0.382	0.438	0.285	0.443	0.194	0.478
E_{1987}	2.079	2.079	1.386	2.485	2.639	1.792	3.091	2.708	2.890	2.639	2.639	2.639	2.833	2.708	2.773	2.565	1.946	2.303	2.639	1.386	1.386
E_{2001}	2.079	1.946	2.303	2.565	2.890	2.303	2.773	2.833	2.890	2.833	2.944	2.944	2.565	2.485	2.485	2.639	2.398	2.398	2.833	2.565	2.485
$H\ max_{1987}$	0.259	0.313	0.156	0.104	0.068	0.028	0.186	0.129	0.165	0.018	0.110	0.085	0.172	0.174	0.145	0.049	0.018	0.085	0.131	0.022	0.005
$H\ max_{2001}$	0.148	0.201	0.243	0.035	0.239	0.141	0.157	0.071	0.087	0.143	0.135	0.151	0.259	0.176	0.219	0.145	0.183	0.119	0.156	0.075	0.192
S^2_{1987}	0.063	0.075	0.051	0.021	0.013	0.008	0.025	0.023	0.026	0.003	0.020	0.016	0.028	0.030	0.025	0.010	0.005	0.019	0.024	0.008	0.002
S^2_{2001}	0.037	0.053	0.053	0.007	0.037	0.031	0.026	0.012	0.014	0.023	0.020	0.023	0.049	0.035	0.043	0.027	0.038	0.025	0.025	0.015	0.038
Sd	0.316	0.357	0.323	0.167	0.223	0.199	0.228	0.185	0.199	0.163	0.202	0.197	0.276	0.256	0.261	0.190	0.208	0.211	0.223	0.149	0.200
df	14.988	14.832	11.580	19.171	28.173	14.272	36.812	27.811	32.949	21.774	32.262	32.966	25.725	26.123	23.739	22.724	13.730	20.833	30.840	16.006	12.967
t	0.735	0.729	1.064	1.010	2.302	1.383	0.614	0.810	1.136	2.186	0.523	1.120	0.642	0.134	0.543	1.350	1.935	0.425	0.434	1.092	2.361
Sigificant at:	NS	NS	NS	NS	p=0.05	NS	NS	NS	NS	p=0.05	NS	NS	NS	NS	NS	NS	p=0.05	NS	NS	NS	p=0.05

NOTES: D = Simpson's index; H' = Shannon-Wiener index; E = Evenness. NS = Not Significant.

FIGURES

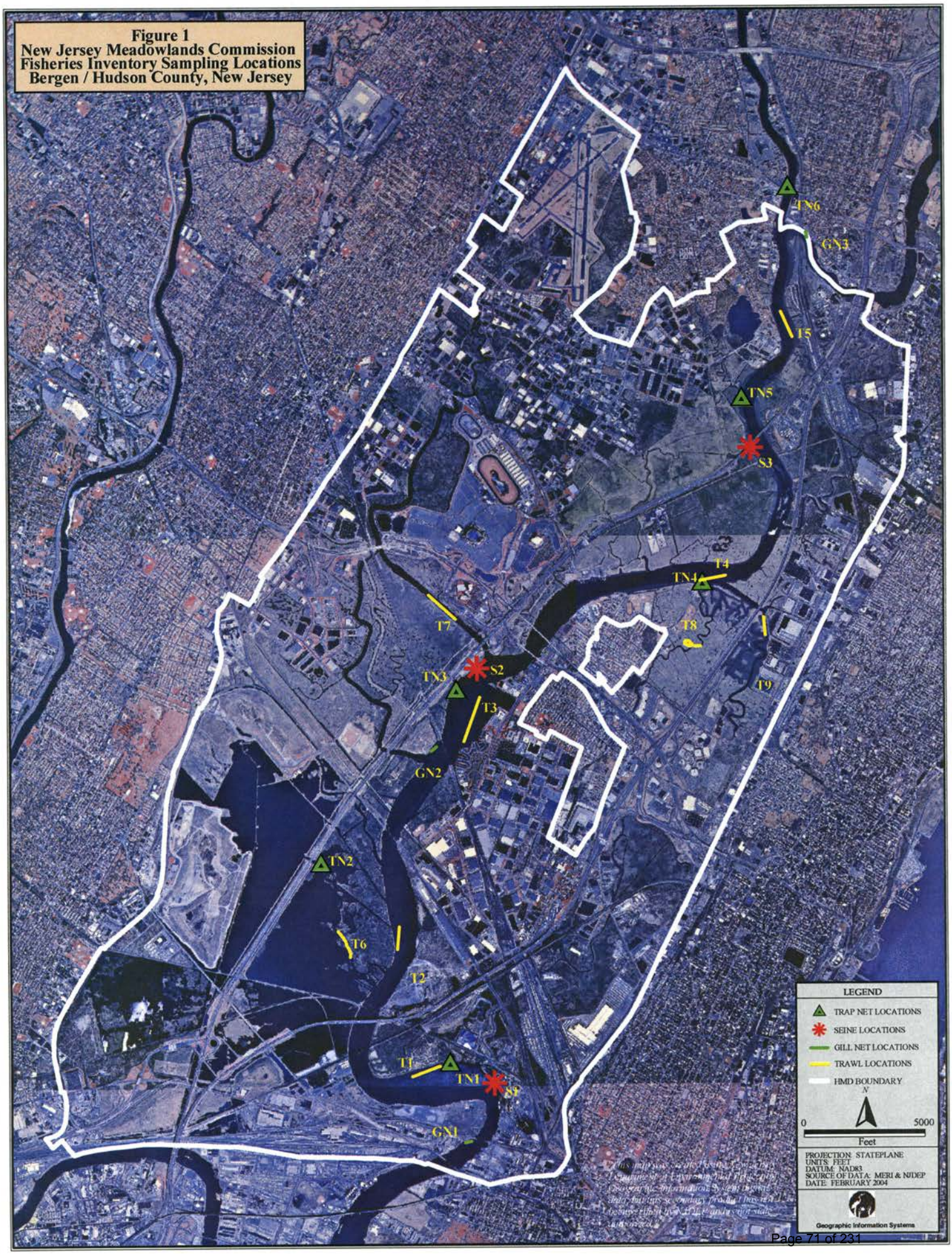
Figure 1
New Jersey Meadowlands Commission
Fisheries Inventory Sampling Locations
Bergen / Hudson County, New Jersey
TN6
GN3
T5
TN5
S3
T4
TN4
T7
T8
S2
TN3
T3
T9
GN2
TN2
T6
T2
T1
TN1
S1
GN1
LEGEND
TRAP NET LOCATIONS
SEINE LOCATIONS
GILL NET LOCATIONS
TRAWL LOCATIONS
HMD BOUNDARY
N
0
5000
Feet
PROJECTION: STATEPLANE
UNITS: FEET
DATUM: NAD83
SOURCE OF DATA: MERI & NJDEP
DATE: FEBRUARY 2004
Geographic Information Systems

FIGURE 2
NJMC HACKENSACK RIVER
FISHERIES RESOURCE INVENTORY

Station/Location: _____

Collection No.: _____ Replicate No.: _____

Date/Time (Set): _____ Gear: _____
Date/Time(Retr.): _____

RPM: _____

Duration of tow/set: _____

Depth: _____

Tide: High
Low
Moon Phase: _____

Weather: wind: Calm, Breeezy, Windy, Other: _____
sea: Calm, Choppy, Rough, Other: _____
atmosphere: Clear, Overcast, Fog, Drizzle, Rain, Sleet, Snow, Other: _____

Temp. : air: _____
(^{0}C) surface: _____ Crew: _____
bottom: _____ Remarks: _____

D.O. surface: _____
(mg/L) bottom: _____

Cond : surface: _____
(umhos) bottom: _____

Salinity surface: _____
(0/00) bottom: _____

Turb: surface: _____
(NTU) bottom: _____

pH: surface: _____
bottom: _____

T.D.S.: surface: _____
bottom: _____ Tissue samples: _____

Redox : surface: _____ Date
(mV) bottom: _____ proccessed: _____
Sorted by: _____

Secchi (cm): _____ Identified by: _____

Site:

CAPTURE DATA

#	Species											
		mm TL										
		grams										
		mm TL										
		grams										
		mm TL										
		grams										
		mm TL										
		grams										
		mm TL										
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		mm TL										
		grams										

FIGURE 3
Monthly and Seasonal Abundance of the Top 10 Species

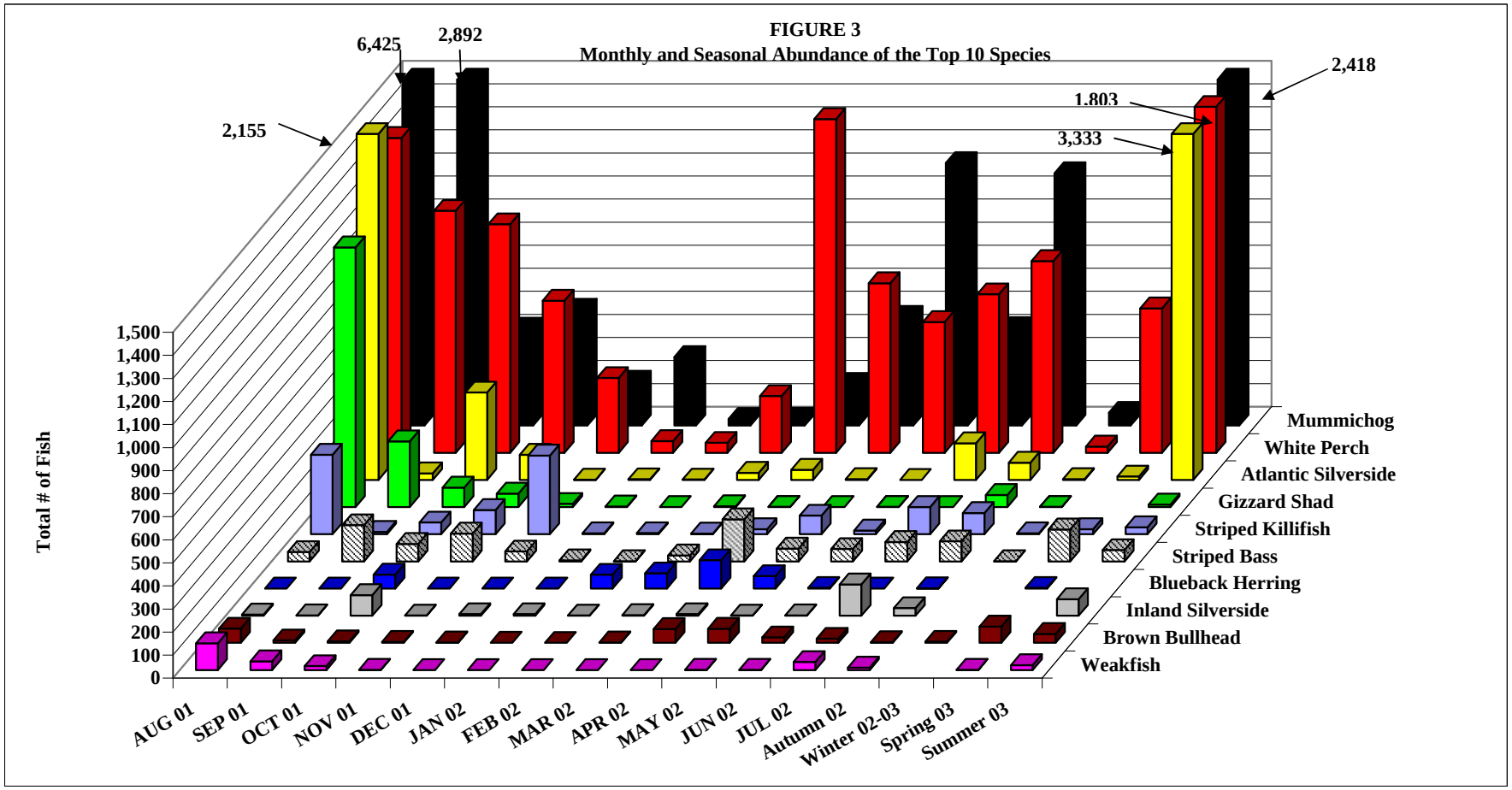
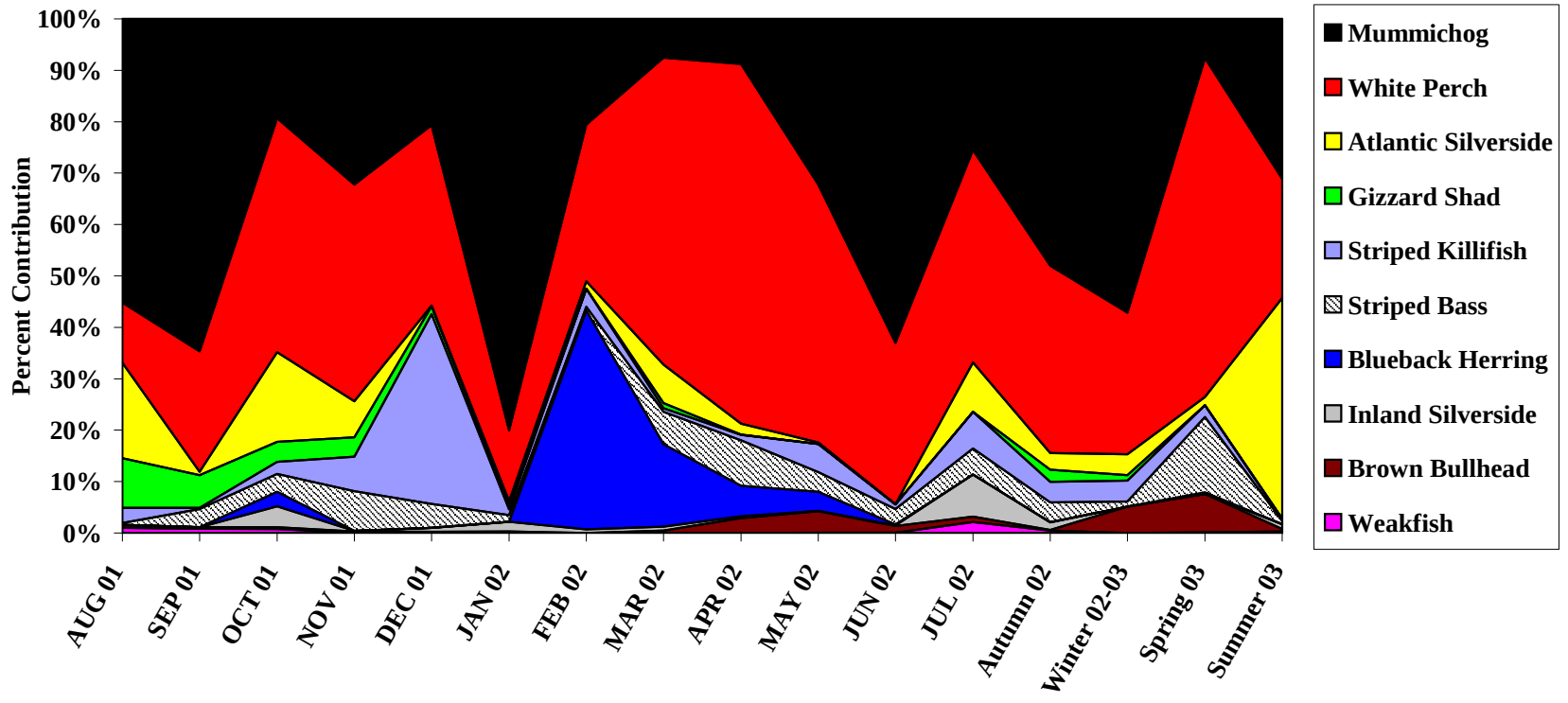


FIGURE 4
Monthly and Seasonal Percent Contribution of the 10 Most Abundant Species



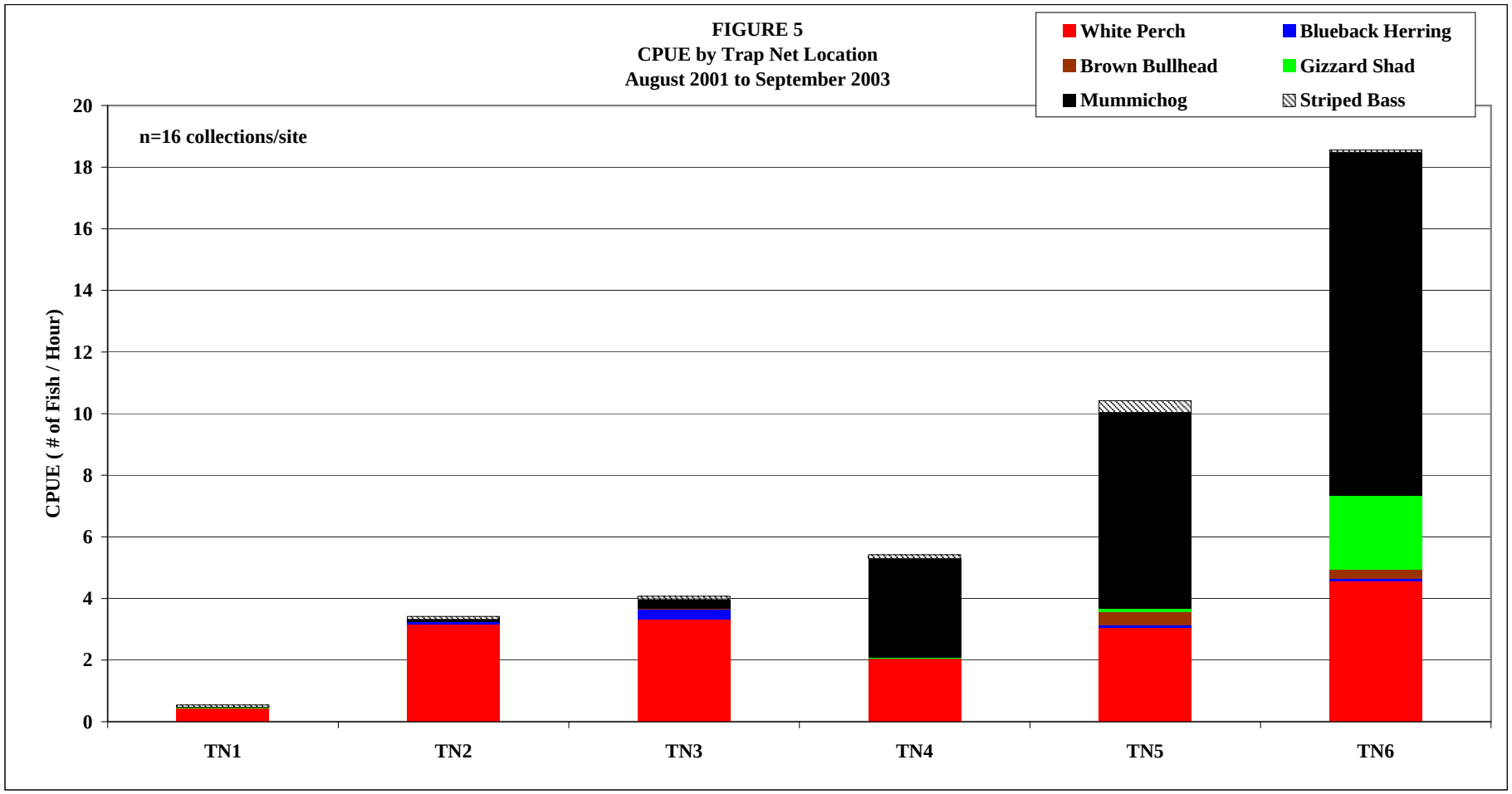


FIGURE 5
CPUE by Trap Net Location
August 2001 to September 2003
White Perch
Blueback Herring
Brown Bullhead
Gizzard Shad
Mummichog
Striped Bass
n=16 collections/site
CPUE (# of Fish / Hour)
0
2
4
6
8
10
12
14
16
18
20
TN1
TN2
TN3
TN4
TN5
TN6

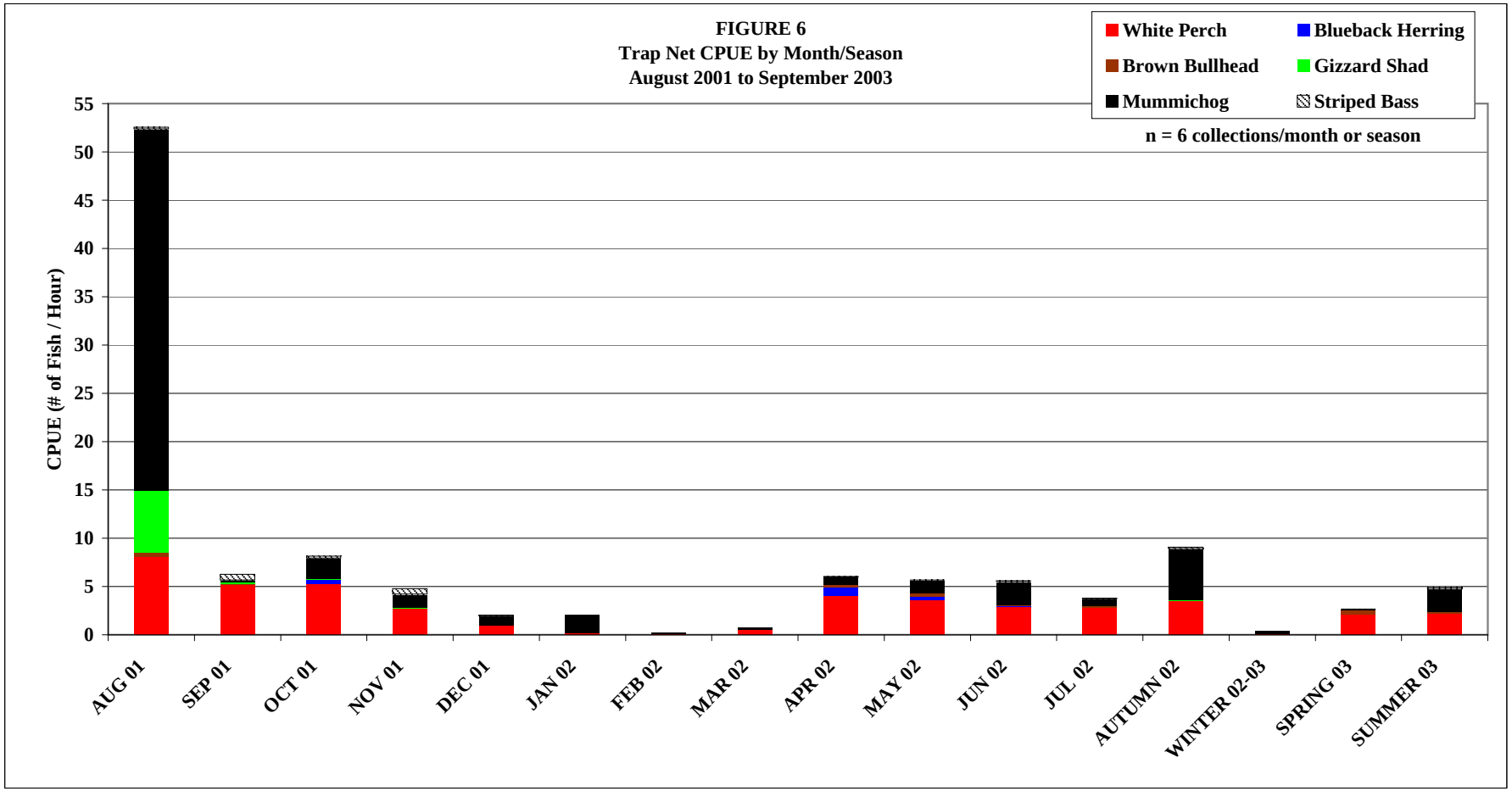


FIGURE 6
Trap Net CPUE by Month/Season
August 2001 to September 2003
White Perch
Blueback Herring
Brown Bullhead
Gizzard Shad
Mummichog
Striped Bass
n = 6 collections/month or season
CPUE (# of Fish / Hour)
55
50
45
40
35
30
25
20
15
10
5
0
AUG 01
SEP 01
OCT 01
NOV 01
DEC 01
JAN 02
FEB 02
MAR 02
APR 02
MAY 02
JUN 02
JUL 02
AUTUMN 02
WINTER 02-03
SPRING 03
SUMMER 03

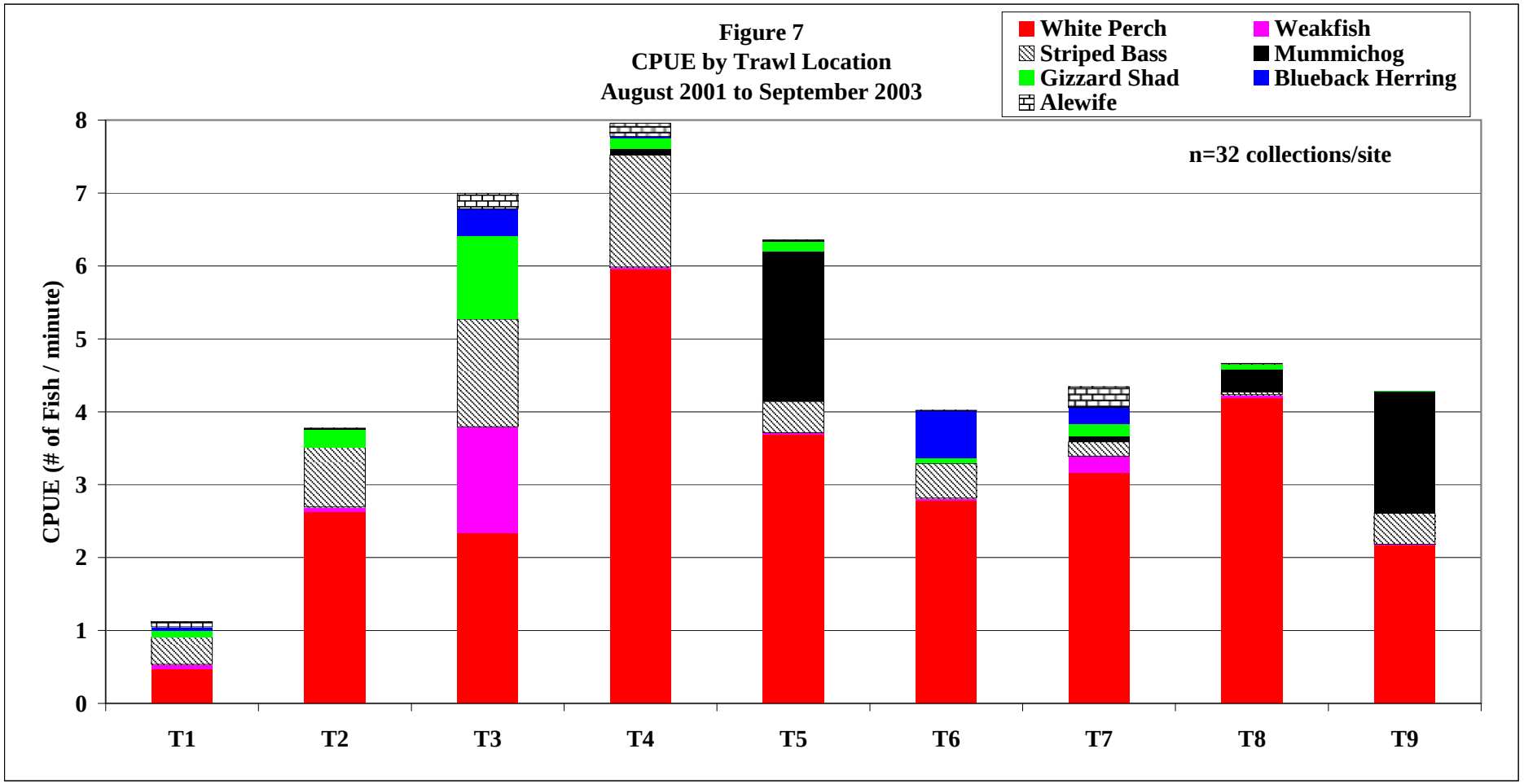


Figure 7
CPUE by Trawl Location
August 2001 to September 2003
White Perch
Weakfish
Striped Bass
Mummichog
Gizzard Shad
Blueback Herring
Alewife
n=32 collections/site
CPUE (# of Fish / minute)
0
1
2
3
4
5
6
7
8
T1
T2
T3
T4
T5
T6
T7
T8
T9

FIGURE 8
Trawl CPUE by Month/Season
August 2001 to September 2003

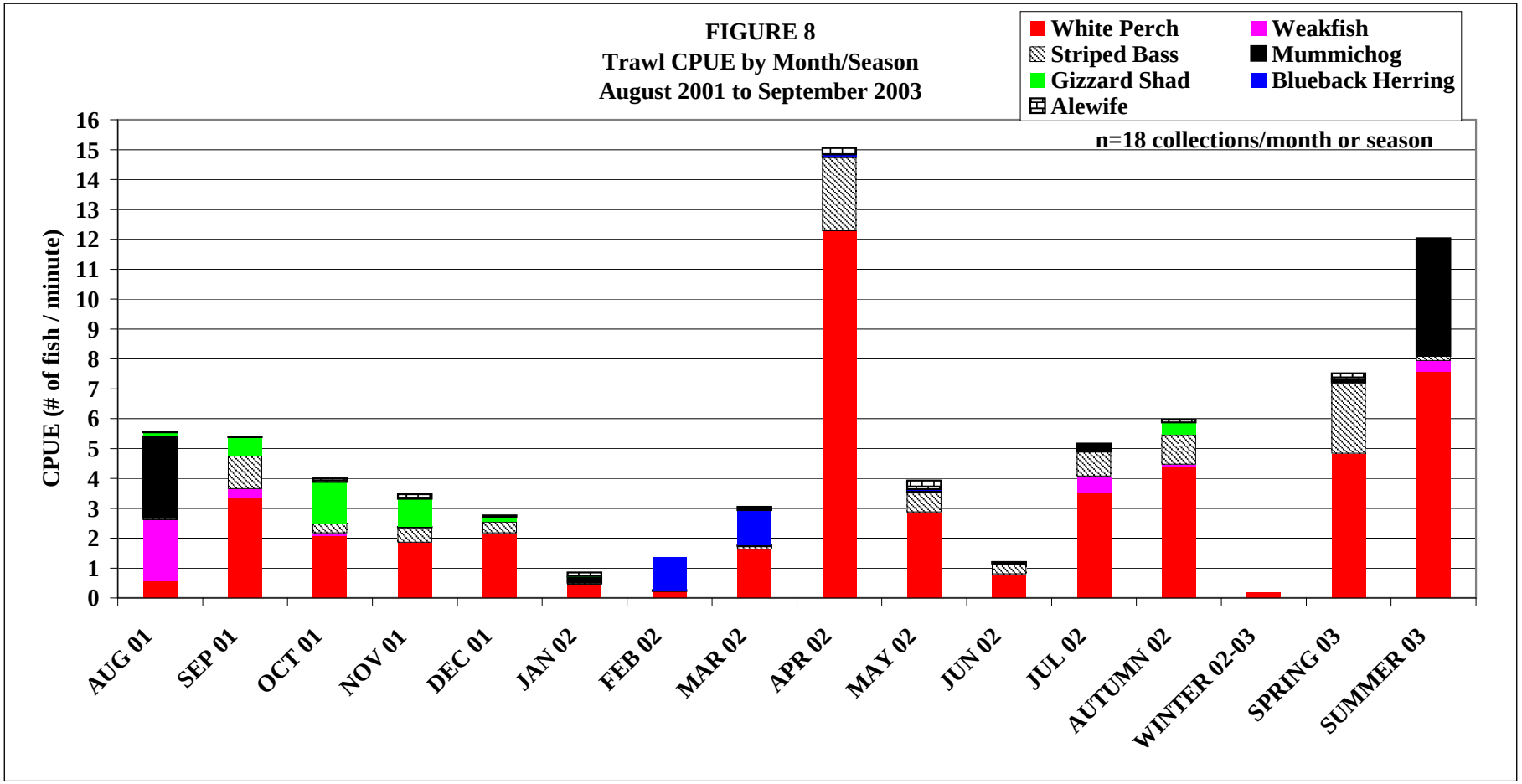


FIGURE 9
CPUE by Seine Location
August 2001 to September 2003

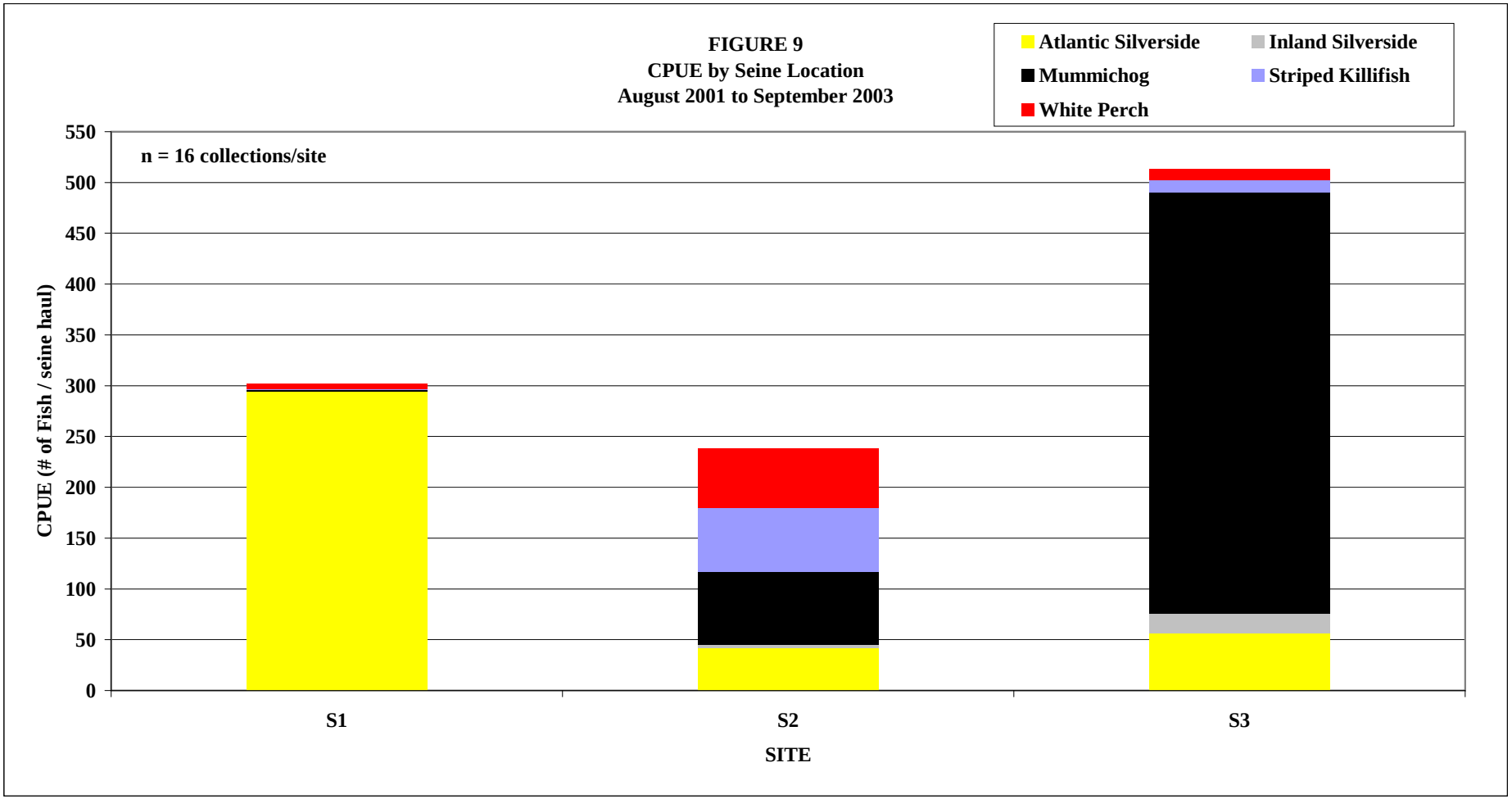


FIGURE 10
Seine CPUE by Month/Season
August 2001 to September 2003

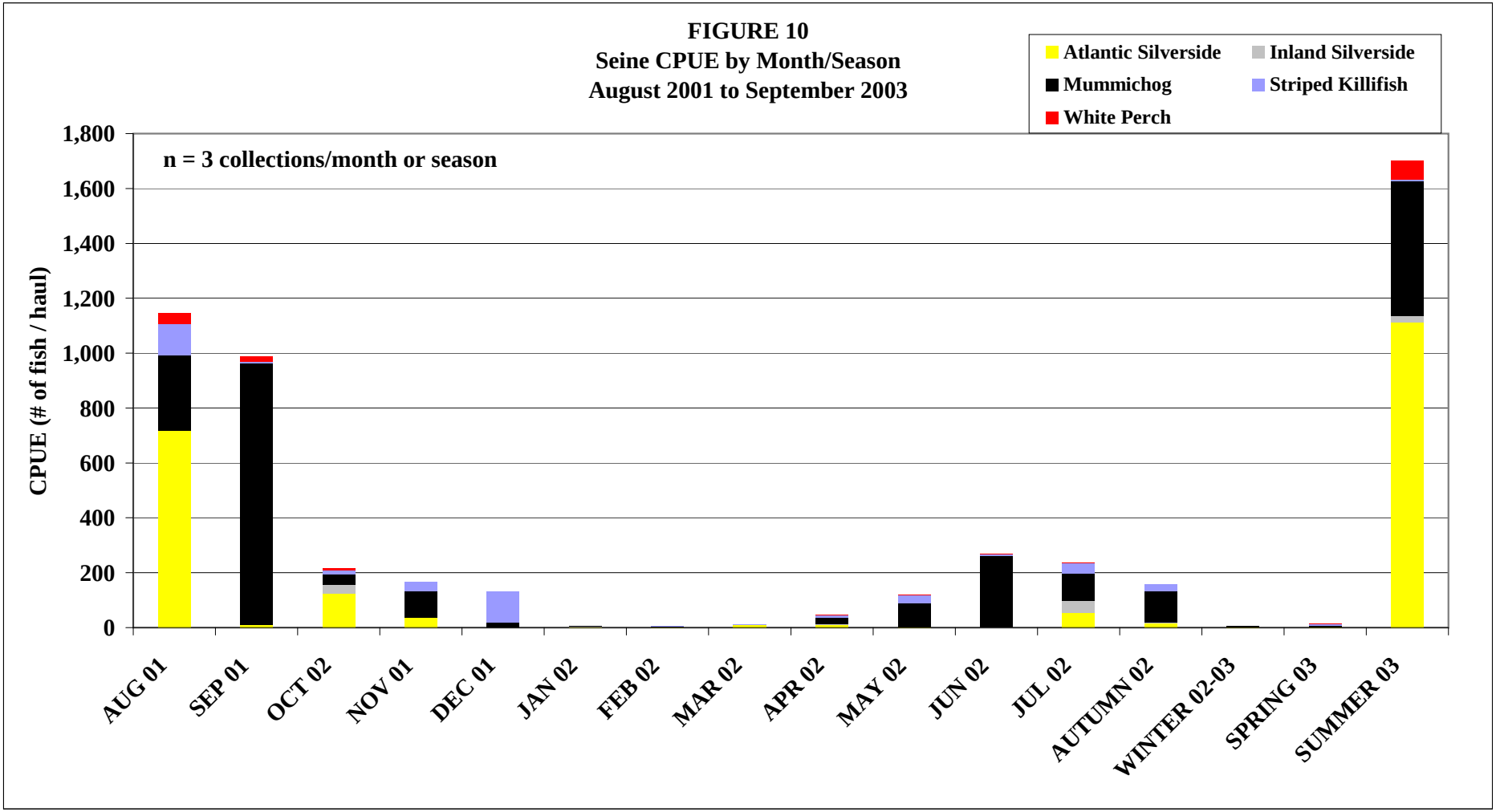


FIGURE 11
CPUE by Gill Net Location
August 2001 to September 2003

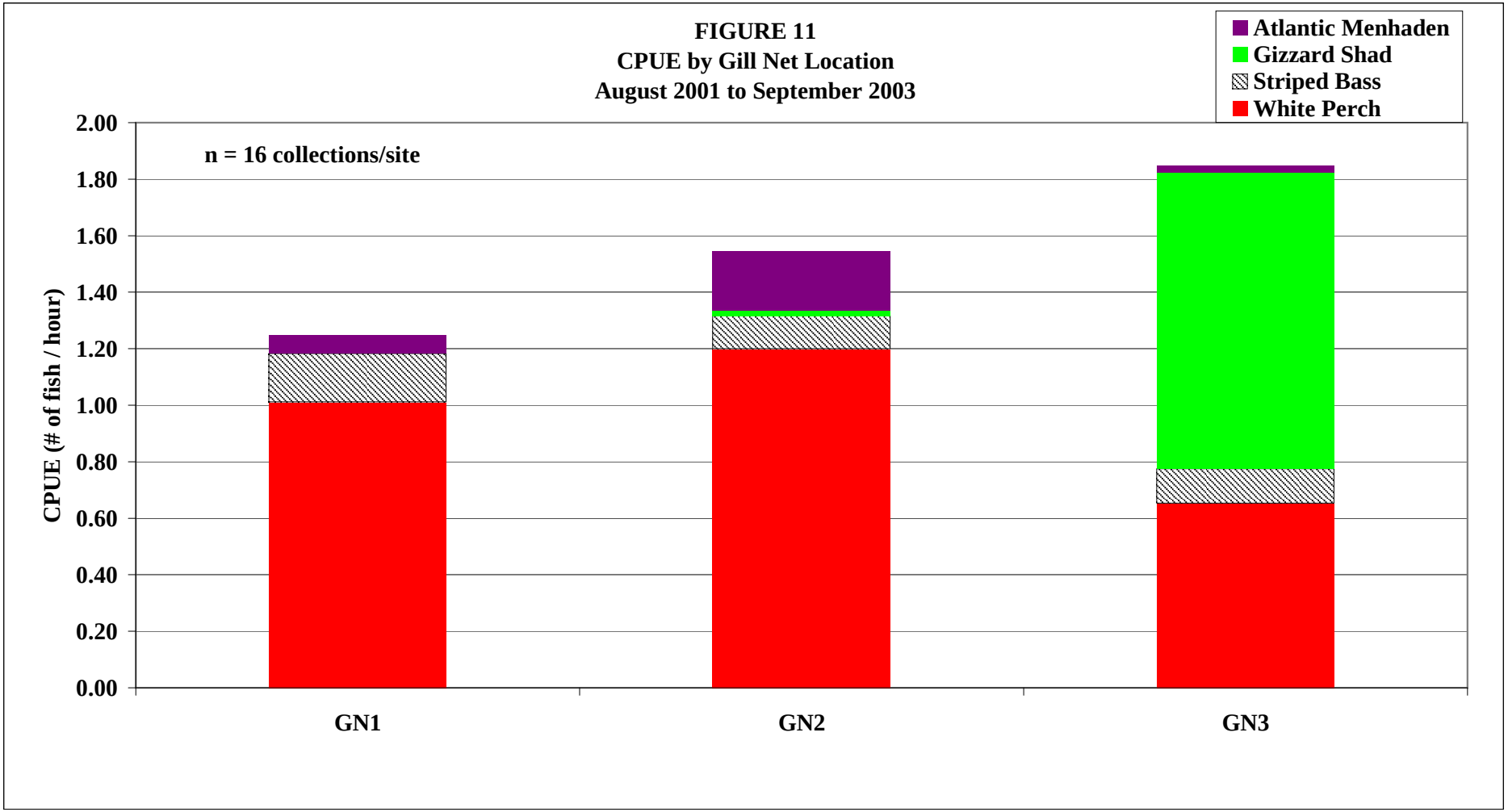


FIGURE 12
Gill Net CPUE by Month/Season
August 2001 to September 2003

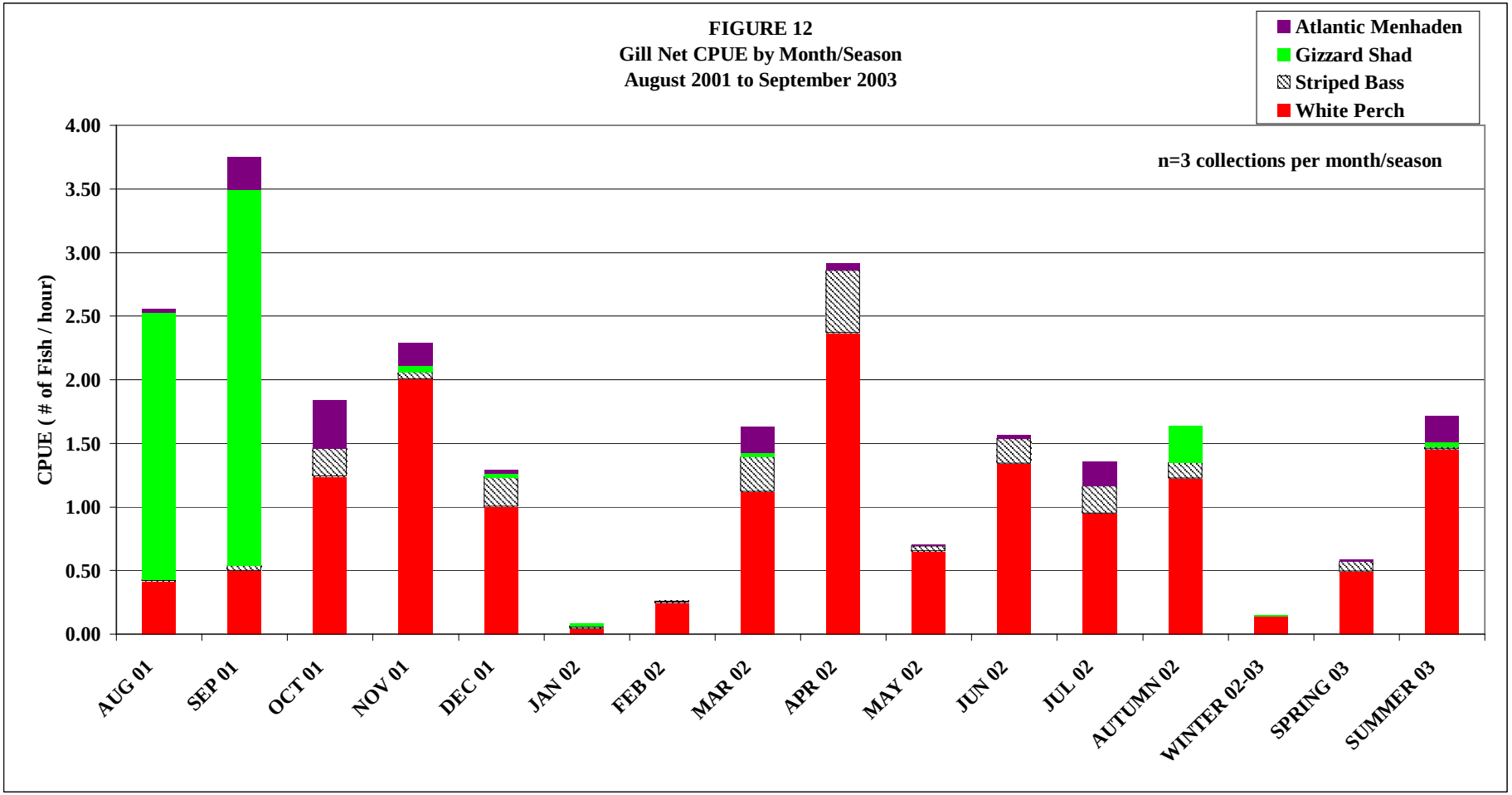


FIGURE 13
Comparison of Biomass and Abundance
August 2001 to September 2003

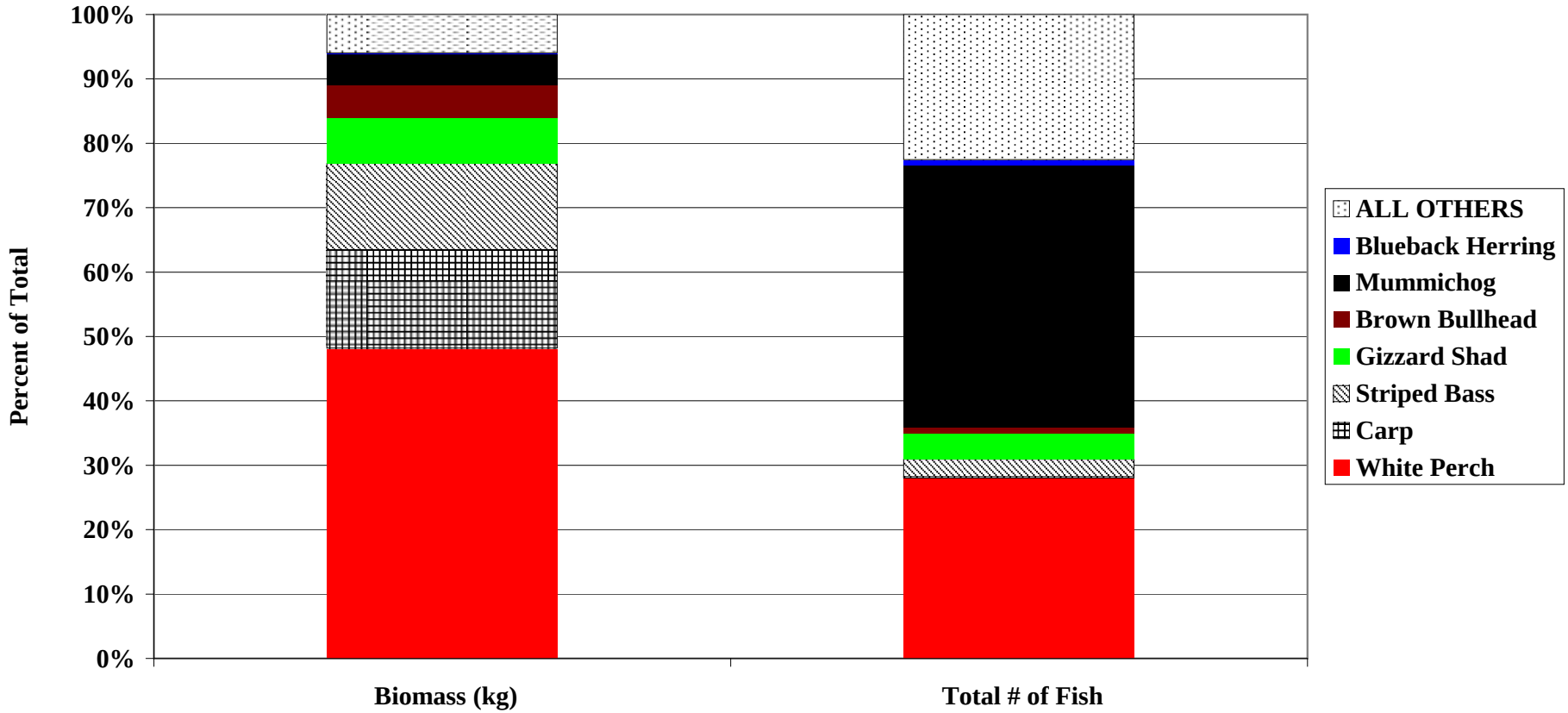
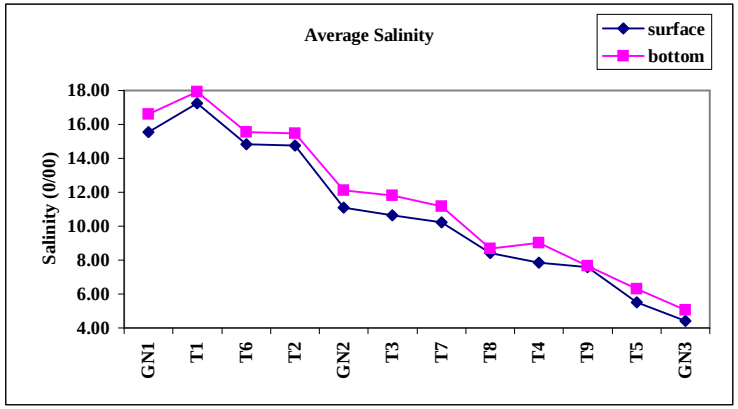
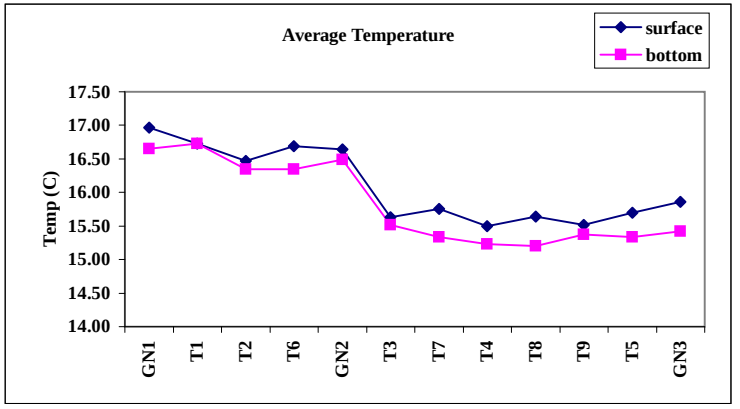
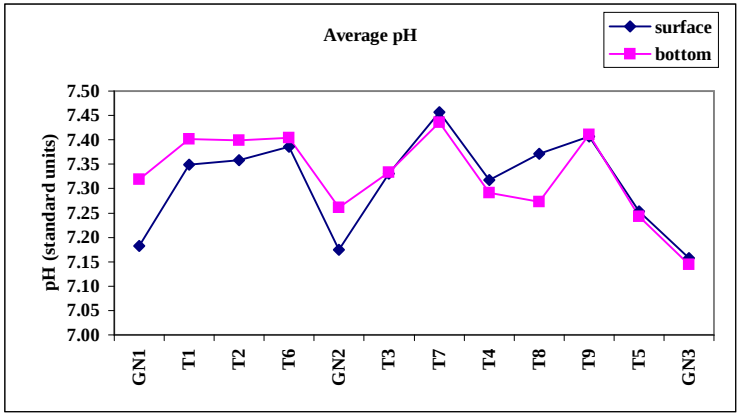
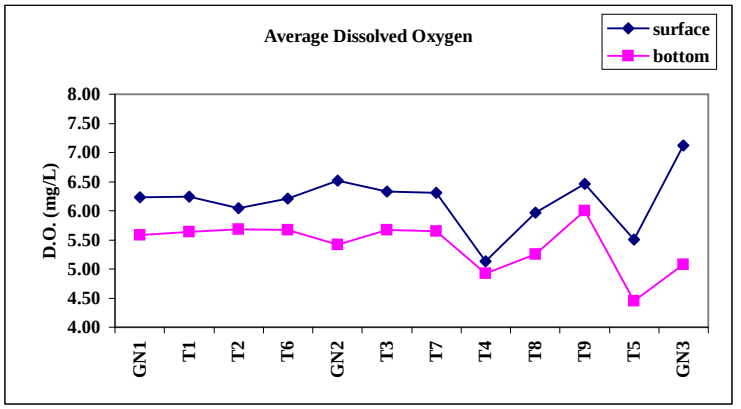


FIGURE 14
Water Quality Averages by Site Location
NJMC/MERI Hackensack River FisheryResource Inventory
August 2001 to September 2003









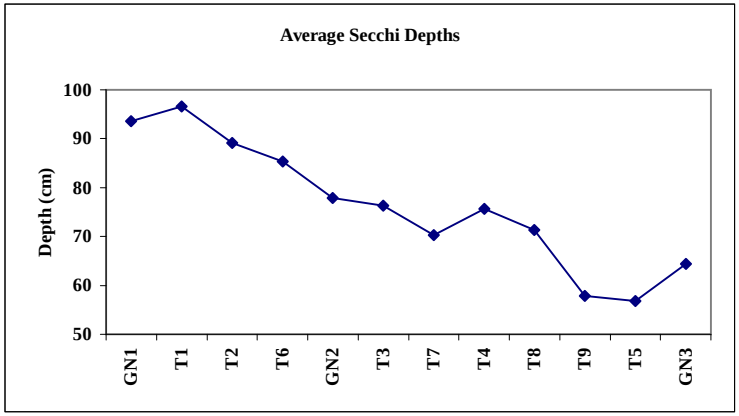
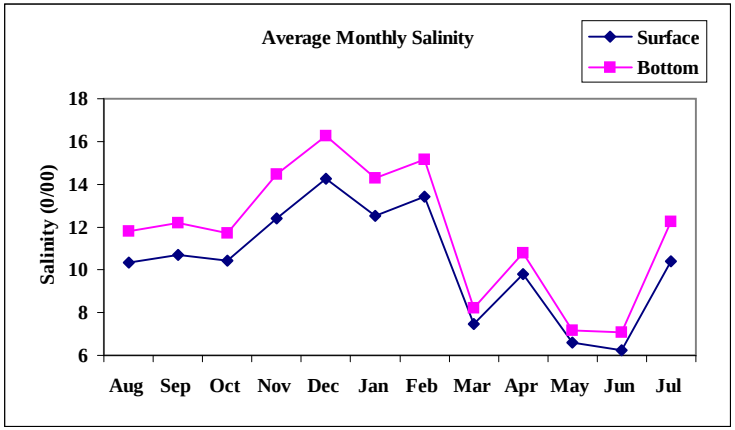
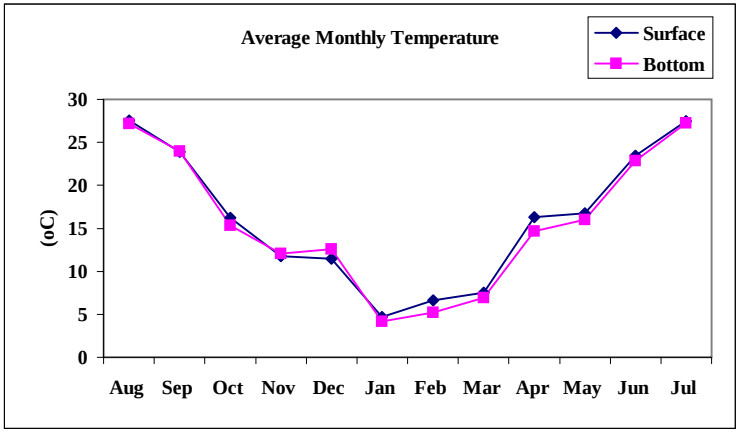
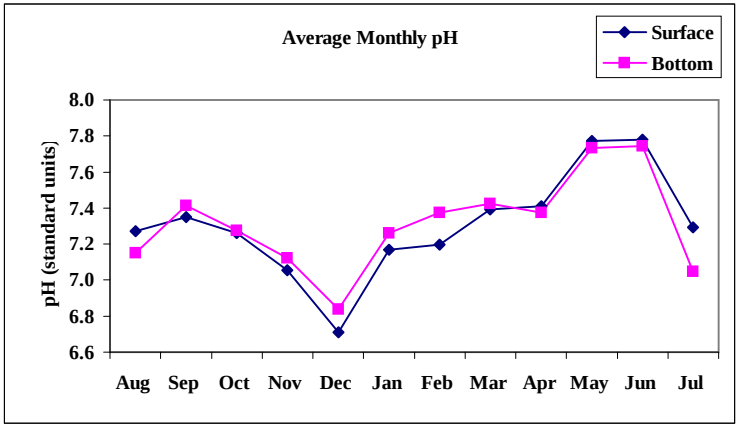
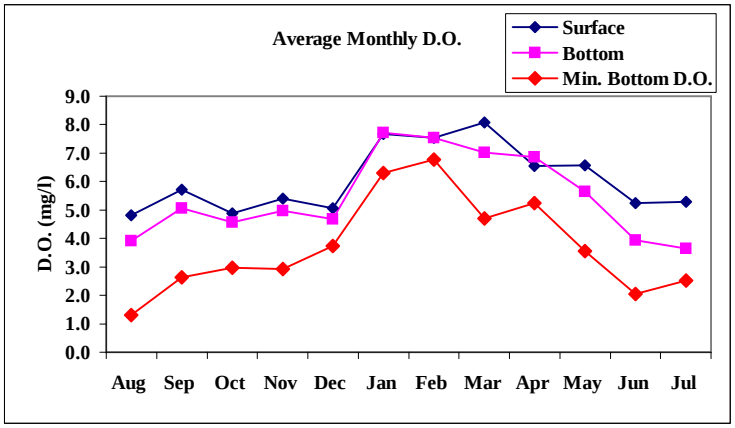


FIGURE 15
Water Quality Averages by Month
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001-August 2003









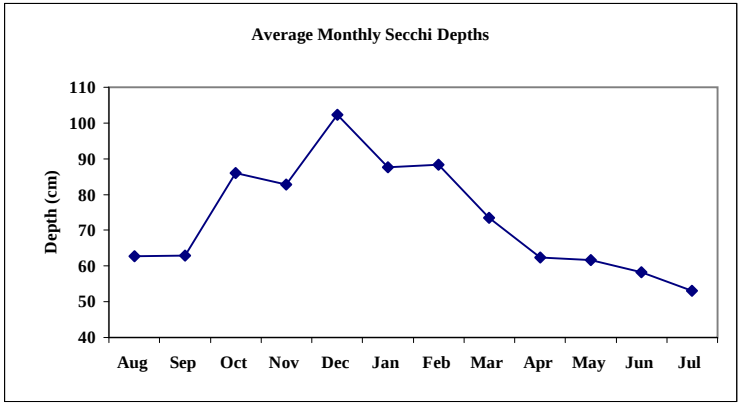


FIGURE 16
Relative Abundance Comparison
2001-03 = 480 collections/40,940 fish/39 species
1987-88 = 433 collections/61,718 fish/36 species

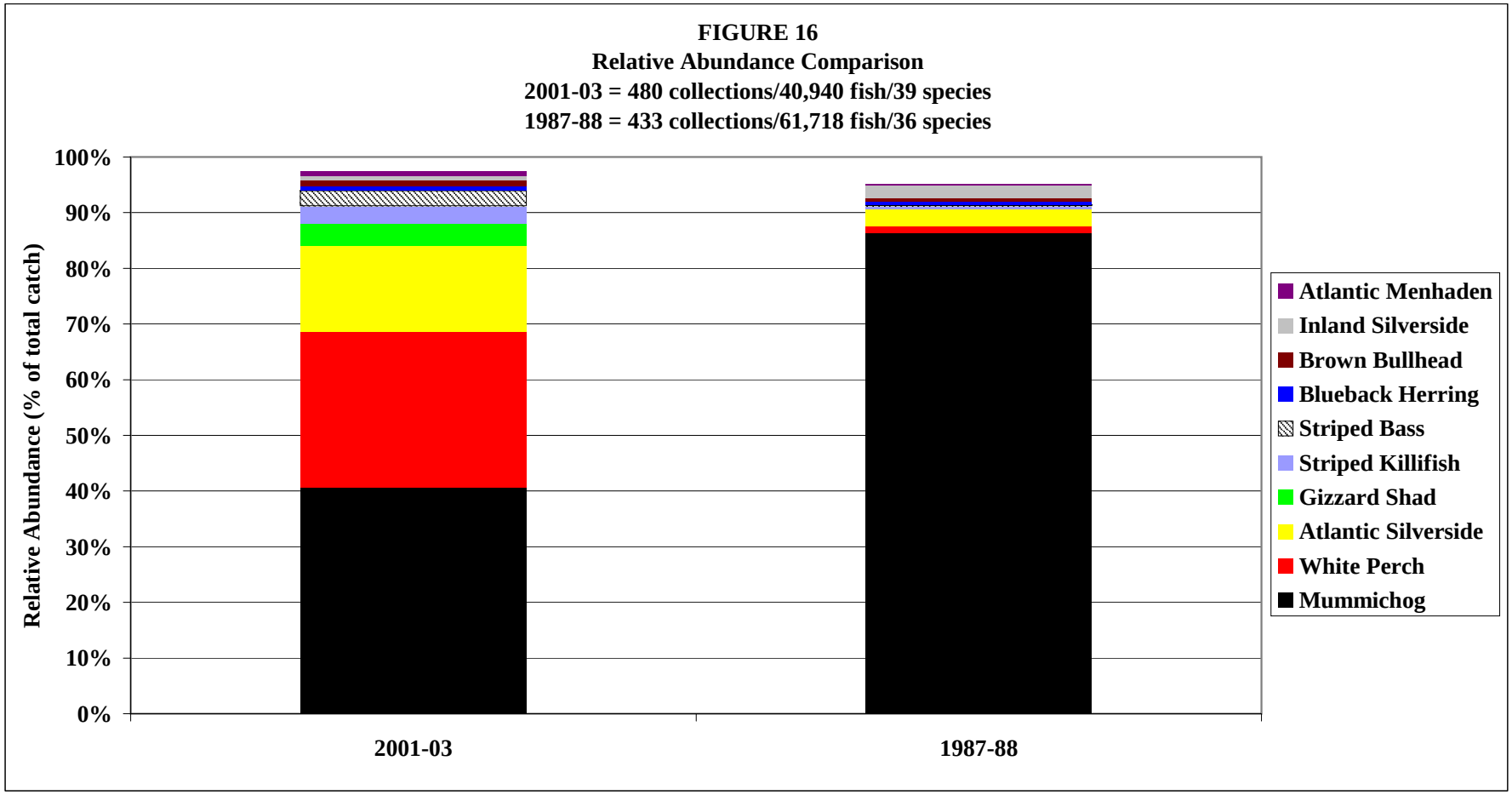


FIGURE 17
Percent Frequency of Occurrence Comparison
2001-03 (n=480) vs. 1987-88 (n=433)

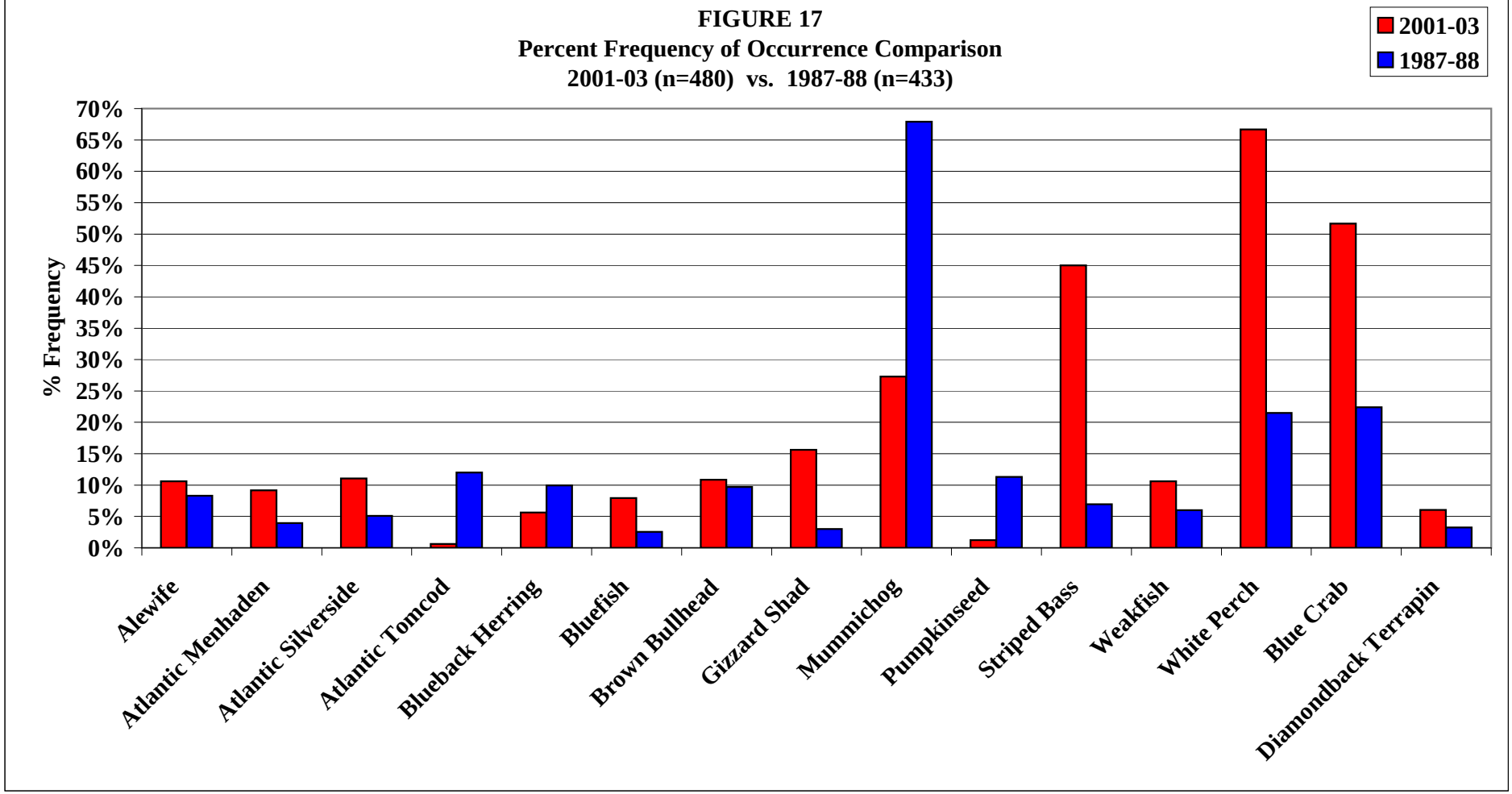
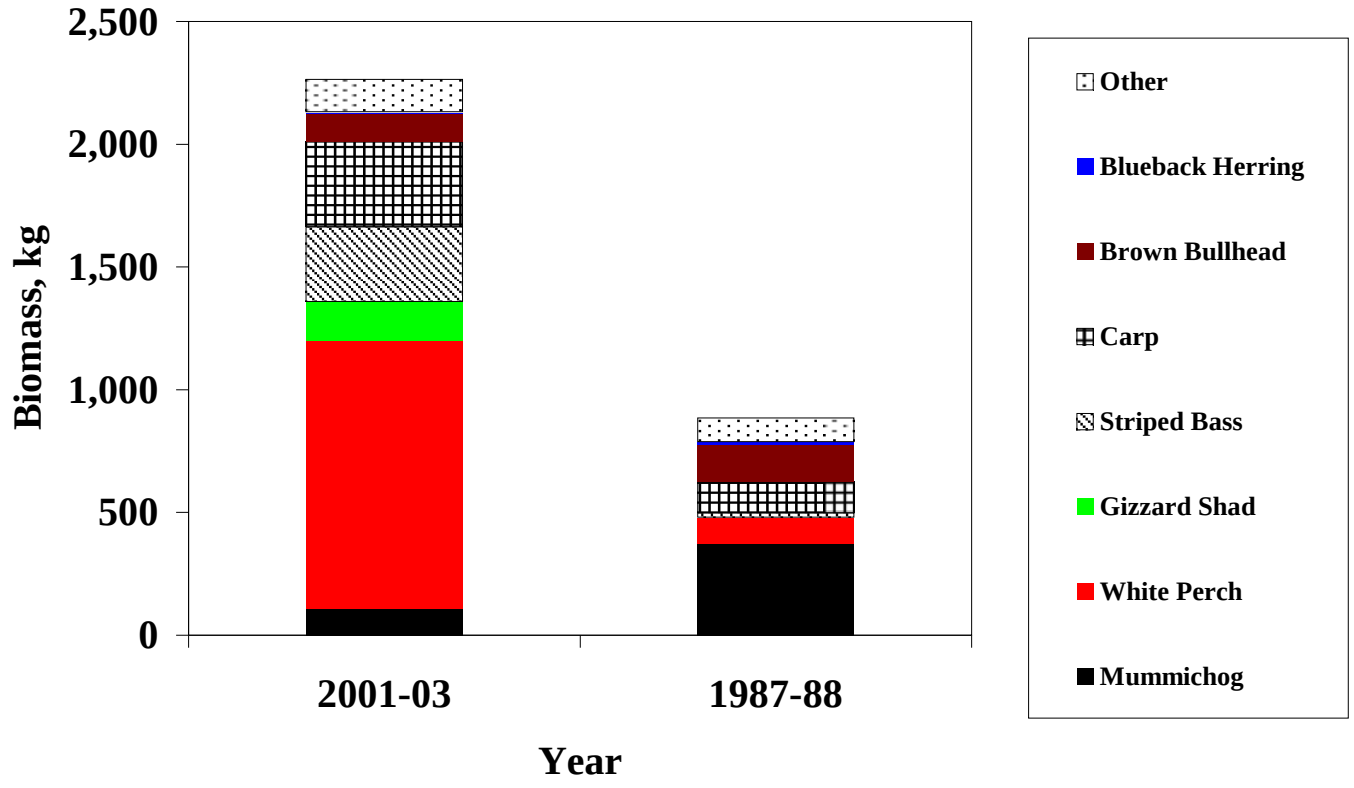


FIGURE 18
Total Biomass by Species
2001-03 vs. 1987-88



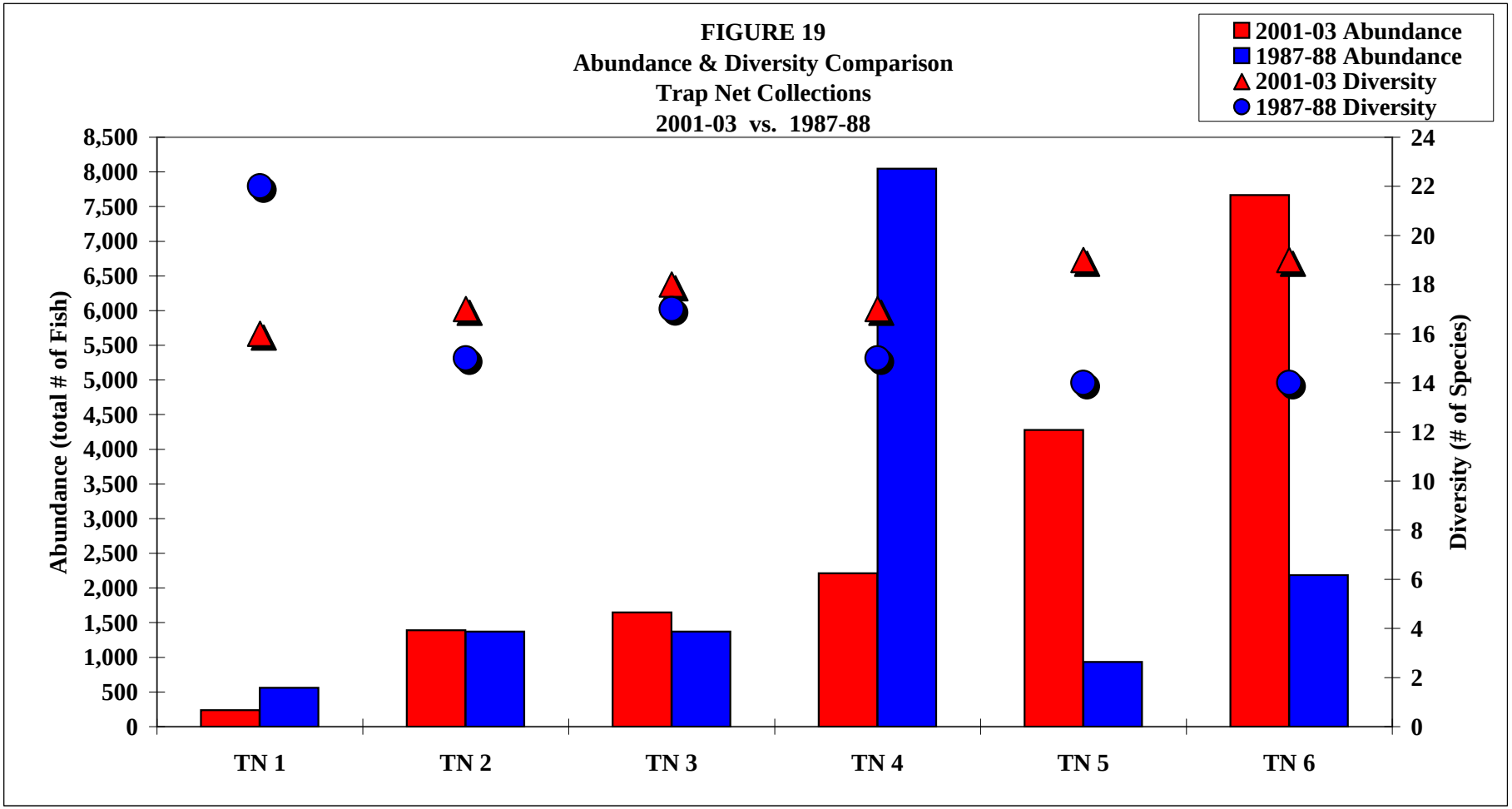


FIGURE 19
Abundance & Diversity Comparison
Trap Net Collections
2001-03 vs. 1987-88
2001-03 Abundance
1987-88 Abundance
2001-03 Diversity
1987-88 Diversity
Abundance (total # of Fish)
Diversity (# of Species)
8,500
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
24
22
20
18
16
14
12
10
8
6
4
2
0
TN 1
TN 2
TN 3
TN 4
TN 5
TN 6

FIGURE 20
CPUE Comparison by Trap Net Location
2001-03 vs. 1987-88

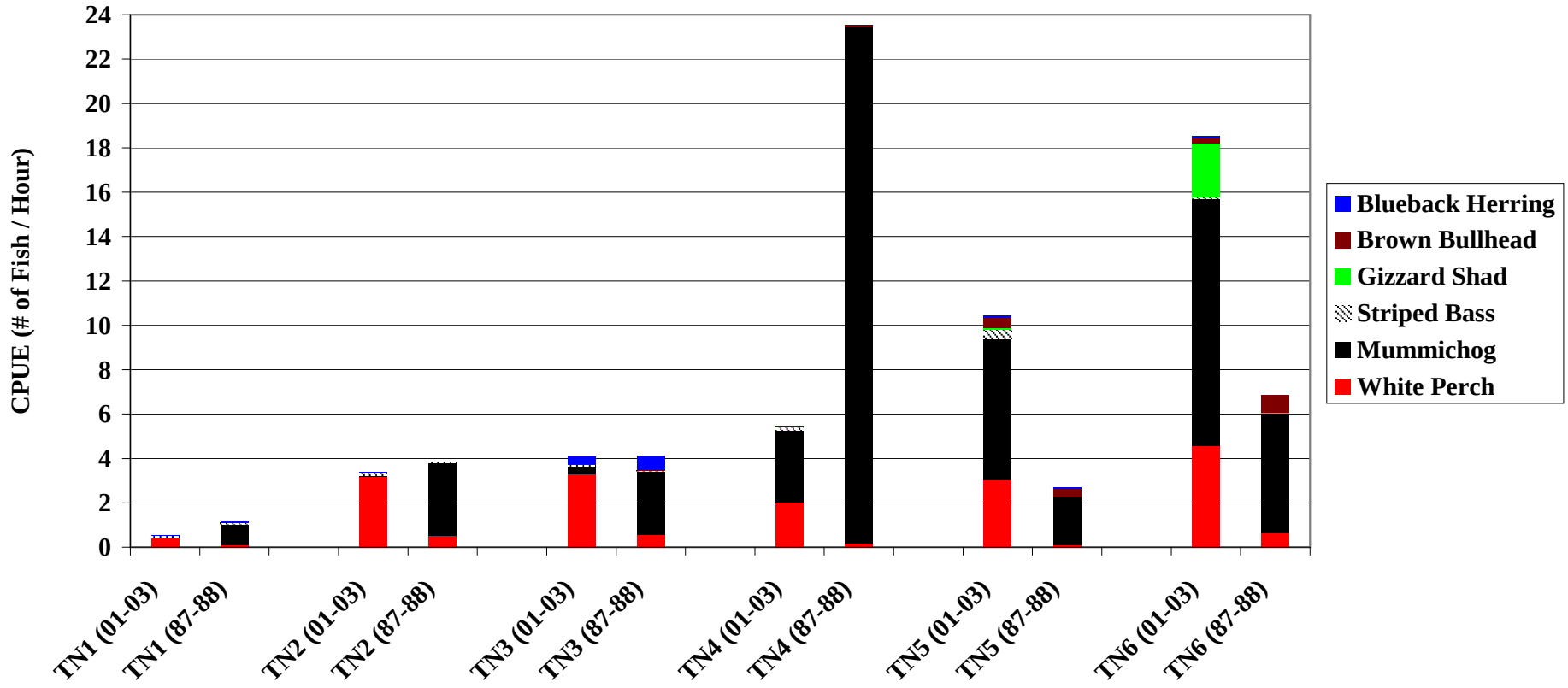


FIGURE 21
Abundance & Diversity Comparison
Trawl Collections
2001-03 vs. 1987-88

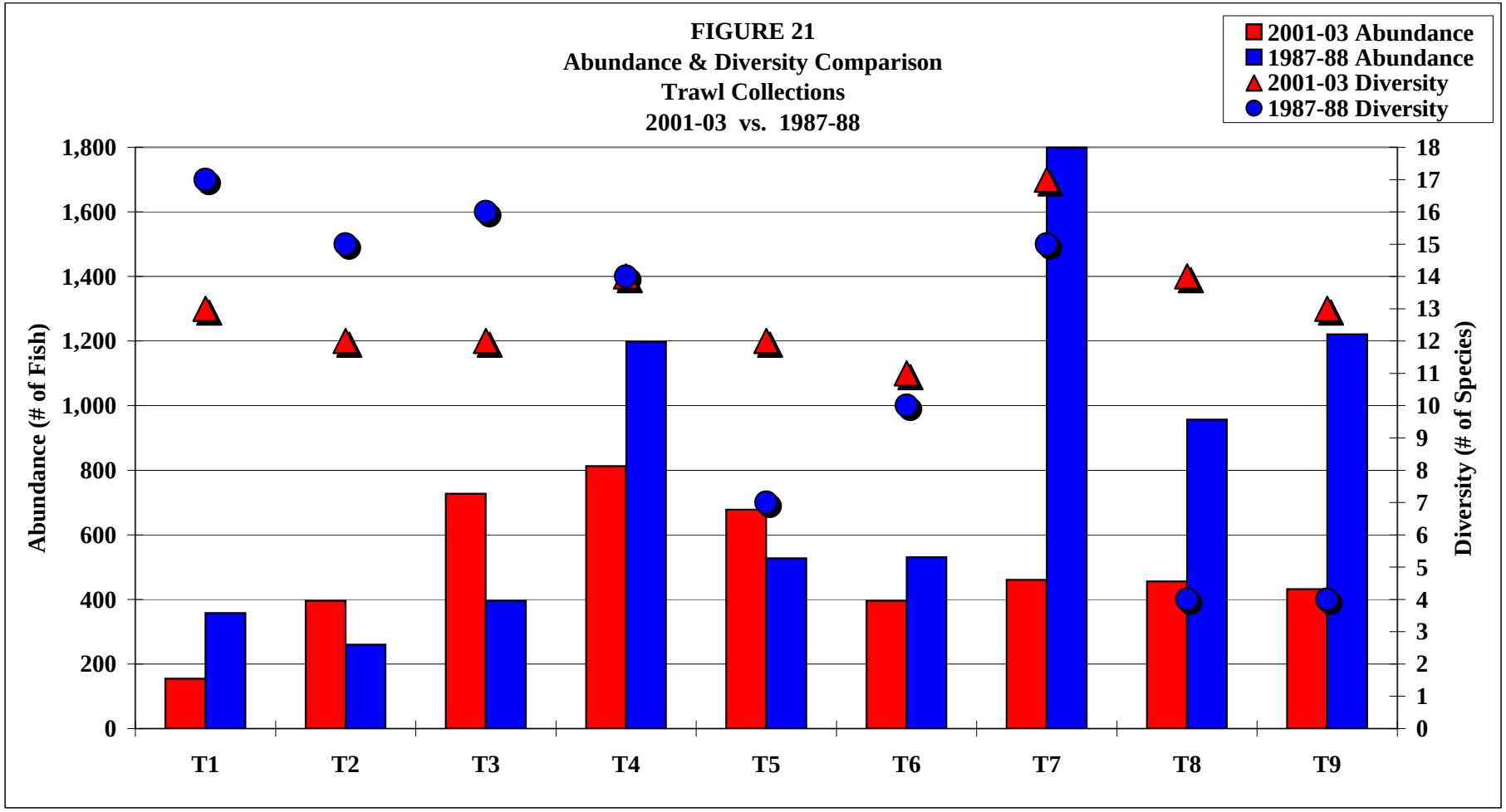
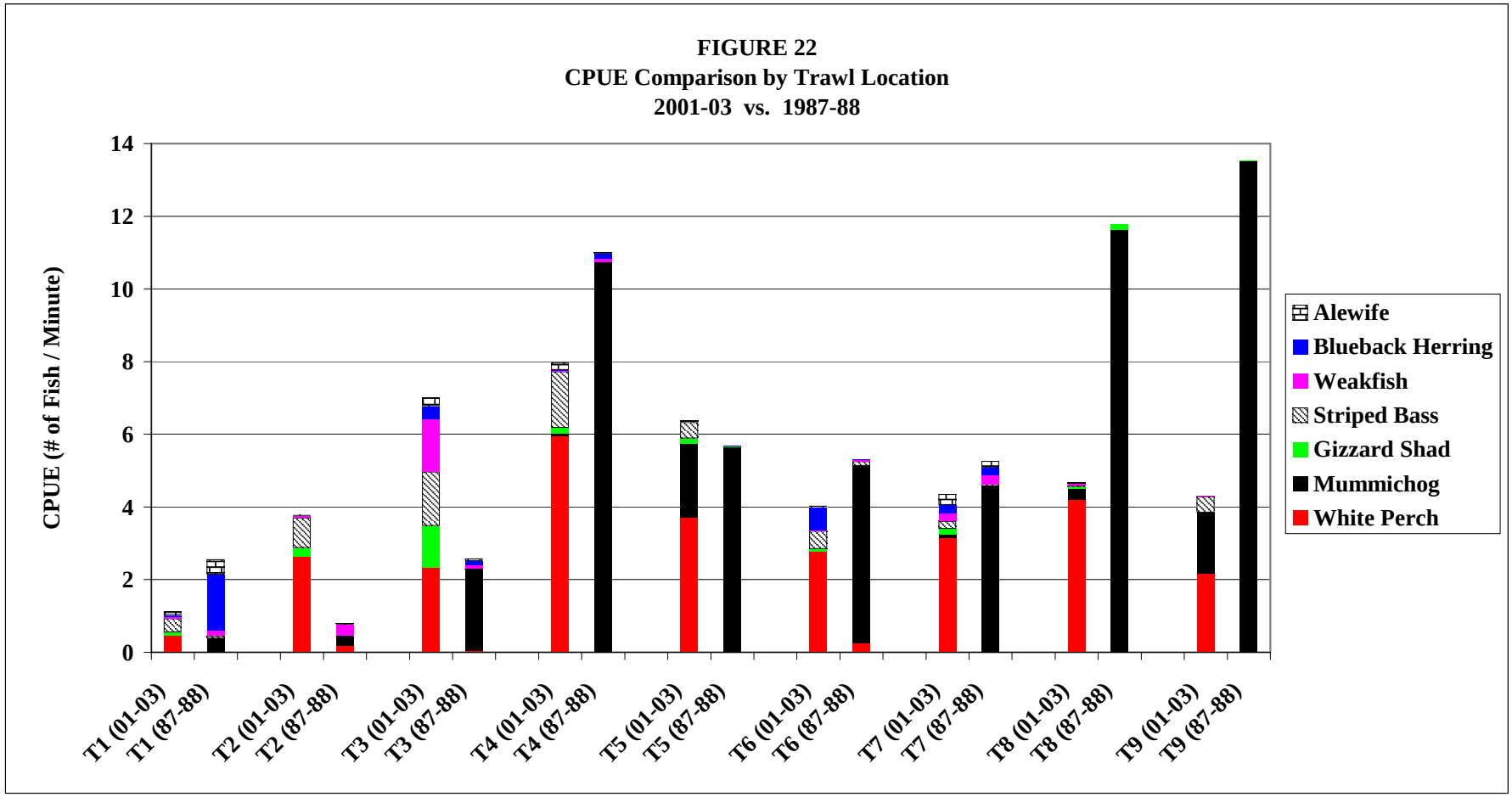


FIGURE 22
CPUE Comparison by Trawl Location
2001-03 vs. 1987-88



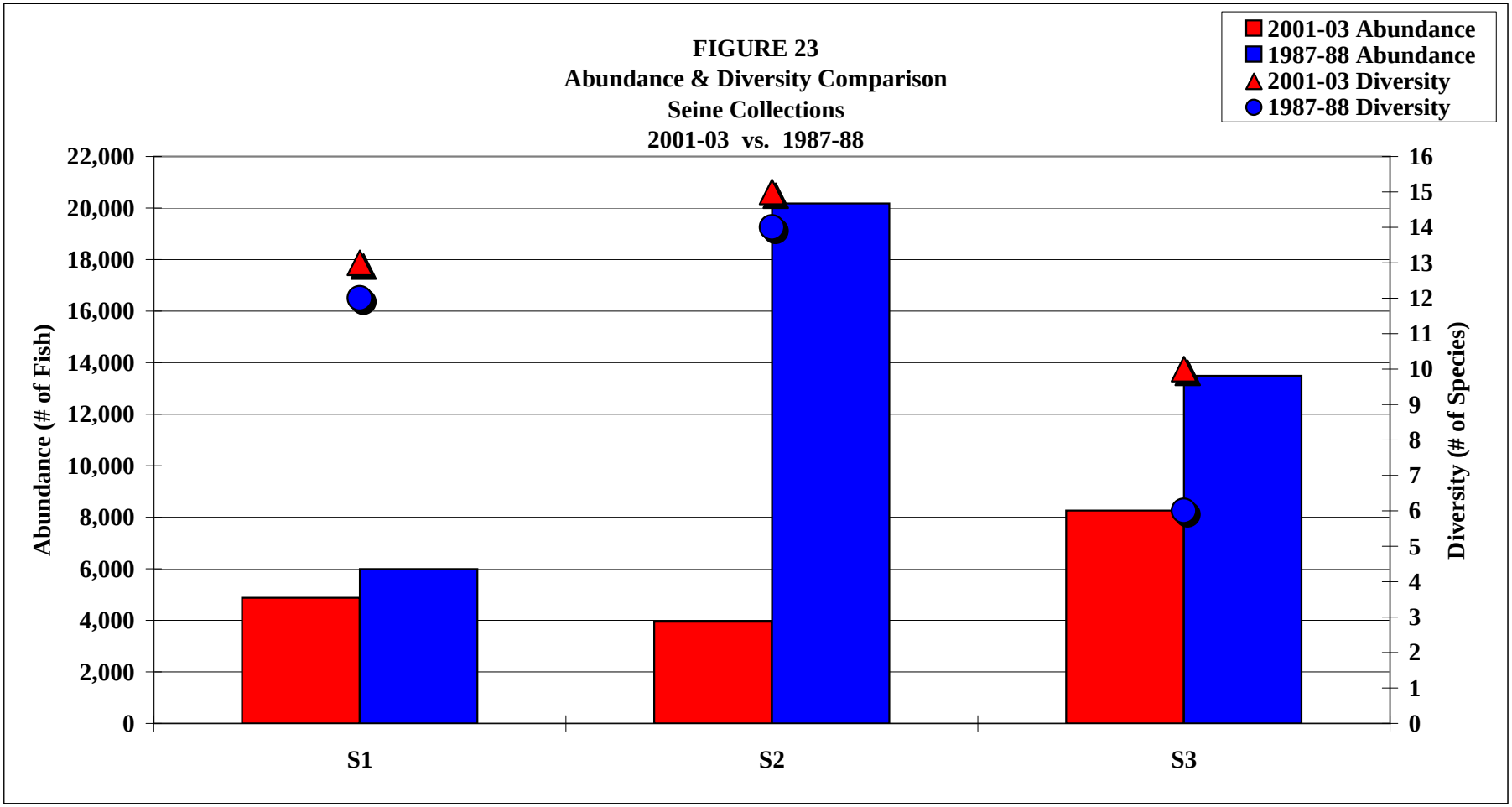
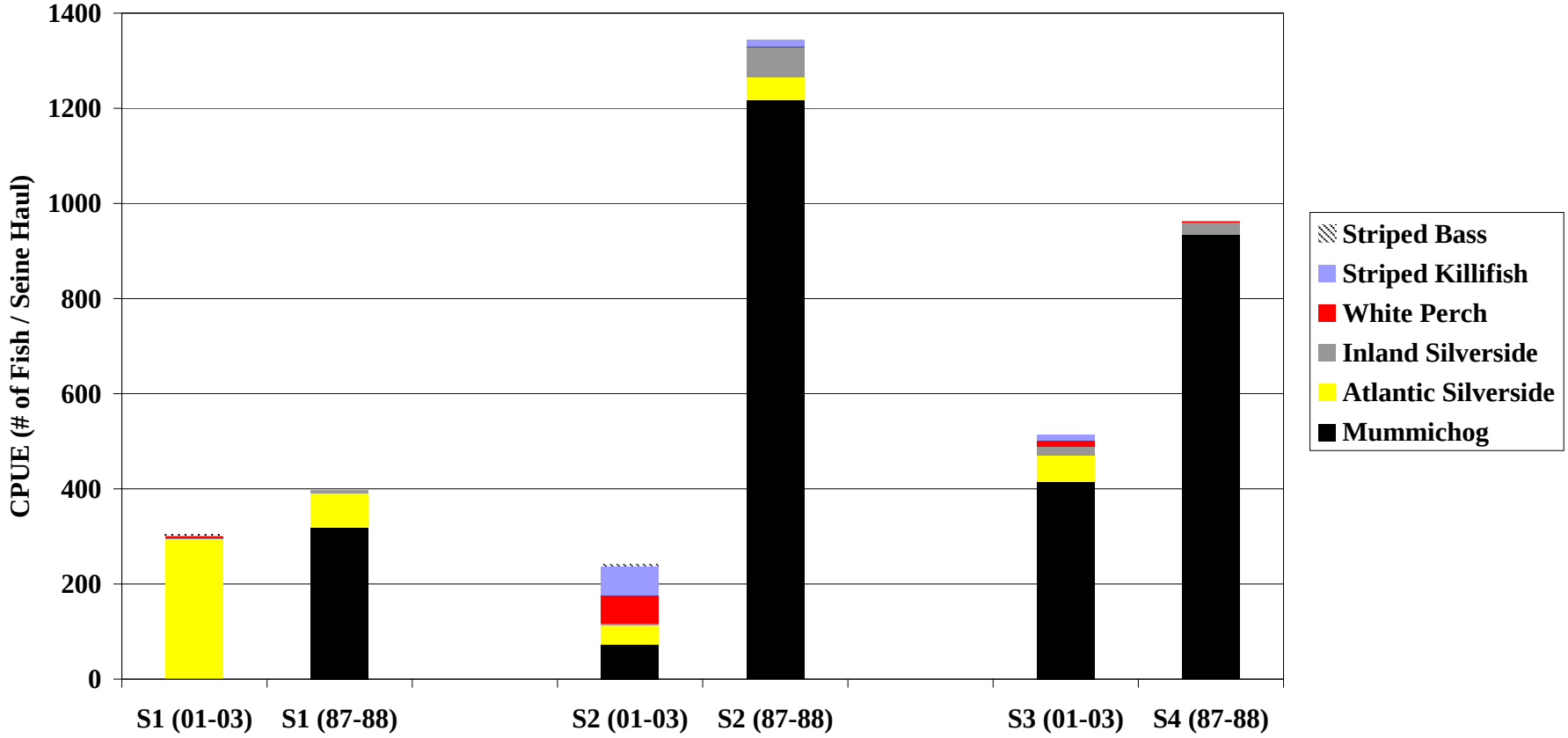


FIGURE 23
Abundance & Diversity Comparison
Seine Collections
2001-03 vs. 1987-88
2001-03 Abundance
1987-88 Abundance
2001-03 Diversity
1987-88 Diversity
Abundance (# of Fish)
Diversity (# of Species)
22,000
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
S1
S2
S3

FIGURE 24
CPUE Comparison by Seine Location
2001-03 vs. 1987-88



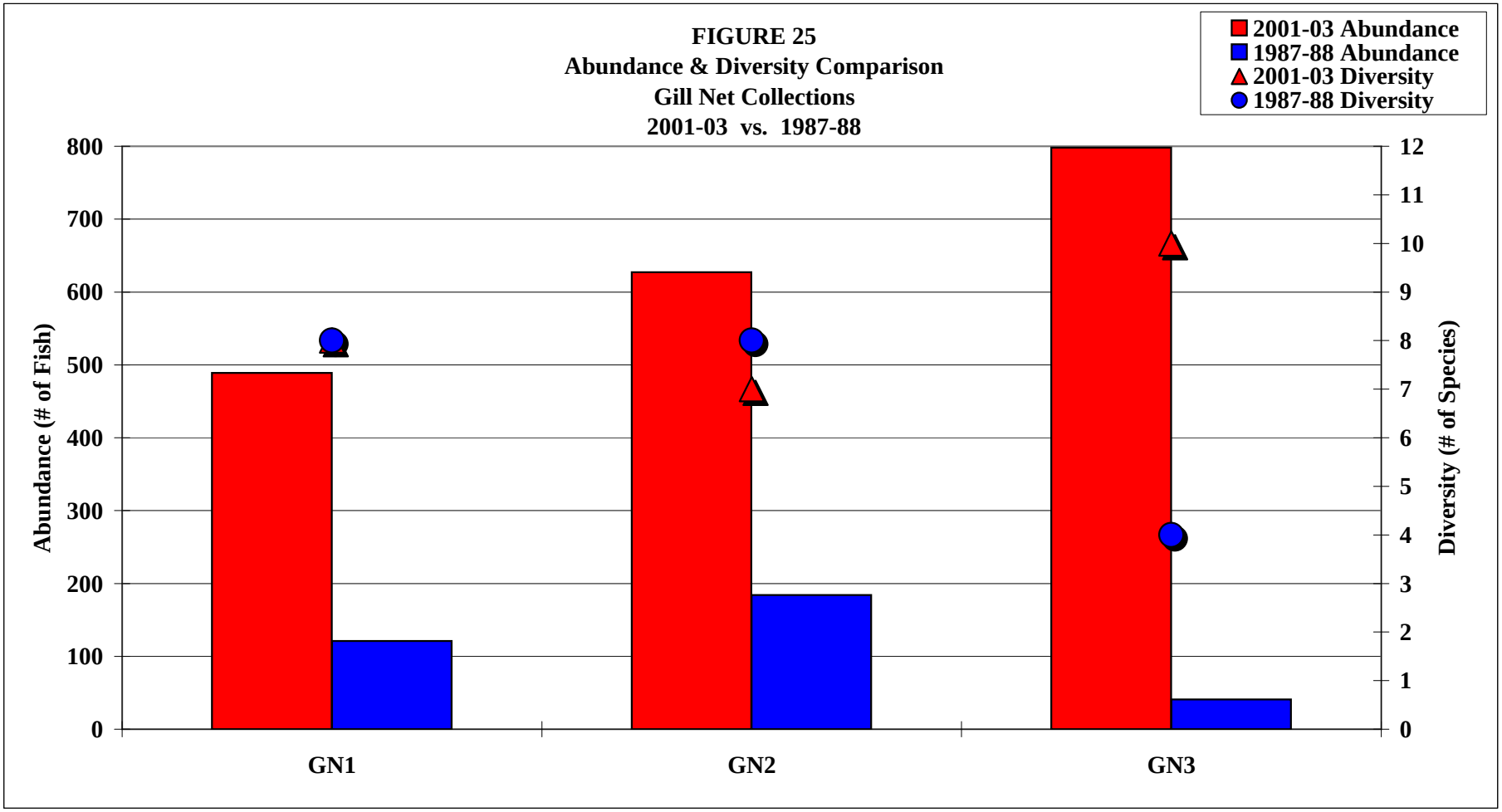


FIGURE 25
Abundance & Diversity Comparison
Gill Net Collections
2001-03 vs. 1987-88
2001-03 Abundance
1987-88 Abundance
2001-03 Diversity
1987-88 Diversity
Abundance (# of Fish)
Diversity (# of Species)
800
700
600
500
400
300
200
100
0
12
11
10
9
8
7
6
5
4
3
2
1
0
GN1
GN2
GN3

FIGURE 26
CPUE Comparison by Gill Net Location
2001-03 vs. 1987-88

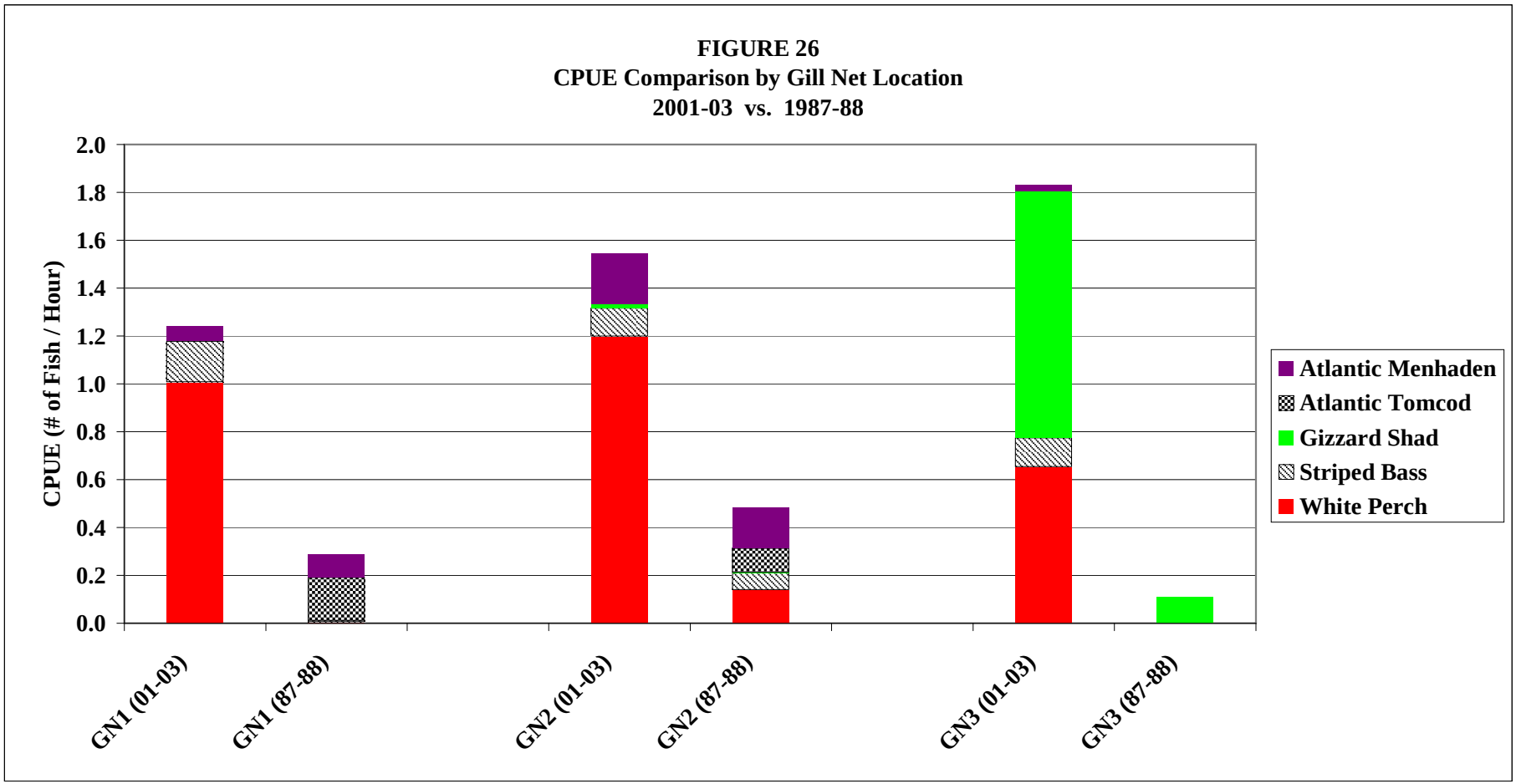


FIGURE 27
Average Surface Water Quality by Site (arranged south to north)
2001-03 vs. 1987-88

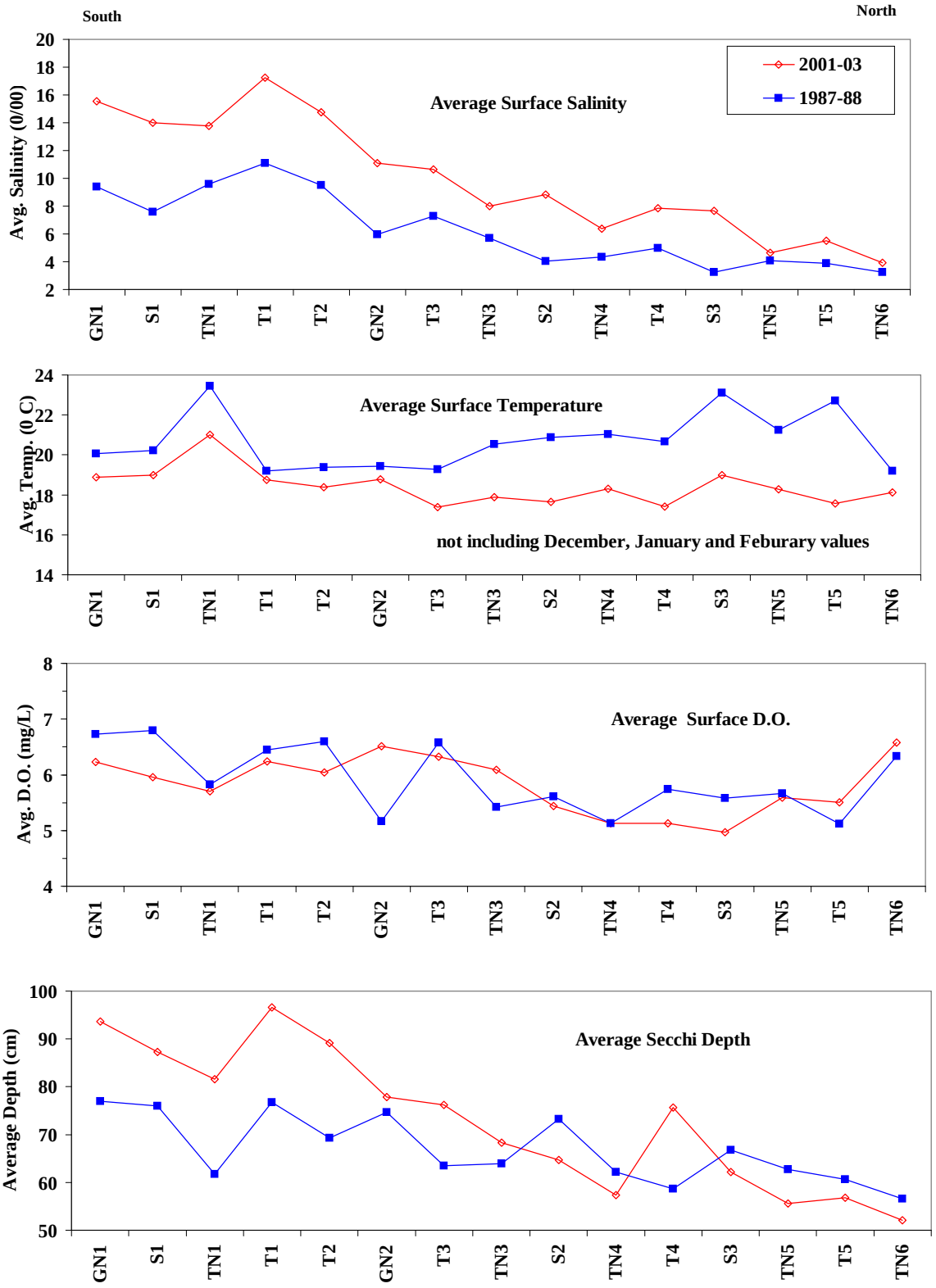
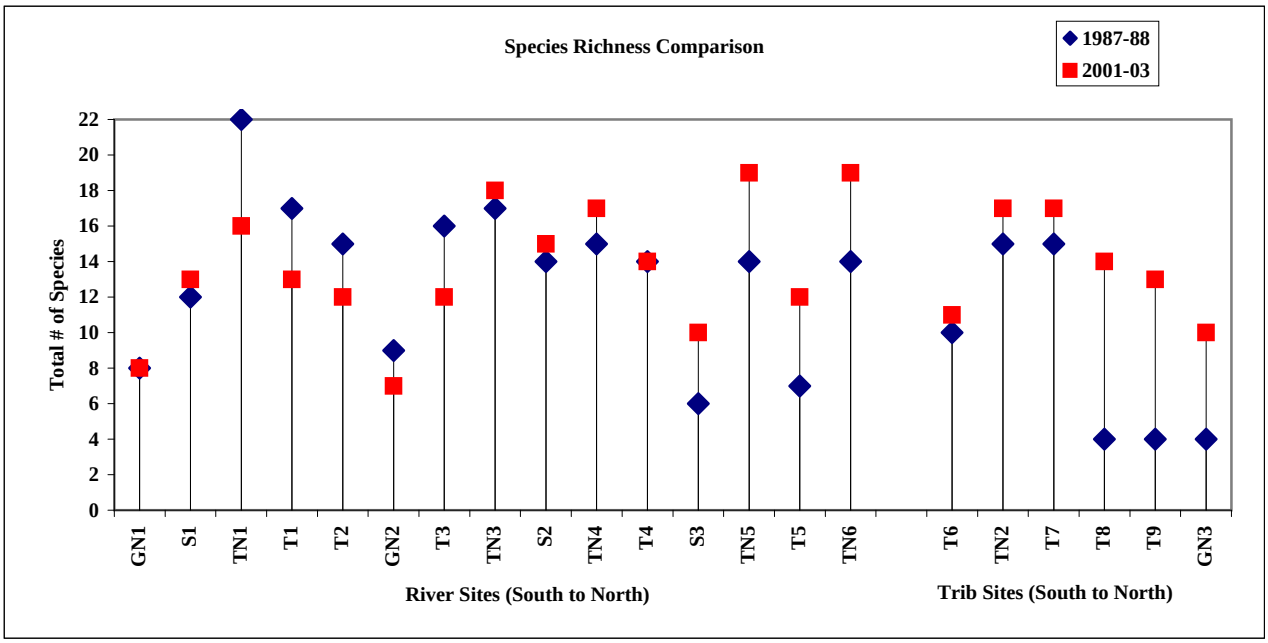
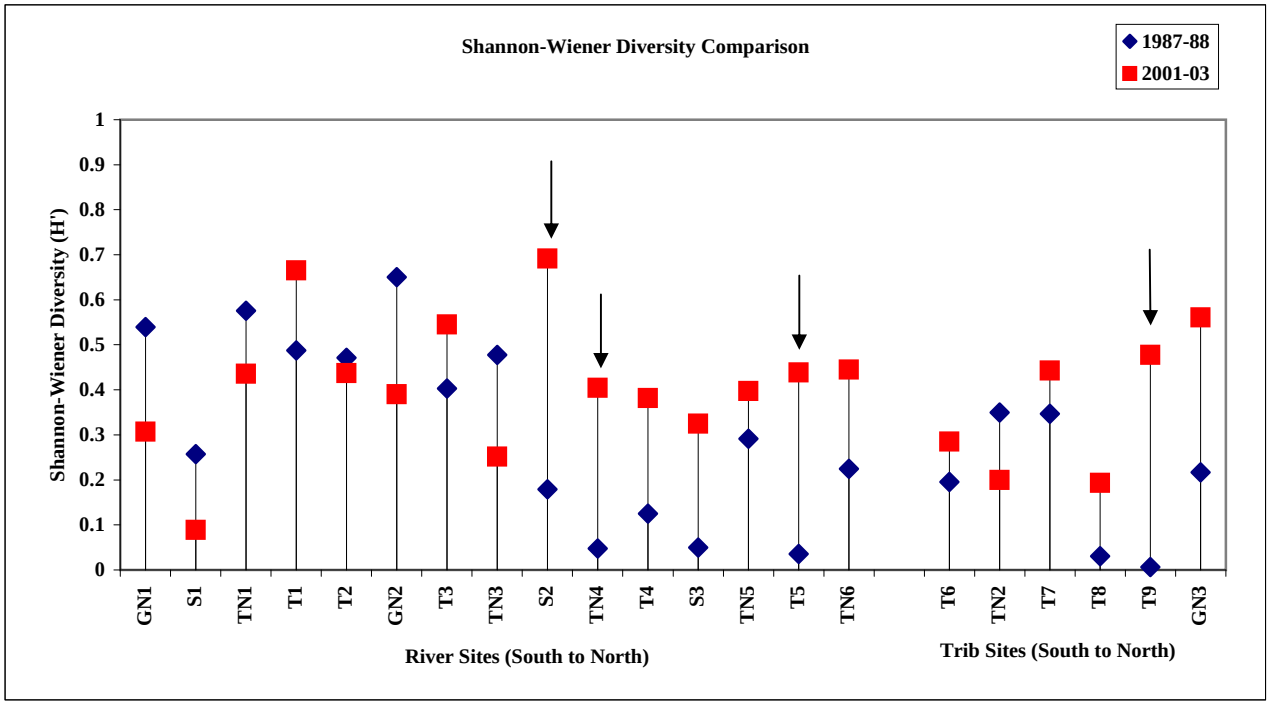


FIGURE 28
Species Richness and Shannon-Wiener Diversity Index Comparisons
NJMC/MERI Hackensack River Fishery Resource Inventory
2001-03 vs. 1987-88





→ **S2, TN4, T5 and T9 are significantly different (p=0.05)**

APPENDIX A

TABLE A-1
Catch and Water Quality at Station T1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T1	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0026-0027		0045-0046		0073-0074		0108-0109		0138-0139		0170-0171	
Date	8/22/01		9/6/01		10/3/01		11/14/01		12/6/01		1/16/02	
Time	13:53		12:02		11:29		11:27		12:39		11:19	
Tidal Stage (+hours)	High +1.5		High +0.5		High +1.5		High +4		High +0		High +1.0	
Depth (feet)	10 to 21		10 to 19		9 to 22		8.5 to 16.5		9 to 20		10 to 17	
Salinity (0/00) surface	19.35		19.55		19.52		20.05		22.46		19.94	
bottom	20.62		19.88		21.50		20.26		22.76		20.93	
Temp (oC) surface	27.45		24.40		19.56		11.55		13.15		5.09	
bottom	26.27		24.31		20.00		11.25		13.07		4.86	
air	29		24		21		13		20		4	
D.O. (mg/L) surface	3.80		5.15		7.19		5.42		5.62		7.73	
bottom	3.30		4.18		5.26		5.33		5.50		7.77	
pH surface	7.33		7.10		7.24		7.09		6.68		7.67	
bottom	7.31		7.25		7.25		7.18		6.83		7.66	
Secchi (cm)	80		85		100		100		110		120	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife											7	80-130
American Shad			3	104-110			2	99 - 109	1	95		
Bay anchovy			7	n/a								
Blueback Herring												
Bluefish	6	154-194	3	187-221	2	203-237						
Crevalle Jack	2	84-84	2	122-129								
Gizzard Shad							8	122-223				
Spotted Hake												
Striped Bass			3	232-370			1	132	6	113-445		
Summer Flounder												
Weakfish												
White Perch			2	173-193			11	120-233	1	111	1	130
Winter Flounder					1	132						
INVERTEBRATES												
Amphipoda												
Balanus improvisus					300		10				10	
Bryozoa												
Callinectes sapidus	3	34-164	6	68-171	8	36-147	10	46-126	9	31-166		
Crangon septemspinosa									1		9	
Crassostrea virginica			1								1	
Ctenophora pleurobrachia		+	1,000									
Isopoda												
Molgula sp.									5			
Mya arenaria												
Neomysis americana												
Palaeomonetes pugio											8	
Rhithropanopeus harrissi									1		1	

TABLE A-1
Catch and Water Quality at Station T1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T1	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0200-0201		0235-0236		0261-0262		0294-0295		0322 - 0323		0342 - 0343	
Date	2/15/02		3/21/02		4/12/02		5/16/02		6/12/02		7/10/02	
Time	11:48		11:40		13:10		11:15		11:59		10:44	
Tidal Stage (+hours)	High +1.0		Low +3.5		High +3.5		Low +4.5		High +1		High + 1	
Depth (feet)	7.5 to 17		10 to 17		11 to 18		17 to 11		10 to 18		10 to 20	
Salinity (0/00)surface	20.98		15.32		14.88		11.74		12.21		20.29	
bottom	21.63		15.97		15.16		11.94		13.28		21.02	
Temp (oC) surface	5.69		12.80		13.78		17.30		23.99		25.81	
bottom	5.13		10.53		13.79		15.75		22.35		24.90	
air	6		11		13		21		29		24	
D.O. (mg/L) surface	7.84		7.74		5.75		6.53		4.57		5.32	
bottom	7.74		6.84		6.03		6.34		4.88		4.39	
pH surface	7.47		6.86		7.25		8.10		8.10		6.80	
bottom	7.57		6.99		7.29		8.04		8.11		6.88	
Secchi (cm)	140		120		85		100		100		80	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Shad			6	103-165								
Bay anchovy											2	74 - 77
Blueback Herring		**NO**	5	72-84				**NO**		**NO**		
Bluefish												
Crevalle Jack		**CATCH**						**CATCH**		**CATCH**		
Gizzard Shad												
Spotted Hake					1	85						
Striped Bass			1	295	6	123-347						
Summer Flounder					2	338-342						
Weakfish												
White Perch			1	252	22	81-253						
Winter Flounder												
INVERTEBRATES												
Amphipoda									2			
Balanus improvisus			15		10		40					
Bryozoa				+								
Callinectes sapidus			2	95-121			4	31-158	1	61	5	34 - 159
Crangon septemspinosa	10						2					
Crassostrea virginica												
Ctenophora pleurobrachia												+
Isopoda											2	
Molgula sp.			10		3		3					
Mya arenaria					4							
Neomysis americana												
Palaeomonetes pugio	5		4		1							
Rhithropanopeus harrissi												

TABLE A-1
Catch and Water Quality at Station T1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T1	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0378/0379		0401/0402		0429/0430		0460/0461	
Date	10/30/02		3/10/03		5/12/03		8/4/03	
Time	11:08 & 11:29		11:18 & 11:30		11:09 & 11:24		11:16 & 11:26	
Tidal Stage (+hours)	Low +1.5		Low + 3.25		High + 5.0		Low + 3.0	
Depth (feet)	14.1 to 19.7		15 to 21		12 to 18		11 to 17	
Salinity (0/00) surface	12.07		N/A		10.77		19.50	
bottom	12.81		N/A		11.01		20.32	
Temp (oC) surface	15.60		5.00		17.18		29.23	
bottom	13.87		N/A		17.16		27.67	
air	7		-1		17		28	
D.O. (mg/L) surface	5.97		N/A		N/A		8.69	
bottom	5.30		N/A		N/A		6.13	
pH surface	7.46		N/A		N/A		7.74	
bottom	7.45		N/A		N/A		7.82	
Secchi (cm)	100		80		85		60	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Shad								
Bay anchovy				**NO**			6	73 - 86
Blueback Herring								
Bluefish				**FISH**				
Crevalle Jack								
Gizzard Shad				**CAUGHT**				
Spotted Hake					1	97		
Striped Bass	11	214 - 474			7	99 - 248	1	302
Summer Flounder					1	291		
Weakfish							6	35 - 272
White Perch	2	213 - 262			2	166 - 236	3	40 - 58
Winter Flounder								
INVERTEBRATES								
Amphipoda					17			
Balanus improvisus					15			
Bryozoa								
Callinectes sapidus	3	40 - 122			1	94	3	53 - 130
Crangon septemspinosa								
Crassostrea virginica					1			
Ctenophora pleurobrachia							100	
Isopoda								
Molgula sp.								
Mya arenaria								
Neomysis americana					20			
Palaeomonetes pugio								
Rhithropanopeus harrissi			4					

N/A = Not available, equipment malfunctioned.

TABLE A-2
Catch and Water Quality at Station T2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T2	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0024-0025		0047-0048		0077-0078		0110-0111		0134-0135		0172-0173	
Date	8/22/01		9/6/01		10/3/01		11/14/01		12/6/01		1/16/02	
Time	13:00		12:57		13:01		12:18		11:17		12:02	
Tidal Stage (+hours)	High +0		High +1.5		High +3		High +4.5		High +4.5		High +1.5	
Depth (feet)	16 to 21		16 to 23		10 to 17		9 to 15		11.5 to 20		14 to 18	
Salinity (0/00) surface	17.65		16.65		15.62		16.74		19.70		15.88	
bottom	17.92		18.15		17.44		17.15		19.76		17.58	
Temp (oC) surface	27.11		25.69		19.27		10.80		13.98		4.93	
bottom	27.42		25.13		18.75		10.72		13.69		5.07	
air	29		26		24		14		18		4	
D.O. (mg/L) surface	3.55		7.34		4.52		6.10		5.10		7.49	
bottom	2.54		4.90		4.14		6.04		4.69		7.31	
pH surface	7.20		7.26		6.68		7.14		6.56		7.74	
bottom	7.22		7.28		6.87		7.16		6.87		7.69	
Secchi (cm)	90		85		62		100		105		110	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
Atlantic croaker												
Atlantic Silverside												
Bay anchovy			12	36-49								**NO**
Bluefish	2	164-179	1	232	1	244						
Carp												
Gizzard Shad			2	142-153	20	152-187	2	166-193				**CATCH**
Naked Goby												
Spot												
Striped Bass			1	262	1	122	7	119-450				
Weakfish	1	69										
White Perch	1	237	3	100-212	17	103-265	53	107-283	4	110-305		
INVERTEBRATES												
Amphipoda											8	
Balanus improvisus							400				150	
Bryozoa												
Callinectes sapidus	2	119-155			10	32-168						
Congeria leucopheata							10					
Crangon septemspinosa							4		3		3	
Crassostrea virginica					2							
Ctenophora pleurobrachia		+	40									
Guekensia demissus												
Macoma balthica												
Molgula sp.												
Neomysis sp.												
Nudibranch												
Palaeomonetes pugio												
Rhithropanopeus harrissii									1		2	

N/A = Not available, equipment malfunctioned.

TABLE A-2
Catch and Water Quality at Station T2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T2	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0202-0203		0237-0238		0255-0256		0290-0291		0324 - 0325		0346 - 0347	
Date	2/15/02		3/21/02		4/11/02		5/15/02		6/12/02		7/10/02	
Time	12:53		12:39		13:03		12:56		12:33		12:17	
Tidal Stage (+hours)	High +2.0		Low +4.5		High +4		High +1		High + 2.0		High + 2.5	
Depth (feet)	12 to 19		11.5 to 18		11 to 17		12 to 20		12 to 20		11 to 15	
Salinity (0/00) surface	17.57		13.39		12.50		9.83		10.93		15.19	
bottom	18.55		13.97		12.60		10.42		11.23		15.44	
Temp (oC) surface	5.75		10.87		14.45		15.60		24.70		27.70	
bottom	5.63		10.15		14.26		15.60		24.12		27.76	
air	6		14		15		18		29		26	
D.O. (mg/L) surface	7.36		6.69		7.09		6.59		5.14		4.43	
bottom	7.45		6.57		7.19		6.38		5.98		4.14	
pH surface	7.66		7.19		7.29		7.95		8.11		6.87	
bottom	7.64		7.23		7.36		7.93		8.11		6.88	
Secchi (cm)	145		95		80		70		100		65	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
Atlantic croaker	1	65										
Atlantic Silverside			1	118								
Bay anchovy							1	76				
Bluefish												
Carp												
Gizzard Shad												
Naked Goby												
Spot											8	120 - 146
Striped Bass					15	195-647	3	156-259			17	143 - 279
Weakfish											4	21 - 261
White Perch	1	117			72	101-296	23	123-224	1	261		
INVERTEBRATES												
Amphipoda	10		5		10		70		20	+		
Balanus improvisus	10		26		90				150			+
Bryozoa				+								
Callinectes sapidus					7	29-122	3	40-159	2	149-149	34	24 - 159
Congeria leucopheata												
Crangon septemspinosa	30				1		1		5			
Crassostrea virginica												
Ctenophora pleurobrachia												+
Guekensia demissus							4					
Macoma balthica	1											
Molgula sp.			5		70		60					
Neomysis sp.	300											
Nudibranch							1		1			
Palaeomonetes pugio	15				3				1			
Rhithropanopeus harrissii					15		5		3			

N/A = Not available, equipmer

TABLE A-2
Catch and Water Quality at Station T2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T2	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0382/0383		0403/0404		0431/0432		0464/0465	
Date	10/30/02		3/10/03		5/12/03		8/4/03	
Time	12:36 & 13:01		11:53 & 12:14		11:49 & 12:13		12:35 & 12:45	
Tidal Stage (+hours)	Low +3.0		Low + 4.0		High + 5.5		Low + 4.25	
Depth (feet)	12 to 16		12 to 18		10 to 17.5		11 to 18	
Salinity (0/00) surface	11.59		N/A		7.80		20.49	
bottom	12.12		N/A		9.21		20.59	
Temp (oC) surface	12.47		5.00		17.19		28.02	
bottom	13.06		5.00		17.17		27.98	
air	9		-3		17		28.5	
D.O. (mg/L) surface	5.92		N/A		N/A		7.28	
bottom	5.65		N/A		N/A		6.51	
pH surface	7.51		N/A		N/A		7.85	
bottom	7.50		N/A		N/A		7.83	
Secchi (cm)	95		85		80		60	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	146		
Atlantic croaker								
Atlantic Silverside								
Bay anchovy							4	74 - 78
Bluefish								
Carp					1	694		
Gizzard Shad								
Naked Goby			2	43 - 46				
Spot								
Striped Bass	3	239 - 433			28	162 - 315	4	47 - 187
Weakfish							1	32
White Perch	52	192 - 320			24	107 - 252	1	50
INVERTEBRATES								
Amphipoda							20	
Balanus improvisus	800						300	
Bryozoa								
Callinectes sapidus	1	46	6	18 - 44	2	56 - 112	6	37 - 88
Congeria leucopheata								
Crangon septemspinosa			2					
Crassostrea virginica	2							
Ctenophora pleurobrachia								
Guekensia demissus	2						1	
Macoma balthica								
Molgula sp.								
Neomysis sp.								
Nudibranch								
Palaeomonetes pugio							1	
Rhithropanopeus harrissii			3				20	

N/A = Not available, equipmer

TABLE A-3
Catch and Water Quality at Station T3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T3	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0020-0021		0035-0036		0065-0066		0112-0113		0132-0133		0166-0167	
Date	8/21/01		9/4/01		10/1/01		11/14/01		12/05/01		1/15/02	
Time	14:19		13:27		13:50		13:26		12:12		13:09	
Tidal Stage (+hours)	High +2.5		High +3		High +5		High +5		High +0		High +3.0	
Depth (feet)	13 to 18		8 to 18		10 to 18		10 to 18		11 to 24		10 to 16	
Salinity (0/00)surface	13.15		12.36		12.02		12.99		14.72		14.22	
bottom	13.48		13.76		13.59		13.91		18.11		16.09	
Temp (oC) surface	27.91		24.29		16.60		10.00		14.17		5.17	
bottom	27.50		24.21		16.90		9.85		13.44		4.94	
air	27		24		12		14		18		8	
D.O. (mg/L) surface	2.21		7.35		5.43		6.80		4.85		7.96	
bottom	2.54		5.83		4.59		6.46		4.51		8.56	
pH surface	7.38		7.68		7.14		6.42		6.77		7.48	
bottom	7.28		7.57		7.10		6.61		6.79		7.42	
Secchi (cm)	80		60		65		90		110		85	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							9	86-173				
Atlantic Croaker							1	45				
Atlantic Menhaden			1	80								
Atlantic Tomcod												
Bay Anchovy			2	39-41								
Blueback Herring												
Bluefish			2	198-235	9	185-286						
Gizzard Shad	4	79-110	11	131-176	46	148-183	40	149-208				
Spot												
Striped Bass			36	109-335	4	184-231	12	111-455	8	136-570		
Weakfish	103	65-115	8	124-178	4	107-202	1	99				
White Perch			62	59-211	50	99-225	15	98-228	7	90-133	2	94-97
INVERTEBRATES												
Amphipoda												
Callinectes sapidus	23	67-174	14	136-169	3	54-164	1	118				
Crangon septemspinosa												
Neomysis americana												
Nudibranch												
Palaemonetes pugio												
Rhithropanopeus harrissii							1		1			

TABLE A-3
Catch and Water Quality at Station T3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T3	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0196-0197		0220-0221		0253-0254		0288-0289		0318 - 0319		0348 - 0349	
Date	2/14/02		3/12/02		4/11/02		5/15/02		6/11/02		7/11/02	
Time	13:25		11:16		12:06		11:48		12:12		10:40	
Tidal Stage (+hours)	High +3.5		High +3.25		High +3		Low +5.5		High + 2.0		High + 0	
Depth (feet)	12 to 19		12.5 to 17		10 to 22		11 to 16		10 to 16		12 to 18	
Salinity (0/00)surface	14.59		12.42		10.98		8.25		8.48		14.15	
bottom	15.65		13.08		11.90		8.33		8.94		15.75	
Temp (oC) surface	4.79		7.92		14.02		15.17		24.56		26.21	
bottom	4.53		8.28		13.76		14.98		23.65		26.54	
air	3		6		14		15		27.5		23	
D.O. (mg/L) surface	10.36		6.61		6.73		6.58		3.65		5.23	
bottom	7.71		6.41		6.29		6.35		3.19		3.62	
pH surface	7.49		6.87		7.22		7.91		8.00		6.83	
bottom	7.47		7.00		7.29		7.89		8.00		6.80	
Secchi (cm)	95		100		75		65		50		55	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			1	81			2	96-105				
Atlantic Croaker												
Atlantic Menhaden									6	120 - 144		
Atlantic Tomcod												
Bay Anchovy					1	44			3	45 - 75	7	69 - 85
Blueback Herring			34	70-97	1	111						
Bluefish												
Gizzard Shad												
Spot							1	31	11	26 - 76	7	106 - 141
Striped Bass					9	147-365	23	107-220	3	149 - 165	2	149 - 173
Weakfish											24	17 - 35
White Perch	1	128			16	108-262	14	79-188				
INVERTEBRATES												
Amphipoda	75						150		60			
Callinectes sapidus	1	96			1	22	5	62-147	10	14 - 140	16	21 - 160
Crangon septemspinosa					1		1		1			
Neomysis americana												
Nudibranch							2					
Palaemonetes pugio							1					
Rhithropanopeus harrissii									1			

TABLE A-3
Catch and Water Quality at Station T3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T3	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0374/0375		0412/0413		0437/0438		0471/0472	
Date	10/29/02		3/11/03		5/13/03		8/7/03	
Time	12:01 & 12:16		13:04 & 13:13		12:27 & 12:52		13:06 & 13:16	
Tidal Stage (+hours)	Low +3.5		Low + 3.75		High + 5.5		Low + 1.5	
Depth (feet)	11.5 to18		12 to 16		8 to 12		7 to 15.5	
Salinity (0/00)surface	9.42		4.45		5.50		2.70	
bottom	9.83		6.10		6.12		4.64	
Temp (oC) surface	12.53		5.16		15.55		26.03	
bottom	12.74		4.81		15.85		26.27	
air	8		4		15		26	
D.O. (mg/L) surface	6.43		9.39		7.30		4.39	
bottom	5.91		8.26		6.38		4.10	
pH surface	7.52		7.92		N/A		N/A	
bottom	7.52		7.92		N/A		N/A	
Secchi (cm)	80		80		70		60	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife	2	122 - 147			7	136 - 207		
Atlantic Croaker								
Atlantic Menhaden	1	155		**NO**				
Atlantic Tomcod					3	39 - 50		
Bay Anchovy				**FISH**				
Blueback Herring								
Bluefish				**CAUGHT**				
Gizzard Shad	9	118 - 165						
Spot								
Striped Bass	9	203 - 362			36	106 - 266		
Weakfish								
White Perch	11	114 - 227			44	82 - 260	2	60 - 61
INVERTEBRATES								
Amphipoda							60	
Callinectes sapidus	1	150	1	25	3	31 - 129	1	85
Crangon septemspinosa								
Neomysis americana					30			
Nudibranch								
Palaemonetes pugio								
Rhithropanopeus harrissii					1			

N/A = Not available, equipment malfunctioned.

TABLE A-4
Catch and Water Quality at Station T4 (Hackensack River)
NJMC/MMERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T4	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0016-0017		0033-0034		0063-0064		0093-0094		0130-0131		0158-0159	
Date	8/21/01		9/4/01		10/1/01		11/05/01		12/05/01		01/14/02	
Time	12:15		12:11		12:47		12:15		11:17		11:41	
Tidal Stage (+hours)	High +0.75		High +1.5		High +3.75		High +1		Low +5.25		High +2.0	
Depth (feet)	12 to 17		9 to 20		9 to 14.5		9 to 15		9 to 17		12 to 17	
Salinity (0/00) surface	10.83		10.06		9.46		12.59		12.81		9.47	
bottom	11.63		11.57		10.45		13.56		14.33		11.65	
Temp (oC) surface	27.37		24.33		16.34		13.13		13.20		3.85	
bottom	26.84		24.10		16.16		13.10		12.62		3.35	
air	28		25		12		11		15		5	
D.O. (mg/L) surface	2.89		2.64		4.01		2.06		4.56		8.46	
bottom	2.05		3.47		4.71		4.36		4.35		7.41	
pH surface	7.13		7.49		7.09		7.35		6.84		6.84	
bottom	7.14		7.40		7.07		7.32		6.84		6.87	
Secchi (cm)	70		n/a		100		120		120		85	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					2	137-167			3	151-162		
American Eel		**NO**			1	453						
American Shad									3	101-142		
Atlantic Menhaden		**CATCH**	1	68								
Bay anchovy			9	31-46								
Blueback Herring												
Bluefish			5	182-235	1	220						
Brown Bullhead												
Gizzard Shad			7	125 - 156	2	179-184			5	102-188		
Mummichog												
Spot												
Striped Bass			11	155-325	8	183-375	3	211-482	6	139-311		
Weakfish			3	99-137								
White Perch			3	187-216	13	146-249	1	206	57	81-249	5	84-111
INVERTEBRATES												
Amphipoda												
Balanus improvisus	50		50				100		50		50	
Callinectes sapidus	10	70-142	24	76-160	9	103-160	1	51				
Chironomidae larvae												
Congeria leucopheata							3,200		180		150	
Crangon septemspinosa									1			
Ctenophora pleurobrachia			1,000		1,000							
Cyathura polita												
Palaeomonetes pugio	1										10	
Rhithropanopeus harrissi	1		1				5		2		11	

TABLE A-4
Catch and Water Quality at Station T4 (Hackensack River)
NJMC/MMERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T4	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0188-0189		0222-0223		0247-0248		0280-0281		0312 - 0313		0340 - 0341	
Date	2/13/02		3/12/02		4/10/02		5/14/02		6/10/02		7/9/02	
Time	11:41		12:05		12:34		11:15		11:52		12:26	
Tidal Stage (+hours)	High +1.5		High +4		High +3.5		Low +5.5		High +2.0		High + 3.0	
Depth (feet)	10 to 16		10 to 17.5		7 to 16		8 to 17		10 to 16		10.5 to 16	
Salinity (0/00) surface	11.30		7.52		6.48		7.11		4.73		7.64	
bottom	12.01		9.78		7.35		7.20		5.56		7.64	
Temp (oC) surface	4.72		7.89		14.10		15.47		23.16		27.11	
bottom	4.68		7.67		13.20		15.55		22.59		27.17	
air	3		7		13		13		25		31	
D.O. (mg/L) surface	6.74		6.55		7.44		5.21		2.60		4.52	
bottom	7.23		5.69		7.63		4.52		2.05		3.36	
pH surface	7.39		7.50		7.67		7.57		7.74		7.09	
bottom	7.38		7.39		7.59		7.60		7.73		6.98	
Secchi (cm)	85		85		60		75		45		40	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							12	100-131				
American Eel					1	325					19	149 - 603
American Shad												
Atlantic Menhaden							1	99			2	129 - 137
Bay anchovy												
Blueback Herring							2	92 - 102				
Bluefish												
Brown Bullhead											1	305
Gizzard Shad												
Mummichog												
Spot									1	46		
Striped Bass			4	251-540	71	127-340	4	124-203	6	138 - 224	8	166 - 249
Weakfish												
White Perch	2	92-97	2	215-224	394	74-286	22	86-262	3	148 - 202	4	139 - 192
INVERTEBRATES												
Amphipoda			180				1,150		150		1,000	
Balanus improvisus										+	20	
Callinectes sapidus					3	28-38	10	35-123	14	69 - 154	16	53 - 156
Chironomidae larvae												
Congeria leucopheata	150		150				20			+		
Crangon septemspinosa											5	
Ctenophora pleurobrachia												
Cyathura polita												
Palaeomonetes pugio			5									
Rhithropanopeus harrissi			15				1				5	

TABLE A-4
Catch and Water Quality at Station T4 (Hackensack River)
NJMC/MMERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T4	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0368/0369		0395/0396		0445/0446		0469/0470	
Date	10/25/02		3/4/03		5/14/03		8/7/03	
Time	12:37 & 13:03		11:52 & 12:12		12:13 & 12:27		12:18 & 12:25	
Tidal Stage (+hours)	High +1.0		High + 2.0		High + 4.0		Low + 0.75	
Depth (feet)	11 to 19		12 to 21		9 to 15		10.5 to 19	
Salinity (0/00) surface	7.02		3.73		4.11		0.68	
bottom	8.37		5.89		4.83		2.21	
Temp (oC) surface	12.85		2.24		16.26		25.97	
bottom	13.19		1.82		15.79		25.89	
air	9		0.5		18.5		25	
D.O. (mg/L) surface	5.91		8.69		4.99		4.83	
bottom	4.70		7.28		5.84		4.14	
pH surface	7.34		7.40		N/A		N/A	
bottom	7.36		7.41		N/A		N/A	
Secchi (cm)	70		60		60		60	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	169		
American Eel			2	65				
American Shad								
Atlantic Menhaden								
Bay anchovy	2	66 - 87						
Blueback Herring								
Bluefish								
Brown Bullhead								
Gizzard Shad								
Mummichog							8	42 - 57
Spot								
Striped Bass	19	163 - 399			8	207 - 358		
Weakfish								
White Perch	39	138 - 272	1	280	22	136 - 265	3	40 - 55
INVERTEBRATES								
Amphipoda								
Balanus improvisus								
Callinectes sapidus	1	68	2	19 - 23			2	92 - 128
Chironomidae larvae			1					
Congeria leucopheata							20	
Crangon septemspinosa								
Ctenophora pleurobrachia								
Cyathura polita			1					
Palaeomonetes pugio			3					
Rhithropanopeus harrissi			5		500		45	

N/A = Not available, equipment malfunctioned.

TABLE A-5
Catch and Water Quality at Station T5 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T5	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0014-0015		0031-0032		0061-0062		0091-0092		0128-0129		0156-0157	
Date	8/21/02		9/4/01		10/1/01		11/05/01		12/5/01		1/14/02	
Time	11:18		11:20		12:05		11:29		10:39		10:46	
Tidal Stage (+hours)	Low +4.5		High +1.0		High +3		High +0		High +4.5		High +1.0	
Depth (feet)	16 to 20		8 to 19		9 to 17		7.5 to 17		7.5 to 16		12 to 19	
Salinity (0/00) surface	6.49		7.04		7.93		10.26		8.65		7.14	
bottom	7.12		7.78		8.58		9.64		10.62		8.40	
Temp (oC) surface	26.44		24.50		16.43		13.59		13.13		4.88	
bottom	26.39		24.09		16.59		13.58		12.32		3.79	
air	26		28		13		11		15		8	
D.O. (mg/L) surface	3.94		6.57		3.57		3.40		3.68		5.84	
bottom	2.53		3.90		3.39		3.58		3.73		6.30	
pH surface	7.15		7.34		7.02		7.18		6.87		6.78	
bottom	7.15		7.25		7.01		7.22		6.87		6.93	
Secchi (cm)	65		30		82		90		85		80	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel	2	164-503										
Atlantic Menhaden									1	384		
Atlantic Silverside												
Black Crappie												
Bluefish			3	189-225	1	217						
Brown Bullhead	1	362										
Gizzard Shad			3	150-163	1	160					1	105
Mummichog											1	48
Striped Bass					3	280-368					1	515
Weakfish					1	109						
White Perch			6	137 - 171	5	147-222	2	75-81	1	75	12	64-127
INVERTEBRATES												
Amphipoda									140		200	
Balanus improvisus							1,435					
Callinectes sapidus			5	86-160								
Congeria leucopheata							130		120		1,000	
Palaeomonetes pugio									25			
Rhithropanopeus harrissi									10		15	

TABLE A-5
Catch and Water Quality at Station T5 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T5	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0192-0193		0224-0225		0245-0246		0278-0279		0310 -0311		0352 - 0353	
Date	2/14/02		3/12/02		4/10/02		5/14/02		6/10/02		7/11/02	
Time	11:18		13:04		11:22		10:31		11:13		12:56	
Tidal Stage (+hours)	High +0.75		High +4.5		High +2.5		Low +5		High +1.25		High +2.0	
Depth (feet)	11 to 19.5		10 to 15		12 to 16.5		12 to 19		10 to 18		8 to 17	
Salinity (0/00) surface	8.61		5.91		5.58		3.39		2.96		6.27	
bottom	10.98		5.97		6.32		3.87		4.08		7.97	
Temp (oC) surface	4.79		8.30		14.30		16.15		23.74		25.98	
bottom	4.47		8.33		13.23		15.70		22.85		25.81	
air	3.50		8		13		13		26		23	
D.O. (mg/L) surface	7.76		5.93		7.81		4.35		5.06		4.95	
bottom	6.91		4.70		6.28		3.55		2.68		2.56	
pH surface	6.93		7.74		6.91		7.67		8.06		6.99	
bottom	7.01		7.54		7.13		7.65		7.86		6.88	
Secchi (cm)	n/a		50		55		30		45		40	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	181						
American Eel									2	153 - 273	1	214
Atlantic Menhaden											3	55 - 124
Atlantic Silverside												
Black Crappie												
Bluefish												
Brown Bullhead					10	233-302	11	215-275	1	282		
Gizzard Shad												
Mummichog			1	46			1	58			4	66 - 78
Striped Bass					27	139 - 324					1	224
Weakfish												
White Perch	2	130-165	79	67-152	108	90-256	2	155-202			4	129 - 184
INVERTEBRATES												
Amphipoda			75		150		10		120			
Balanus improvisus	15											
Callinectes sapidus							16	11 - 69	2	61 - 80	2	38 - 66
Congeria leucopheata	120		300		100		13		5			
Palaeomonetes pugio			22				8		1			
Rhithropanopeus harrissi			23									

TABLE A-5
Catch and Water Quality at Station T5 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T5	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0366/0367		0399/0400		0435/0436		0467/0468	
Date	10/25/02		3/4/03		5/13/03		8/7/03	
Time	11:34 & 12:01		13:26 & 13:39		11:29 & 11:46		11:18 & 11:45	
Tidal Stage (+hours)	High +0		High + 3.5		High + 4.0		High + 6.0	
Depth (feet)	12 to 18		9 to 17		10.5 to 15.5		8 to 14	
Salinity (0/00) surface	3.98		1.14		2.56		0.23	
bottom	5.32		1.22		2.58		0.24	
Temp (oC) surface	13.49		3.16		16.34		25.88	
bottom	13.24		2.92		16.39		25.70	
air	10		2		15		26	
D.O. (mg/L) surface	4.48		8.95		6.95		4.81	
bottom	3.86		8.16		5.02		4.13	
pH surface	7.36		7.54		N/A		N/A	
bottom	7.36		7.53		N/A		N/A	
Secchi (cm)	65		40		45		50	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	211		
American Eel					2	142 - 295	2	255 - 380
Atlantic Menhaden								
Atlantic Silverside	2	95 - 104						
Black Crappie	1	141						
Bluefish								
Brown Bullhead	1	345	1	303	4	309 - 365	19	56 - 356
Gizzard Shad	8	90 - 149						
Mummichog							191	47 - 112
Striped Bass	3	180 - 219			5	140 - 407	1	149
Weakfish	1	122						
White Perch	7	145 - 246	8	85 - 314	22	162 - 275	96	47 - 195
INVERTEBRATES								
Amphipoda								
Balanus improvisus								
Callinectes sapidus	9	45 - 109			3	57 - 104	3	61 - 101
Congeria leucopheata								
Palaeomonetes pugio			1					
Rhithropanopeus harrissi			5				1	

N/A = Not available, equipment malfunctioned.

TABLE A-6
Catch and Water Quality at Station T6 (Sawmill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T6	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0022-0023		0049-0050		0075-0076		0099-0100		0136-0137		0168-0169	
Date	8/22/01		9/6/01		10/3/01		11/7/01		12/6/01		1/16/02	
Time	11:29		14:01		12:13		12:36		11:53		10:38	
Tidal Stage (+hours)	Low +5		High +2.5		High +2.25		Low +5.5		Low +5		High+0	
Depth (feet)	15 to 21		13 to 19		16.5 to 20		14 to 21		16 to 22		15 to 21	
Salinity (0/00)surface	15.26		14.92		15.50		19.15		20.10		17.11	
bottom	15.56		17.55		18.08		19.29		20.16		18.07	
Temp (oC) surface	27.81		26.20		20.38		13.19		13.89		5.73	
bottom	27.55		25.37		19.03		12.89		13.79		5.33	
air	29		27		--		16		18		4	
D.O. (mg/L) surface	2.24		9.85		4.37		5.53		4.84		7.70	
bottom	2.48		4.85		4.04		5.50		4.74		7.44	
pH surface	7.18		7.67		7.41		6.80		6.69		7.73	
bottom	7.2		7.41		7.27		7.01		6.79		7.66	
Secchi (cm)	65		75		85		100		110		110	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel	1	638										
Bay anchovy					1	27					1	47
Black Crappie												
Blueback Herring												
Bluefish			2	217 - 253								
Gizzard Shad	2	125-152	3	141 - 169	1	176						
Northern Pipefish												
Spot												
Striped Bass	3	141-222	1	364								
Weakfish	3	78-110										
White Perch	29	136-249	65	99-277			8	222-260	33	99-254		
INVERTEBRATES												
Amphipoda												
Balanus improvisus	70						1,200				20	n/a
Callinectes sapidus	15	48-154	10	39-152	3	25-106	1	73				
Congeria leucopheata							10					
Crangon septemspinosa												
Ctenophora pleurobrachia						+						
Crassostrea virginica					2		6					
Guekensia demissus							1					
Mya arenaria											1	
Nudibranches												
Palaemonetes pugio											1	
Rhithropanopeus harrissi	1						5		5			

TABLE A-6
Catch and Water Quality at Station T6 (Sawmill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T6	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0198-0199		0230-0231		0259-0260		0297-0298		0326 - 0327		0344 - 0345	
Date	2/15/02		3/13/02		4/12/02		5/20/02		6/12/02		7/10/02	
Time	10:58		13:01		12:26		11:55		13:08		11:26	
Tidal Stage (+hours)	High +0.0		High +4.5		High +3		Low +1.5		High +2.25		High +2.0	
Depth (feet)	15 to 21		14 to 20		15 to 20		15 to 20		12 to 22		13 to 19	
Salinity (0/00) surface	18.64		14.44		14.76		6.84		10.44		16.50	
bottom	19.34		14.56		15.31		7.98		10.68		17.40	
Temp (oC) surface	5.72		8.43		13.95		15.46		25.72		27.33	
bottom	5.56		8.64		13.85		14.43		24.86		27.30	
air	5		4		14		14		29		25	
D.O. (mg/L) surface	7.60		7.57		5.94		7.15		4.83		5.04	
bottom	7.68		7.46		6.20		7.84		4.33		3.90	
pH surface	7.06		7.70		7.20		7.70		8.13		6.77	
bottom	7.29		7.55		7.29		7.90		8.13		6.80	
Secchi (cm)	120		100		80		80		85		80	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		1/2:45 & 1/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			1	79								
American Eel			1	265								
Bay anchovy												
Black Crappie												
Blueback Herring	60	71-184	2	70-172								
Bluefish												
Gizzard Shad			1	458								
Northern Pipefish									1	168		
Spot											3	108 - 133
Striped Bass							6	116-201				
Weakfish												
White Perch					7	121-230	41	100-282	1	141	62	114 - 256
INVERTEBRATES												
Amphipoda			5						1			
Balanus improvisus												
Callinectes sapidus					4	50-95	1	141	1	58	3	52 - 121
Congeria leucopheata												
Crangon septemspinosa	1		26									
Ctenophora pleurobrachia											5	
Crassostrea virginica												
Guekensia demissus												
Mya arenaria												
Nudibranches							4					
Palaemonetes pugio			1									
Rhithropanopeus harrissi			7									

TABLE A-6
Catch and Water Quality at Station T6 (Sawmill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

T6	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0380/0381		0405/0406		0434/0435		0462/0463	
Date	10/30/02		3/10/03		5/12/03		8/4/03	
Time	11:56 & 12:08		12:39 & 12:50		12:48 & 13:10		12:01 & 12:13	
Tidal Stage (+hours)	Low +2.0		Low + 4.5		Low + 0		Low + 3.5	
Depth (feet)	9 to 19.5		16 to 20		10 to 17		14.5 to 23	
Salinity (0/00) surface	11.21		N/A		9.30		18.50	
bottom	11.32		N/A		9.20		18.45	
Temp (oC) surface	12.30		5.50		17.22		28.19	
bottom	12.35		5.00		17.30		28.32	
air	7		-3		17		28	
D.O. (mg/L) surface	6.24		N/A		N/A		8.01	
bottom	5.94		N/A		N/A		7.05	
pH surface	7.49		N/A		N/A		7.87	
bottom	7.49		N/A		N/A		7.86	
Secchi (cm)	80		85		45		65	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel								
Bay anchovy		**NO**		**NO**				**NO**
Black Crappie								
Blueback Herring								
Bluefish		**FISH**		**FISH**				**FISH**
Gizzard Shad								
Northern Pipefish		**CAUGHT**		**CAUGHT**				**CAUGHT**
Spot								
Striped Bass					36	202 - 302		
Weakfish								
White Perch					21	143 - 249		
INVERTEBRATES								
Amphipoda					4			
Balanus improvisus	20							
Callinectes sapidus			2	46 - 101	1	97		
Congeria leucopheata								
Crangon septemspinosa								
Ctenophora pleurobrachia							210	
Crassostrea virginica								
Guekensia demissus								
Mya arenaria								
Nudibranches								
Palaemonetes pugio			2					
Rhithropanopeus harrissi					1			

N/A = Not available, equipment malfunctioned.

TABLE A-7
Catch and Water Quality at Station T7 (Berry's Creek Canal)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T7	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0018-0019		0037-0038		0071-0072		0095-0096		0122-0123		0164-0165	
Date	8/21/01		9/5/01		10/2/01		11/5/01		12/4/01		1/15/02	
Time	13:29		11:09		13:03		13:08		11:31		12:16	
Tidal Stage (+hours)	High +2		High +0		High +3.5		High +2		High +0.5		High +2	
Depth (feet)	13 to 16		14 to 16		13 to 16		13.5 to 15.5		15 to 17		15 to 17	
Salinity (0/00) surface	13.02		12.22		11.31		15.18		15.86		12.67	
bottom	12.94		12.71		12.83		16.03		16.73		14.70	
Temp (oC) surface	28.04		23.79		18.02		13.02		13.36		5.12	
bottom	27.44		23.95		17.11		13.35		12.93		4.37	
air	28		25		24		10		15.5		8	
D.O. (mg/L) surface	2.19		6.00		3.33		5.56		5.41		7.68	
bottom	1.78		4.90		3.49		4.65		4.65		7.75	
pH surface	7.44		7.77		7.26		7.47		6.48		7.48	
bottom	7.31		7.62		7.15		7.41		6.77		7.42	
Secchi (cm)	80		70		95		70		90		90	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			1	124	5	106-162						
American Eel	2	404-518	1	456								
Atlantic Menhaden												
Atlantic Silverside												
Bay Anchovy												
Blueback Herring												
Bluefish			1	207	4	188-210						
Brown Bullhead												
Gizzard Shad			2	149-157	4	120-175			4	135-172		
Mummichog											1	87
Northern Pipefish												
Pumpkinseed												
Spot												
Striped Bass			5	138-237	1	126					2	678-699
Striped Killifish												
Weakfish	4	74-79	5	105-133								
White Perch			27	104-252	17	119-212	7	83-237	9	106-239	4	83-264
INVERTEBRATES												
Amphipoda									1		1,100	
Balanus improvisus							15				50	
Callinectes sapidus	10	77-168	8	107-156	2	53-116						
Congeria leucopheata							25					
Crangon septemspinosa									1		5	
Ctenophora pleurobrachia												
Palaetomonetes pugio											25	
Rhithropanopeus harrissii	2						3				50	

TABLE A-7
Catch and Water Quality at Station T7 (Berry's Creek Canal)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T7	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0194-0195		0218-0219		0249-0250		0286-0287		0320 - 0321		0350 - 0351	
Date	2/14/02		3/12/02		4/10/02		5/15/02		6/11/02		7/11/02	
Time	12:25		10:23		13:59		10:47		13:06		11:47	
Tidal Stage (+hours)	High +2.5		High +2.5		High +4		Low +4.5		High +3.0		High +1.0	
Depth (feet)	14 to 16.2		13 to 15.5		10.0		14 to 16		11 to 14		14.5 to 16	
Salinity (0/00) surface	13.32		11.01		8.02		6.51		6.24		12.87	
bottom	15.04		12.43		8.44		6.89		7.32		14.27	
Temp (oC) surface	4.61		7.85		14.63		15.81		24.79		26.22	
bottom	4.02		8.00		13.40		15.18		23.55		26.33	
air	3		6		16		15		29		23	
D.O. (mg/L) surface	8.07		6.49		11.25		5.87		4.72		5.42	
bottom	7.93		6.65		10.53		5.42		3.00		4.03	
pH surface	6.96		6.78		7.97		7.85		8.06		6.93	
bottom	7.16		6.95		8.01		7.83		8.05		6.87	
Secchi (cm)	60		110		45		70		45		70	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			4	73-106	10	88-103	2	104-111	1	104		
American Eel									2	274 - 524	1	199
Atlantic Menhaden			1	98					1	119	8	132 - 159
Atlantic Silverside												
Bay Anchovy											14	64 - 92
Blueback Herring			21	70-99	1	174						
Bluefish												
Brown Bullhead							2	245-299				
Gizzard Shad												
Mummichog			1	95					1	109		
Northern Pipefish												
Pumpkinseed			1	139								
Spot											1	122
Striped Bass					2	125-146			1	191	1	142
Striped Killifish												
Weakfish											2	16 - 29
White Perch	6	82-155	1	70	19	96-267	46	90-257				
INVERTEBRATES												
Amphipoda	530		255		20		700		70			+
Balanus improvisus	75								30			
Callinectes sapidus					4	40-115	5	45-156	14	53 - 169	14	27 - 157
Congeria leucopheata	100											
Crangon septemspinosa	3		20									
Ctenophora pleurobrachia												+
Palaetomonetes pugio	45		11									
Rhithropanopeus harrissii	40		35		10				40			

TABLE A-7
Catch and Water Quality at Station T7 (Berry's Creek Canal)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T7	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0376/0377		0410/0411		0439/0440		0481/0482	
Date	10/29/02		3/11/03		5/13/03		9/11/03	
Time	12:52 & 13:13		12:20 & 12:38		13:28 & 13:59		13:41 & 13:56	
Tidal Stage (+hours)	Low +4.5		Low + 3.0		Low + 0		High + 3.5	
Depth (feet)	14.5 to 17		12 to 16		10 to 11.5		12.8 to 13.8	
Salinity (0/00) surface	8.19		3.94		4.54		8.46	
bottom	8.93		5.05		4.57		9.95	
Temp (oC) surface	12.25		5.09		16.07		23.38	
bottom	12.45		4.52		15.71		22.98	
air	8		4		15		25	
D.O. (mg/L) surface	6.23		9.41		5.64		7.73	
bottom	5.54		9.77		5.30		5.00	
pH surface	7.52		7.95		N/A		7.93	
bottom	7.52		7.92		N/A		7.54	
Secchi (cm)	80		50		50		50	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife	3	126 - 131			1	220		
American Eel			1	104	1	170	1	553
Atlantic Menhaden								
Atlantic Silverside	1	94						
Bay Anchovy								
Blueback Herring								
Bluefish								
Brown Bullhead								
Gizzard Shad	5	118 - 158						
Mummichog					5	63 - 110		
Northern Pipefish	1	160						
Pumpkinseed								
Spot								
Striped Bass	4	184 - 309			3	140 - 250		
Striped Killifish			1	85				
Weakfish							11	84 - 174
White Perch	30	103 - 252	1	69	105	90 - 235	31	63 - 211
INVERTEBRATES								
Amphipoda			35					
Balanus improvisus			50					
Callinectes sapidus	3	87 - 110	8	35 - 86	2	76 - 85	5	88 - 114
Congeria leucopheata								
Crangon septemspinosa								
Ctenophora pleurobrachia								
Palaetomonetes pugio			15					
Rhithropanopeus harrissii	30		30		400			

N/A = Not available, equipment malfunctioned.

TABLE A-8
Catch and Water Quality at Station T8 (Mill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T8	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0028-0029		0039-0040		0067-0068		0101-0102		0124-0125		0162-0163	
Date	8/22/01		9/5/01		10/2/01		11/7/01		12/4/01		1/15/02	
Time	15:00		12:39		11:06		14:13		12:36		10:59	
Tidal Stage (+hours)	High +2		High +1		High +1.0		High +1.0		High +1.5		High +0	
Depth (feet)	7 to 11		6 to 10		7.5 to 13		5 to 11		6 to 11		6 to 12	
Salinity (0/00) surface	7.88		9.07		9.46		12.19		12.91		10.60	
bottom	8.48		9.47		10.21		12.26		13.21		10.82	
Temp (oC) surface	28.80		24.49		17.70		12.99		12.99		4.17	
bottom	27.81		23.83		16.70		12.65		12.66		3.90	
air	29		24		18		16		17		7	
D.O. (mg/L) surface	8.91		7.44		3.36		3.70		6.04		7.43	
bottom	6.18		4.25		2.98		4.85		3.80		7.34	
pH surface	7.83		7.21		7.00		6.70		6.67		7.37	
bottom	7.59		7.24		6.96		7.03		6.87		7.33	
Secchi (cm)	60		85		105		80		90		65	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		1/2:50 & 1/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel			1	222								
Atlantic Silverside												
Black Crappie												
Blueback Herring		**NO**										
Bluefish			1	210								
Brown Bullhead		**CATCH**							1	281		
Gizzard Shad			6	139-170								
Mummichog							1	46			1	47
Northern Pipefish												
Pumpkinseed												
Striped Bass							1	267				
Weakfish												
White Perch					9	136-235	2	172-188	5	166-263		
INVERTEBRATES												
Amphipoda							100		150		1	
Balanus improvisus											530	
Callinectes sapidus			1	19	3	31 - 63	2	27-42				
Chironomidae larvae												
Congeria leucopheata	10		100		100,000		8,000		10,000		1,150	
Palaeomonetes pugio							25		5		2	
Rhithropanopeus harrissii			3				200				1	
REPTILES												
Snapping Turtle												

TABLE A-8
Catch and Water Quality at Station T8 (Mill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T8	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0186-0187		0226-0227		0257-0258		0282-0283		0316 - 0317		0336 - 0337	
Date	2/13/02		3/13/02		4/12/02		5/14/02		6/11/02		7/9/02	
Time	10:41		11:11		10:42		12:20		10:54		10:24	
Tidal Stage (+hours)	High +0.5		High +2		High +0.5		High +1		High +0		High +1.0	
Depth (feet)	6 to 11		5 to 10		5 to 12		6 to 12		5 to 11		6 to 12	
Salinity (0/00) surface	11.73		9.45		8.59		5.81		5.62		8.92	
bottom	11.89		9.58		8.85		5.83		5.86		9.06	
Temp (oC) surface	5.23		8.18		13.88		16.04		24.09		26.85	
bottom	4.69		7.77		13.46		15.88		23.45		26.77	
air	3		6		13		15		28		31	
D.O. (mg/L) surface	6.13		5.53		6.89		4.65		4.39		3.60	
bottom	6.77		6.72		6.58		4.45		2.43		2.51	
pH surface	7.16		7.33		7.23		8.02		8.01		6.92	
bottom	7.22		7.29		7.26		7.88		7.82		6.86	
Secchi (cm)	65		85		65		70		60		45	
#/ length of tow (min)	2/3:00		1/3:00 & 1/2:30		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	117						
American Eel					1	150						
Atlantic Silverside												
Black Crappie												
Blueback Herring					1	82						
Bluefish												
Brown Bullhead					3	261-375						
Gizzard Shad												
Mummichog	1	57			1	106	2	58-85	1	74	10	44 - 87
Northern Pipefish					1	81						
Pumpkinseed												
Striped Bass					1	263						
Weakfish												
White Perch			4	192-244	21	82-269	3	129-190	1	179	3	109 - 223
INVERTEBRATES												
Amphipoda	225		600		1,000		100		300			+
Balanus improvisus	70		150		20							
Callinectes sapidus					19	14-49	24	14-57	53	16 - 160	50	27 - 139
Chironomidae larvae									30			+
Congeria leucopheata	300		800		5,500		700		50		100	+
Palaeomonetes pugio	2		20		25							
Rhithropanopeus harrissii	3		5		40				120			+
REPTILES												
Snapping Turtle							1					

TABLE A-8
Catch and Water Quality at Station T8 (Mill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T8	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0370/0371		0393/0394		0441/0442		0477/0478	
Date	10/25/02		3/4/03		5/14/03		9/11/03	
Time	13:36 & 14:00		11:01 & 11:16		10:56 & 11:10		11:10 & 11:39	
Tidal Stage (+hours)	High +2.0		High + 1.5		High + 3.0		High + 1.0	
Depth (feet)	6 to 13		6 to 13		6 to 11		6 to 13	
Salinity (0/00)surface	6.21		4.23		4.69		7.53	
bottom	6.42		4.34		4.63		7.82	
Temp (oC) surface	12.55		2.37		16.84		23.00	
bottom	12.77		1.82		16.34		22.74	
air	9.5		-1		18.5		25	
D.O. (mg/L) surface	5.19		8.63		6.57		7.02	
bottom	4.65		7.32		6.55		6.62	
pH surface	7.37		7.45		7.74		7.93	
bottom	7.36		7.45		6.46		7.75	
Secchi (cm)	90		60		45		N/A	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		1/2:20 & 1/2:50	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel								
Atlantic Silverside	2	65 - 68						
Black Crappie							1	69
Blueback Herring				**NO**				
Bluefish								
Brown Bullhead				**FISH**	2	353 - 363		
Gizzard Shad								
Mummichog				**CAUGHT**	1	108	11	45 - 107
Northern Pipefish								
Pumpkinseed							2	43 - 51
Striped Bass	2	189 - 199						
Weakfish	2	97 - 134					2	120 - 123
White Perch	86	108 - 265			12	111 - 246	250	43 - 114
INVERTEBRATES								
Amphipoda			5					
Balanus improvisus								
Callinectes sapidus	9	22 - 82			9	17 - 54	6	105 - 135
Chironomidae larvae								
Congeria leucopheata								
Palaeomonetes pugio								
Rhithropanopeus harrissii					200			
REPTILES								
Snapping Turtle								

N/A = Not available, equipment malfunctioned.

TABLE A-9
Catch and Water Quality at Station T9 (Cromakill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T9	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0012-0013		0041-0042		0069-0070		0097-0098		0126-0127		0160-0161	
Date	8/20/01		9/5/01		10/2/01		11/7/01		12/4/01		1/14/02	
Time	13:58		14:03		12:07		11:12		13:40		12:21	
Tidal Stage (+hours)	High +3		High +2.5		High +2		Low +4		High +2.5		High +3.0	
Depth (feet)	3.5 to 5		8 to 13		8 to 14		8 to 20		7 to 14		4.5 to 12	
Salinity (0/00)surface	6.94		8.49		9.51		11.33		12.26		8.40	
bottom	7.12		8.49		9.52		11.49		12.53		8.39	
Temp (oC) surface	26.86		24.77		18.07		12.52		13.18		3.90	
bottom	26.54		24.64		17.50		12.21		12.88		3.91	
air	29		24		19		16		17		5	
D.O. (mg/L) surface	4.30		7.81		3.65		3.88		4.17		7.30	
bottom	3.35		7.41		3.61		3.61		3.84		7.10	
pH surface	7.21		7.29		7.26		6.81		6.85		7.38	
bottom	7.22		7.43		7.14		6.90		6.87		7.35	
Secchi (cm)	55		65		105		90		85		40	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel												
Atlantic Silverside	1	76										
Bluefish			4	189-204								
Brown Bullhead												
Carp										**NO**		
Gizzard Shad	1	86										
Inland Silverside										**CATCH**	2	50-59
Mummichog	148	31-81									8	35-59
Northern Pipefish												
Striped Bass			2	179-294	1	179	3	194-268				
Threespine stickleback												
Weakfish												
White Perch			13	141-214	1	209						
INVERTEBRATES												
Amphipoda									25		1	
Balanus improvisus							5				10	
Callinectes sapidus			1	168	1	31			1	13		
Chironomidae larvae												
Congeria leucopheata							20,000		520		5,000	
Palaeomonetes pugio									8		4	
Polycheate worm												
Mulinia lateralis												
Rhithropanopeus harrissi			4				10				56	

TABLE A-9
Catch and Water Quality at Station T9 (Cromakill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T9	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0190-0191		0228-0229		0251-0252		0284-0285		0314 - 0315		0338 - 0339	
Date	2/13/02		3/13/02		4/11/02		5/14/02		6/10/02		7/9/02	
Time	12:23		12:07		11:11		13:20		12:46		11:29	
Tidal Stage (+hours)	High +2.5		High +3		High +1.5		High +2		High + 3.0		High + 2.0	
Depth (feet)	7 to 13		6 to 19		9 to 15		6 to 13.5		8.5 to 15		8 to 13	
Salinity (0/00) surface	10.43		8.60		8.17		5.31		3.94		7.90	
bottom	10.79		8.58		8.20		5.25		4.18		7.84	
Temp (oC) surface	5.00		7.35		13.97		16.35		24.91		27.53	
bottom	4.91		7.43		13.74		16.12		25.18		27.31	
air	3		4		14		15		25		31	
D.O. (mg/L) surface	7.60		7.21		7.63		7.77		6.42		5.44	
bottom	7.47		6.33		7.20		6.96		5.92		4.95	
pH surface	7.41		7.49		7.31		7.82		8.07		7.06	
bottom	7.45		7.46		7.37		7.83		8.06		7.02	
Secchi (cm)	45		65		45		55		50		35	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel												
Atlantic Silverside												
Bluefish												
Brown Bullhead												
Carp					2	553-650			1	598		
Gizzard Shad												
Inland Silverside												
Mummichog	1	60			1	32			1	97	1	36
Northern Pipefish					1	109						
Striped Bass					2	294-319			8	143 - 200	15	117 - 207
Threespine stickleback			1	69								
Weakfish												
White Perch					4	106 - 264	1	150	37	100 - 272	117	110 - 236
INVERTEBRATES												
Amphipoda			40		70		140		30		75	
Balanus improvisus			20								5	
Callinectes sapidus					3	25-43	22	24-64	25	22 - 133	27	37 - 91
Chironomidae larvae								+	30			
Congeria leucopheata	100		100		20		520		5		25	
Palaeomonetes pugio			35		1							
Polycheate worm												
Mulinia lateralis												
Rhithropanopeus harrissi			5		5		30		5			

+ = present in large numbers, but not counted or estimated

TABLE A-9
Catch and Water Quality at Station T9 (Cromakill Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

T9	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0372/0372		0397/0398		0443/0444		0479/0480	
Date	10/29/02		3/4/03		5/14/03		9/11/03	
Time	11:01 & 11:18		12:41 & 12:56		11:42 & 11:52		12:34 & 12:57	
Tidal Stage (+hours)	Low +2.0		High + 3.0		High + 4.0		High +2.0	
Depth (feet)	9 to 13.2		6 to 15		5 to 15.8		9.5 to 14	
Salinity (0/00) surface	4.62		3.38		4.31		7.51	
bottom	4.54		3.35		4.63		7.49	
Temp (oC) surface	11.95		2.46		16.14		23.24	
bottom	11.79		2.18		16.34		23.26	
air	8		2		18.5		25	
D.O. (mg/L) surface	5.66		9.27		7.20		8.07	
bottom	4.75		8.13		6.76		8.66	
pH surface	7.48		7.49		N/A		8.17	
bottom	7.49		7.49		N/A		8.08	
Secchi (cm)	70		40		45		35	
#/ length of tow (min)	2/3:00		2/3:00		2/3:00		2/3:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel							5	323 - 556
Atlantic Silverside								
Bluefish							1	204
Brown Bullhead							1	103
Carp	2	545 - 585		**NO**				
Gizzard Shad								
Inland Silverside				**FISH**				
Mummichog								
Northern Pipefish				**CAUGHT**				
Striped Bass	3	260 - 515			5	215 - 252	2	91 - 295
Threespine stickleback								
Weakfish	1	132						
White Perch	10	186 - 271			9	170 - 224	16	72 - 233
INVERTEBRATES								
Amphipoda								
Balanus improvisus	500		5					
Callinectes sapidus			1	50	3	51 - 69	5	61 - 160
Chironomidae larvae								
Congeria leucopheata			50					
Palaeomonetes pugio								
Polycheate worm			1					
Mulinia lateralis			1					
Rhithropanopeus harrissi	1		11					

N/A = Not available, equipment malfunctioned.

TABLE A-10
Catch and Water Quality at Station TN1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

TN1	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0008		0054		0081		0117		0145		0176	
Date (Set)	8/15/01		9/13/01		10/11/01		11/26/01		12/12/01		01/22/02	
Time (Set)	1200		1140		1100		1125		1200		1037	
Tidal Stage (+hours)	High +5.5		Low +0		Low +0		High + 5.5		High + 5.0		Low +1.0	
Depth (feet-when set)	2 to 3		2 to 3		3 to 4		3 to 4		3 to 5		2.5	
Salinity (0/00) surface	14.30		15.07		15.60		18.08		20.14		17.63	
bottom	--		--		--		--		--		--	
Temp (oC) surface	28.66		26.24		18.46		12.74		10.97		11.68	
bottom	--		--		--		--		--		--	
air	26		13		24		12		9		8	
D.O. (mg/L) surface	3.61		3.72		4.37		5.47		6.10		7.03	
bottom	--		--		--		--		--		--	
pH surface	7.37		7.30		7.13		6.49		6.59		7.23	
bottom	--		--		--		--		--		--	
Secchi (cm)	80		45		85		150		100		120	
Length of Set (hr:min)	23:30		26:05		23:50		23:55		23:35		25:03	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel			1	1100								
Atlantic Silverside							1	125				
Bay Anchovy												
Blueback Herring												
Bluefish					3	196-228						
Crevalle Jack			1	129	1	129						
Gizzard Shad	2	124-129										
Green Sunfish												
Mummichog												
Spotted Hake												
Striped Bass	10	73-415	10	98-162	4	94-186	2	150 - 182				
Striped Killifish									9	81 - 110		
Threespine stickleback												
Weakfish	1	115	1	147								
White Perch	58	67-285	7	91-215	9	117-215	38	96 - 268	11	135 - 280		
Winter Flounder											1	114
INVERTEBRATES												
Crangon septemspinosa									1		4	
Callinectes sapidus	48	90-190	22	29-162	12	51-178	3	42 - 134				
Idotea sp.							1		4			
Palaeomonetes pugio							1					
Rhithropanopeus harrissii									3			
REPTILES												
Diamond Back Terrapin	2	124-208	6	113-198			1	209				

TABLE A-10
Catch and Water Quality at Station TN1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

TN1	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0208		0215		0242		0277		0303		0354	
Date (Set)	02/20/02		3/7/02		4/4/02		5/07/02		06/03/02		7/16/02	
Time (Set)	1125		1145		1018		1110		11:15		10:30	
Tidal Stage (+hours)	Low +2.5		Low +1.5		Low +1.6		High +5		Low +1.0		Low +1.8	
Depth (feet-when set)	4 to 6		3.0		2.5		2.5 to 3		2.0		3 to 4	
Salinity (0/00) surface	17.78		14.50		12.64		10.12		10.52		16.27	
bottom	--		--		--		--		--		--	
Temp (oC) surface	14.49		16.84		21.08		17.64		29.05		27.14	
bottom	--		--		--		--		--		--	
air	15		10		6		20		23		27	
D.O. (mg/L) surface	6.68		7.05		6.77		7.68		4.96		4.37	
bottom	--		--		--		--		--		--	
pH surface	7.32		6.98		7.11		7.84		7.68		7.25	
bottom	--		--		--		--		--		--	
Secchi (cm)	100		100		60		60		70		60	
Length of Set (hr:min)	24:30		24:13		23:52		25:07		24:15		24:25	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel												
Atlantic Silverside					1	121						
Bay Anchovy							2	68-83				
Blueback Herring					5	71-82						
Bluefish												
Crevalle Jack											1	58
Gizzard Shad			1	462								
Green Sunfish									1	77		
Mummichog	1	79			2	54-85					1	N/A
Spotted Hake							4	131-140				
Striped Bass									2	86 - 110		
Striped Killifish												
Threespine stickleback	1	68										
Weakfish												
White Perch	5	113-121	9	166-286	4	84-282	1	108	3	179 - 197	1	279
Winter Flounder												
INVERTEBRATES												
Crangon septemspinosa	1		1									
Callinectes sapidus	1	121	15	17-131	61	28-148	9	104-174	37	73 - 157	14	30 - 164
Idotea sp.			1									
Palaeomonetes pugio												
Rhithropanopeus harrissii												
REPTILES												
Diamond Back Terrapin							10	115-220	5	122 - 220	5	118 - 198

TABLE A-10
Catch and Water Quality at Station TN1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

TN1	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0362		0415		0423		0456	
Date (Set)	10/17/02		3/13/03		5/6/03		7/24/03	
Time (Set)	13:03		11:45		08:54		11:25	
Tidal Stage (+hours)	Low +0		Low + 0.5		Low + 2.0		High + 5.5	
Depth (feet-when set)	2.0		2.5		3.5		2.5 to 3.5	
Salinity (0/00) surface	13.21		10.85		10.03		18.03	
bottom								
Temp (oC) surface	17.79		9.78		21.00		26.74	
bottom								
air	14		-1		21		28	
D.O. (mg/L) surface	5.16		9.74		6.32		4.91	
bottom								
pH surface	7.12		7.65		7.93		7.68	
bottom								
Secchi (cm)	95		85		80		90	
Length of Set (hr:min)	22:12		23:25		25:18		24:05	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel								
Atlantic Silverside								
Bay Anchovy								
Blueback Herring				**NO**				
Bluefish								
Crevalle Jack				**CATCH**				
Gizzard Shad	1	116						
Green Sunfish								
Mummichog							1	97
Spotted Hake								
Striped Bass					1	268	2	149 - 174
Striped Killifish								
Threespine stickleback								
Weakfish								
White Perch	17	165 - 264			3	154 - 220		
Winter Flounder								
INVERTEBRATES								
Crangon septemspinosa								
Callinectes sapidus	6	14 - 148			9	28 - 122	11	37 - 148
Idotea sp.								
Palaeomonetes pugio								
Rhithropanopeus harrissii								
REPTILES								
Diamond Back Terrapin	2	183 - 212			8	112 - 215	5	130 - 208

TABLE A-11
Catch and Water Quality at Station TN2 (Sawmill Crek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN2	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0009		0055		0082		0118		0146		0177	
Date (Set)	8/15/01		9/13/01		10/11/01		11/26/01		12/12/01		01/22/02	
Time (Set)	1225		1210		1125		1155		1230		1100	
Tidal Stage (+hours)	Low +0		Low +0		Low +0.5		Low +0.5		High + 5.5		Low +1.5	
Depth (feet-when set)	3 to 4		4.0		4.0		3 to 4.5		3 to 4		2.5	
Salinity (0/00) surface	12.64		13.19		14.40		16.53		17.29		14.88	
bottom	--		--		--		--		--		--	
Temp (oC) surface	27.90		19.57		17.93		12.19		10.31		4.51	
bottom	--		--		--		--		--		--	
air	26				24		12		10		8	
D.O. (mg/L) surface	7.62		6.39		4.71		8.96		5.18		9.48	
bottom	--		--		--		--		--		--	
pH surface	7.97		7.52		7.19		6.77		6.65		7.47	
bottom	--		--		--		--		--		--	
Secchi (cm)	35		60		60		83		130		60	
Length of Set (hr:min)	24:00		24:35		24:00		24:17		23:45		25:10	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel	4	469-721	2	391-629			3	487 - 665				
Atlantic Menhaden					3	95-110						
Atlantic Silverside					2	110-112						
Blueback Herring												
Bluefish			2	186-196								
Carp												
Crevalle Jack	1	66										
Gizzard Shad			1	--	1	147						
Lookdown			1	60								
Mummichog					1	81			2	81 - 84	1	85
Spotted Hake												
Striped Bass	15	74-201	8	106-328	4	106-220						
Striped Killifish												
Weakfish	2	111-135										
White Perch	427	66-318	80	66-312	20	119-254	70	87 - 278			1	115
Winter Flounder												
INVERTEBRATES												
Callinectes sapidus	12	102-166	19	71-161	4	127-162	1	103				
Idotea sp.					1				3			
Rhithropanopeus harrissii									1			
REPTILES												
Diamond Back Terrapin	1	156	2	162-210								

TABLE A-11
Catch and Water Quality at Station TN2 (Sawmill Crek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN2	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0207		0216		0243		0276		0304		0355	
Date (Set)	02/20/02		3/07/02		4/4/02		5/07/02		6/03/02		7/16/02	
Time (Set)	1110		1205		1045		1042		11:40		10:50	
Tidal Stage (+hours)	Low +2.0		Low +2		Low +2		High +4.5		Low +1.0		Low + 2.1	
Depth (feet-when set)	4 to 6		3.0		3.0		3.5 to 4		3.5		3.5 to 4.5	
Salinity (0/00) surface	15.93		13.57		12.40		9.44		9.07		15.91	
bottom	--		--		--		--		--		--	
Temp (oC) surface	8.84		8.99		10.42		18.65		21.71		26.13	
bottom	--		--		--		--		--		--	
air	14		11		7		19		23		28	
D.O. (mg/L) surface	7.13		9.14		10.20		9.73		6.69		4.72	
bottom	--		--		--		--		--		--	
pH surface	7.28		7.09		7.49		8.05		8.22		7.43	
bottom	--		--		--		--		--		--	
Secchi (cm)	110		65		55		65		70		40	
Length of Set (hr:min)	24:15		24:20		24:05		24:43		24:35		24:30	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					6	80-102						
American Eel									3	577 - 684		
Atlantic Menhaden					5	73-103						
Atlantic Silverside			1	131								
Blueback Herring					31	73-84						
Bluefish												
Carp							1	593				
Crevalle Jack												
Gizzard Shad												
Lookdown												
Mummichog	1	62	6	59-112	9	63-101					1	74
Spotted Hake					2	89-99						
Striped Bass					1	416	1	142			3	170 - 512
Striped Killifish			1	119								
Weakfish												
White Perch	1	206	14	82-282	68	94-348	64	76-256	32	116 - 253	138	154 - 266
Winter Flounder									1	61		
INVERTEBRATES												
Callinectes sapidus					9	36-142	81	92-169	56	103 - 161	35	68 - 155
Idotea sp.												
Rhithropanopeus harrissii												
REPTILES												
Diamond Back Terrapin					2	120-180	3	99-119	11	115 - 199	8	155 - 228

TABLE A-11
Catch and Water Quality at Station TN2 (Sawmill Crek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN2	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0363		0416		0424		0457	
Date (Set)	10/17/02		3/13/03		5/6/03		7/24/03	
Time (Set)	13:28		12:15		09:18		11:55	
Tidal Stage (+hours)	Low +0.5		Low + 1.0		Low + 1.75		Low + 0	
Depth (feet-when set)	2.5		3.0		3.5		3.0	
Salinity (0/00) surface	9.97		7.87		7.91		15.78	
bottom								
Temp (oC) surface	15.15		3.79		17.38		26.58	
bottom								
air	16		5		21		30	
D.O. (mg/L) surface	5.85		12.53		8.58		4.84	
bottom								
pH surface	7.33		7.57		8.13		7.79	
bottom								
Secchi (cm)	70		45		50		45	
Length of Set (hr:min)	23:04		23:30		25:42		24:30	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel					1	247	1	616
Atlantic Menhaden	2	50 - 89						
Atlantic Silverside	1	115			12	85 - 101		
Blueback Herring								
Bluefish								
Carp								
Crevalle Jack								
Gizzard Shad								
Lookdown								
Mummichog			1	91	6	74 - 115		
Spotted Hake								
Striped Bass	5	177 - 295					2	210 - 256
Striped Killifish			2	79 - 100	4	82 - 99		
Weakfish								
White Perch	227	114 - 298			38	167 - 223	49	64 - 251
Winter Flounder								
INVERTEBRATES								
Callinectes sapidus	6	98 - 143			3	24 - 116	10	85 - 172
Idotea sp.								
Rhithropanopeus harrissii								
REPTILES								
Diamond Back Terrapin	1	245			2	112 - 122	5	126 - 195

TABLE A-12
Catch and Water Quality at Station TN3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN3	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0010		0056		0083		0119		0147		0178	
Date (Set)	8/15/01		9/13/01		10/11/01		11/26/01		12/12/01		01/22/02	
Time (Set)	1248		1235		1142		1220		1310		1128	
Tidal Stage (+hours)	Low +0.5		Low +0		Low +1.0		Low + 0.5		Low + 0		Low +2.0	
Depth (feet-when set)	3 to 4		3 to 6		5 to 7		4 to 6		3 to 6		4.0	
Salinity (0/00) surface	7.52		9.12		9.08		11.33		13.40		12.66	
bottom	--		--		--		--		--		--	
Temp (oC) surface	27.88		22.42		18.44		12.19		9.64		4.24	
bottom	--		--		--		--		--		--	
air	27		13		24		14		10		8	
D.O. (mg/L) surface	7.63		3.60		4.43		3.82		4.85		7.72	
bottom	--		--		--		--		--		--	
pH surface	8.00		7.21		7.17		6.49		6.75		7.37	
bottom	--		--		--		--		--		--	
Secchi (cm)	55		63		80		105		110		80	
Length of Set (hr:min)	25:07		23:30		24:30		24:45		23:35		25:17	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alosa/Clupeidae			1	head only								
Alewife												
American Eel												
American Shad												
Atlantic Menhaden												
Atlantic Silverside												
Blueback Herring												
Bluefish	1	159										
Brown Bullhead	2	234-289										
Carp												
Crevalle Jack	2	70-72	1	123								
Gizzard Shad					1	162						
Mummichog	29	65-119									65	64-109
Spotted Hake												
Striped Bass	3	150-164	6	169-217	5	102-412	2	545 - 840			1	220
Striped Killifish	1	72									3	67-79
Threespine stickleback												
Weakfish	1	92	2	131-143	1	130						
White Perch	289	65-279	115	68-265	64	91-301	21	76 - 294	43	72 - 202	18	67-105
INVERTEBRATES												
Amhipoda									1			
Idotea sp.									1			
Callinectes sapidus	37	95-155	32	83-168	21	105-178						
Rhithropanopeus harrissii							2		1			
REPTILE												
Diamond Back Terrapin	5	130-215	1	142	3	110-205	1	190				
Snapping Turtle												

TABLE A-12
Catch and Water Quality at Station TN3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN3	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0182		0217		0244		0275		0302		0356	
Date (Set)	2/5/2002		3/7/02		4/4/02		5/07/02		06/03/02		07/16/02	
Time (Set)	1115		1230		1110		1015		10:50		11:14	
Tidal Stage (+hours)	Low +1.75		Low + 2.0		Low +2.5		High +4		Low +0		Low +2.25	
Depth (feet-when set)	3		2 to 3		2 to 3		4 to 6		2 to 6		5 to 7	
Salinity (0/00) surface	11.18		9.06		8.03		7.48		5.30		11.14	
bottom	--		--		--		--		--		--	
Temp (oC) surface	4.34		8.20		11.58		17.06		22.66		27.60	
bottom	--		--		--		--		--		--	
air	5		10		7		17		22		30	
D.O. (mg/L) surface	6.88		6.00		9.12		6.87		5.76		5.21	
bottom	--		--		--		--		--		--	
pH surface	5.75		7.08		7.30		7.65		8.02		7.53	
bottom	--		--		--		--		--		--	
Secchi (cm)	75		80		55		60		60		65	
Length of Set (hr:min)	25:14		24:30		24:33		24:00		23:48		24:56	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alosa/Clupeidae												
Alewife			1	146	8	87-111	3	106-262				
American Eel							1	594				
American Shad					1	100						
Atlantic Menhaden												
Atlantic Silverside					1	104	2	N/A			1	N/A
Blueback Herring			4	98-212	80	78-185	50	86-100				
Bluefish												
Brown Bullhead					4	246-305	2	243-289				
Carp							1	696				
Crevalle Jack												
Gizzard Shad												
Mummichog	2	66-81	3	87-101			4	83-105				
Spotted Hake							1	204				
Striped Bass					1	199	2	108-300	2	132 - 141	8	122 - 206
Striped Killifish	1	139			1	85	1	117				
Threespine stickleback	1	70										
Weakfish												
White Perch	5	82-101	38	75-199	75	102-235	115	126-288	77	97 - 290	143	118 - 312
INVERTEBRATES												
Amhipoda	20											
Idotea sp.												
Callinectes sapidus					4	30-60	68	86-146	10	77 - 177	21	66 - 166
Rhithropanopeus harrissii	1		3									
REPTILE												
Diamond Back Terrapin							11	85-228			8	91 - 221
Snapping Turtle											1	N/A

TABLE A-12
Catch and Water Quality at Station TN3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN3	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0364		0407		0425		0458	
Date (Set)	10/17/02		3/11/03		5/6/03		7/24/03	
Time (Set)	13:50		10:40		09:35		12:25	
Tidal Stage (+hours)	Low +0.5		Low + 1.5		Low + 2.5		Low + 0	
Depth (feet-when set)	2.5		3.0		4.0		3.0 to 4.0	
Salinity (0/00) surface	5.98		3.77		6.83		9.55	
bottom								
Temp (oC) surface	14.73		5.20		17.34		27.06	
bottom								
air	20		6		21		30	
D.O. (mg/L) surface	4.60		9.25		8.75		4.16	
bottom								
pH surface	7.46		7.69		8.22		7.87	
bottom								
Secchi (cm)	70		75		75		45	
Length of Set (hr:min)	23:50		24:20		26:20		24:50	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alosa/Clupeidae								
Alewife								
American Eel							1	638
American Shad								
Atlantic Menhaden	1	49						
Atlantic Silverside	2	101 - 103			1	N/A		
Blueback Herring								
Bluefish								
Brown Bullhead					1	344		
Carp								
Crevalle Jack								
Gizzard Shad								
Mummichog			3	86 - 113	1	115	14	73 - 108
Spotted Hake								
Striped Bass	1	189	1	72	1	214	2	158 - 195
Striped Killifish			1	83				
Threespine stickleback								
Weakfish	4	91 - 135						
White Perch	110	116 - 286	6	161 - 219	80	121 - 284	101	61 - 306
INVERTEBRATES								
Amhipoda							200	
Idotea sp.								
Callinectes sapidus	3	53 - 112			11	24 - 109	58	45 - 145
Rhithropanopeus harrissii					1			
REPTILE								
Diamond Back Terrapin			1	154	6	116 - 208	7	130 - 217
Snapping Turtle								

TABLE A-13
Catch and Water Quality at Station TN4 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN4	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0005		0051		0087		0103		0142		0179	
Date (Set)	8/13/01		9/11/01		10/24/01		11/08/01		12/10/01		01/24/02	
Time (Set)	1035		1035		1035		0910		1050		0945	
Tidal Stage (+hours)	Low		Low +0		Low +0.5		Low + 0.5		High + 5.75		High +5.0	
Depth (feet-when set)	3 to 4		4 to 6		3 to 4		3 to 5		3 to 5		3 to 4	
Salinity (0/00) surface	5.28		6.89		8.79		10.29		9.86		9.03	
bottom	--		--		--		--		--		--	
Temp (oC) surface	26.59		24.56		18.17		11.79		10.75		5.37	
bottom	--		--		--		--		--		--	
air	25		25		27		10		9		4	
D.O. (mg/L) surface	2.97		5.19		2.69		3.27		5.24		5.85	
bottom	--		--		--		--		--		--	
pH surface	7.16		6.77		7.13		6.75		6.64		6.95	
bottom	--		--		--		--		--		--	
Secchi (cm)	60		85		90		60		80		70	
Length of Set (hr:min)	24:00		24:20		24:00		25:50		24:05		24:30	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel					3	462-522						
Atlantic Menhaden	4	52-81										
Atlantic Silverside												
Blueback Herring												
Brown Bullhead												
Carp												
Gizzard Shad	3	74-100							1	163		
Inland Silverside												
Mummichog	922	58-201			162	57-89	60	59 - 93			29	55-101
Pumpkinseed												
Striped Bass			33	91-176	2	112-178						
Striped Killifish							8	65 - 86			1	94
Threespine stickleback												
Weakfish					10	99-125						
White Perch	10	60-81	69	76-262	45	74-244	14	116 - 229	33	72 - 239	1	89
Winter Flounder												
INVERTEBRATES												
Amphipoda							5,000		5,000		10	
Callinectes sapidus	5	84-139	32	94-176	11	57-111					1	15
Rhithropanopeous harisii	1				14		1		5		10	
Crangon septemspinosa					1							
Palaeomonetes sp							1					
REPTILES												
Diamond Back Terrapin												
Snapping Turtle												

TABLE A-13
Catch and Water Quality at Station TN4 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN4	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0206		0212		0265		0272		0305		0357	
Date (Set)	2/20/2002		3/5/02		4/18/02		5/02/02		06/05/02		7/18/02	
Time (Set)	1030		1035		1030		1035		10:25		10:25	
Tidal Stage (+hours)	Low +1.5		Low +2		Low +2.5		Low +2.0		High +4.5		Low +0	
Depth (feet-when set)	4 to 6		3 to 4		4 to 6		3.5 to 4.5		3 to 4		3 to 4	
Salinity (0/00) surface	10.31		7.84		7.51		4.60		4.52		8.63	
bottom	--		--		--		--		--		--	
Temp (oC) surface	9.34		6.79		21.84		14.72		23.41		30.19	
bottom	--		--		--		--		--		--	
air	14		7		27		13		25		33	
D.O. (mg/L) surface	7.63		7.33		4.15		3.59		3.43		6.81	
bottom	--		--		--		--		--		--	
pH surface	7.20		6.28		8.55		7.02		7.92		7.26	
bottom	--		--		--		--		--		--	
Secchi (cm)	60		45		50		50		40		40	
Length of Set (hr:min)	24:15		24:35		23:55		23:50		23:55		26:50	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					21	87-115						
American Eel					1	501			3	476 - 764		
Atlantic Menhaden												
Atlantic Silverside					4	110						
Blueback Herring					2	248			3	105 - 114		
Brown Bullhead			1	194	2	228-229						
Carp					1	596						
Gizzard Shad												
Inland Silverside												
Mummichog	1	81	3	51-73	5	51-100			1	100	40	64 - 104
Pumpkinseed												
Striped Bass					1	202	3	122-152	4	147 - 232		
Striped Killifish					1	81						
Threespine stickleback	1	66										
Weakfish												
White Perch	1	201	8	67-209	114	79-270	270	76-308	19	135 - 275		
Winter Flounder									1	42		
INVERTEBRATES												
Amphipoda	100								5,000		100	
Callinectes sapidus					15	18-138	1	90	34	98 - 155	20	30 - 158
Rhithropanopeous harisii	1		1								5	
Crangon septemspinosa												
Palaeomonetes sp												
REPTILES												
Diamond Back Terrapin					3	112-228						
Snapping Turtle					1	130						

TABLE A-13
Catch and Water Quality at Station TN4 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN4	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0391		0414		0426		0453	
Date (Set)	11/14/02		3/13/03		5/8/03		7/22/03	
Time (Set)	11:10		11:15		10:10		10:14	
Tidal Stage (+hours)	Low +0		Low + 0		Low + 1.0		Low + 0	
Depth (feet-when set)	2 to 3		3.0		2.5		2.0 to 3.0	
Salinity (0/00) surface	6.21		2.53		3.70		6.11	
bottom								
Temp (oC) surface	12.32		4.97		17.25		25.21	
bottom								
air	15		5		19		21	
D.O. (mg/L) surface	5.53		8.30		8.71		4.76	
bottom								
pH surface	7.55		7.72		8.16		7.73	
bottom								
Secchi (cm)	60		60		50		55	
Length of Set (hr:min)	26:40		23:20		24:26		24:31	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	189		
American Eel							1	487
Atlantic Menhaden							4	40 - 56
Atlantic Silverside	16	82 - 117		**NO**				
Blueback Herring								
Brown Bullhead				**CATCH**				
Carp							1	668
Gizzard Shad							2	62 - 80
Inland Silverside	1	46						
Mummichog	27	67 - 111			1	57	21	50 - 100
Pumpkinseed	1	75						
Striped Bass							5	117 - 282
Striped Killifish								
Threespine stickleback								
Weakfish								
White Perch	13	165 - 221			55	179 - 289	144	42 - 222
Winter Flounder								
INVERTEBRATES								
Amphipoda							100,000	
Callinectes sapidus	1	44			2	66 - 114	7	64 - 118
Rhithropanopeous harisii							10	
Crangon septemspinosa								
Palaeomonetes sp								
REPTILES								
Diamond Back Terrapin					1	239		
Snapping Turtle								

TABLE A-14
Catch and Water Quality at Station TN5 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN5	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0006		0052		0088		0104		0143		0180	
Date (Set)	8/13/01		9/11/01		10/24/01		11/8/01		12/10/01		01/24/02	
Time (Set)	10:57		10:55		10:55		09:33		11:10		10:03	
Tidal Stage (+hours)	Low +0		Low +1		Low +1.0		Low +1.0		High + 6.0		High +5.25	
Depth (feet-when set)	4 to 5		4 to 6		2.5 to 3		3 to 4		8 to 10		4 to 6	
Salinity (0/00) surface	2.19		4.92		7.14		8.97		7.54		7.67	
bottom	--		--		--		--		--		--	
Temp (oC) surface	26.55		25.32		18.32		11.70		11.02		5.64	
bottom	--		--		--		--		--		--	
air	26		25		25		10		10		6	
D.O. (mg/L) surface	3.67		5.86		3.37		3.70		4.03		6.31	
bottom	--		--		--		--		--		--	
pH surface	7.59		7.18		7.34		6.75		6.72		6.99	
bottom	--		--		--		--		--		--	
Secchi (cm)	40.0		25		80		70		90		70	
Length of Set (hr:min)	24:18		24:45		24:30		26:07		24:20		24:53	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife	1	71	1	71	3	156 - 177			2	169 - 169		
American Eel			5	281-612	1	625	2	510 - 608				
Atlantic Menhaden												
Atlantic Silverside												
Black Crappie					4	87-121			1	109		
Blueback Herring					33	138 - 148						
Bluegill												
Brown Bullhead	18	55-270	6	190-308	4	63-371	3	246 - 281	1	219		
Carp												
Gizzard Shad	4	69-79	23	91-143	6	118-158						
Goldfish	4	101-107	1	86	3	68-76	1	74	2	69 - 83	4	66-70
Largemouth Bass	1	101							1	189		
Mummichog	1,539	54-92	9	65-102	114	57-109	51	59 - 94			125	56-93
Pumpkinseed					2	66-118						
Striped Bass			26	86-215	20	183-336	73	184 - 660	5	206 - 318		
Striped Killifish												
Threespine stickleback												
Weakfish			12	84-122								
White Perch	83	59-88	182	81-241	38	93-174	247	89 - 255	34	73 - 255		
INVERTEBRATES												
Amphipoda									2,000			
Callinectes sapidus	4	100-160	52	59-174	2	101-103						
Palaeomonetes pugio												
Rhithropanopeus harrisii									5			
REPTILES												
Snapping Turtle			1	360								

TABLE A-14
Catch and Water Quality at Station TN5 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN5	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0183		0213		0266		0273		0306		0358	
Date (Set)	2/5/2002		3/5/02		4/18/02		5/02/02		6/5/02		7/18/02	
Time (Set)	11:45		10:55		10:42		10:50		10:40		10:42	
Tidal Stage (+hours)	Low +1.75		Low +2.5		Low +2.75		Low +2.25		High +4.5		Low +0	
Depth (feet-when set)	2		2.5 to 3.5		1 to 2		3 to 4		3 to 4		4 to 7	
Salinity (0/00) surface	8.59		6.76		6.75		3.57		3.08		5.31	
bottom	--		--		--		--		--		--	
Temp (oC) surface	5.06		6.69		21.96		14.48		23.17		29.70	
bottom	--		--		--		--		--		--	
air	8		7		27		13.5		25		32	
D.O. (mg/L) surface	6.82		8.24		3.38		4.35		2.97		7.34	
bottom	--		--		--		--		--		--	
pH surface	7.19		7.04		8.00		7.06		7.86		7.25	
bottom	--		--		--		--		--		--	
Secchi (cm)	60		50		45		65		40		45	
Length of Set (hr:min)	25:25		24:50		24:42		24:15		24:20		25:13	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							1	209				
American Eel												
Atlantic Menhaden												
Atlantic Silverside					4	106-126						
Black Crappie									2	111 - 309		
Blueback Herring					2	86-86						
Bluegill												
Brown Bullhead			1	310	30	201-352	27	233-352	17	222 - 306	4	271 - 329
Carp											4	548 - 712
Gizzard Shad												
Goldfish	1	65	2	84-84	1	291						
Largemouth Bass												
Mummichog			1	77	30	66-102			21	74 - 109	23	45 - 122
Pumpkinseed												
Striped Bass			1	360	7	97-157			3	143 - 244	2	176 - 189
Striped Killifish												
Threespine stickleback			1	66								
Weakfish												
White Perch	1	122	8	89-205	179	71-273	26	98-322	148	86 - 296	92	141 - 254
INVERTEBRATES												
Amphipoda									8,000			
Callinectes sapidus					13	19-111			20	43 - 162	28	47 - 175
Palaeomonetes pugio												
Rhithropanopeus harrisii												
REPTILES												
Snapping Turtle												

TABLE A-14
Catch and Water Quality at Station TN5 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN5	AUTUMN 2002		WINTER 2002-2003		SPRING 2003		SUMMER 2003	
Collection Number	0385		0408		0427		0454	
Date (Set)	10/31/02		3/11/03		5/8/03		7/22/03	
Time (Set)	11:20		11:05		10:25		10:30	
Tidal Stage (+hours)	Low		Low + 2.0		Low +1.5		Low + 0	
Depth (feet-when set)	1.5 t o 3		1.5 to 2.0		2.5		2.5 to 4.0	
Salinity (0/00) surface	4.12		1.09		2.77		3.58	
bottom								
Temp (oC) surface	11.37		5.95		17.29		25.26	
bottom								
air	9		9		19.5		21	
D.O. (mg/L) surface	5.70		10.19		9.34		4.54	
bottom								
pH surface	7.70		7.76		8.13		7.76	
bottom								
Secchi (cm)	70.0		65		52		75	
Length of Set (hr:min)	23:50		26:10		24:44		25:20	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel								
Atlantic Menhaden	6	55 - 84						
Atlantic Silverside	6	85 - 117		**NO**				
Black Crappie							37	52 - 66
Blueback Herring	1	106		**CATCH**	1	249		
Bluegill							1	167
Brown Bullhead					54	74 - 367	5	148 - 357
Carp					1	590		
Gizzard Shad	4	112 - 121					3	75 - 80
Goldfish	4	86 - 88					7	47 - 82
Largemouth Bass								
Mummichog	297	56 - 104			1	50	322	37 - 92
Pumpkinseed								
Striped Bass	17	214 - 360			1	249		
Striped Killifish	3	101 - 107						
Threespine stickleback								
Weakfish	1	152						
White Perch	125	159 - 285			46	111 - 309		
INVERTEBRATES								
Amphipoda								
Callinectes sapidus					2	112	9	62 - 122
Palaeomonetes pugio								
Rhithropanopeus harrisii							2	
REPTILES								
Snapping Turtle								

TABLE A-15
Catch and Water Quality at Station TN6 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN6	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0007		0053		0089		0105		0144		0181	
Date (Set)	8/13/01		9/11/01		10/24/01		11/8/01		12/10/01		01/24/02	
Time (Set)	11:18		11:20		11:13		09:53		11:45		10:25	
Tidal Stage (+hours)	Low +1		Low +1.5		Low +1.25		Low + 1.5		Low + 0		High +5.5	
Depth (feet-when set)	3 to 4		4 to 5		3 to 5		3 to 4		3 to 5		3 to 5	
Salinity (0/00) surface	2.40		5.37		6.49		8.22		6.53		6.43	
bottom	--		--		--		--		--		--	
Temp (oC) surface	27.28		24.80		17.87		11.79		9.60		4.89	
bottom	--		--		--		--		--		--	
air	26		25		23		10		12		7	
D.O. (mg/L) surface	4.62		5.92		5.56		3.70		4.63		7.94	
bottom	--		--		--		--		--		--	
pH surface	7.65		7.25		7.48		6.91		6.79		7.01	
bottom	--		--		--		--		--		--	
Secchi (cm)	65		42		80		60		60		55	
Length of Set (hr:min)	25:00		25:45		25:12		26:52		24:35		24:58	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	152						
American Eel			1	408								
Atlantic Menhaden	22	53-99										
Atlantic Silverside	1	50										
Black Crappie	3	60-75			1	89			8	80 - 232	5	84-209
Blueback Herring					28	134 - 150						
Brown Bullhead	38	133-384	4	215-261	1	386	1	367			1	372
Carp	2	503-520					1	221*				
Gizzard Shad	934	62-126	7	93-144	1	115	5	79 - 157	2	150 - 194		
Goldfish											2	81-82
Inland Silverside												
Largemouth Bass	3	100-120										
Mummichog	2,970	59-101	20	63-108	31	71-110	104	58 - 105	140	52 - 100	61	52-95
Pumpkinseed					1	87						
Striped Bass			7	89-165			13	102 - 442	2	291 - 370		
Threespine stickleback												
Weakfish	1	76	7	75-104	1	97						
White Perch	315	53-224	320	75-290	596	79-305	22	85 - 194	16	63 - 139	4	76-82
Yellow Perch												
INVERTEBRATES												
Amphipoda									1,000		20	
Callinectes sapidus	22	96-183	20	99-166								
Paleomonetes pugio												
Rhithropanopeus harrissii									10		3	
REPTILES												
Snapping turtle												

* Mirror Carp variety

TABLE A-15
Catch and Water Quality at Station TN6 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN6	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0184		0214		0267		0274		0307		0359	
Date (Set)	02/05/02		3/5/02		4/18/02		5/02/02		6/5/02		7/18/02	
Time (Set)	12:10		11:10		11:02		11:10		10:58		11:05	
Tidal Stage (+hours)	Low +2.0		Low +2.5		Low +3		Low +2.5		High +5.0		Low +0	
Depth (feet-when set)	3 to 4		3 to 4		4 to 6		4 to 5		3 to 4		2.5 to 4	
Salinity (0/00) surface	7.33		5.75		5.69		2.63		1.78		5.69	
bottom	--		--		--		--		--		--	
Temp (oC) surface	5.21		7.04		22.28		14.78		23.61		28.67	
bottom	--		--		--		--		--		--	
air	8		8		28		14		25		31	
D.O. (mg/L) surface	8.05		7.78		4.63		5.88		3.83		6.84	
bottom	--		--		--		--		--		--	
pH surface	7.40		7.13		7.87		7.10		7.87		7.22	
bottom	--		--		--		--		--		--	
Secchi (cm)	45		60		40		40		30		40	
Length of Set (hr:min)	25:25		25:10		25:23		24:45		24:47		23:45	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	237						
American Eel							1	624	1	515	5	498 - 631
Atlantic Menhaden												
Atlantic Silverside					2	102-109						
Black Crappie	2	87-97			2	109-208			7	96 - 130		
Blueback Herring												
Brown Bullhead					11	250-385	19	134-368	6	243 - 347	13	254 - 309
Carp							1	141	1	272	2	495 - 542
Gizzard Shad					1	390			1	471		
Goldfish			1	105								
Inland Silverside	1	63					1	65				
Largemouth Bass												
Mummichog	12	60-108	13	58-87	60	64 - 107	194	60-109	330	57 - 89	46	64 - 91
Pumpkinseed							2	51-139				
Striped Bass					3	113-141					3	158 - 238
Threespine stickleback			1	70								
Weakfish											3	51 - 94
White Perch			1	98	158	81 - 262	55	77-311	146	100 - 281	51	113 - 224
Yellow Perch					1	211						
INVERTEBRATES												
Amphipoda												
Callinectes sapidus					2	47-51			12	50 - 136	26	36 - 168
Paleomonetes pugio												
Rhithropanopeus harrissii	1											
REPTILES												
Snapping turtle					1	368						

TABLE A-15
Catch and Water Quality at Station TN6 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

TN6	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0386		0409		0428		0455	
Date (Set)	10/31/02		3/11/03		5/8/03		7/22/03	
Time (Set)	11:50		11:30		10:50		10:55	
Tidal Stage (+hours)	Low +0.5		Low + 2.0		Low + 1.5		Low + 0	
Depth (feet-when set)	3 to 4		3.0		3.0		2.0 to 3.0	
Salinity (0/00) surface	2.44		0.61		1.79		2.26	
bottom								
Temp (oC) surface	10.16		4.03		17.39		25.89	
bottom								
air	11		7		19		21.5	
D.O. (mg/L) surface	7.75		13.56		11.29		4.18	
bottom								
pH surface	7.73		7.72		7.05		7.85	
bottom								
Secchi (cm)	50		65		40		65	
Length of Set (hr:min)	24:20		24:30		25:08		25:48	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					2	254 - 267		
American Eel	1	509						
Atlantic Menhaden	97	57 - 82						
Atlantic Silverside								
Black Crappie	2	159 - 185			1	152	18	34 - 170
Blueback Herring								
Brown Bullhead					10	271 - 385	14	144 - 369
Carp	1	400					2	471 - 560
Gizzard Shad	4	114 - 139					3	62 - 68
Goldfish								
Inland Silverside								
Largemouth Bass								
Mummichog	450	53 - 102	42	53 - 100	4	91 - 98	2	64 - 86
Pumpkinseed								
Striped Bass	1	380			1	219	1	172
Threespine stickleback								
Weakfish	2	117 - 138						
White Perch	13	109 - 260	1	95	100	159 - 292	35	126 - 269
Yellow Perch								
INVERTEBRATES								
Amphipoda							400	
Callinectes sapidus							2	102 - 122
Paleomonetes pugio	1							
Rhithropanopeus harrissii								
REPTILES								
Snapping turtle					2	~400		

TABLE A-16
Catch and Water Quality at Station S1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

S1	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0001a		0060		0079		0107		0150		0153	
Date	8/01/01		9/26/01		10/10/01		11/13/01		12/26/01		01/09/02	
Time	10:45		11:15		10:25		12:35		12:50		11:44	
Tidal Stage (+hours)	High -2.5		Low +0		Low +1.0		High +5.5		Low + 1.0		Low +0	
Depth (feet)	4.0		4.0		5		4		4		3.5	
Salinity (0/00) surface	17.47		14.67		15.42		18.31		16.58		15.88	
bottom	17.29		--		--		--		--		--	
Temp (oC) surface	28.65		23.88		18.57		10.85		6.71		1.95	
bottom	27.07		--		--		--		--		--	
air	31		19		16		10		5		1	
D.O. (mg/L) surface	4.37		3.01		5.85		5.74		6.72		9.84	
bottom	4.56		--		--		--		--		--	
pH surface	7.27		6.97		6.98		7.25		7.11		6.16	
bottom	7.32		--		--		--		--		--	
Secchi (cm)	75		85		80		80		175		120	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden												
Atlantic Silverside	1,588	60-88	27	55-90	76	50-110	107	49 - 119	1	N/A	3	79-107
Atlantic Tomcod												
Bay anchovy												
Bluefish	3	102-140										
Gizzard Shad												
Inland Silverside			1	56	6	43-56					1	62
Mummichog			2	46-70	1	85	1	44				
Northern Pipefish					2	150-180	2	142 - 144				
Striped Bass	3	63-73			4	105-125						
Striped Killifish			3	52-86	2	65-80	4	85 - 92				
Summer Flounder											1	20
White Perch	10	46-79	26	86-227	1	70						
INVERTEBRATES												
Callinectes sapidus			10	17-141	5	16-27	2	34 - 45				
Crangon septemspinosa					2		10		5		22	
Crassostrea virginica									5			
Palaemonetes pugio	1		80		62		200				6	
Rhithropanopeus harrisii			1									

TABLE A-16
Catch and Water Quality at Station S1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

S1	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0210		0241		0269		0300		0309		0335	
Date	02/22/02		3/26/02		4/23/02		05/23/02		6/7/02		7/5/02	
Time	10:45		12:06		11:48		11:50		12:11		11:40	
Tidal Stage (+hours)	High +5.75		High +5.5		High +5.75		High +5		High +5.0		Low + 0	
Depth (feet)	4.0		4.0		4.5		4.0		4.5		4.0	
Salinity (0/00) surface	16.70		14.39		13.11		9.22		11.07		13.52	
bottom	--		--		--		--		--		--	
Temp (oC) surface	9.35		9.24		17.2		20.0		21.5		30.8	
bottom	--		--		--		--		--		--	
air	9		4		10		23		17		27	
D.O. (mg/L) surface	6.99		8.18		4.20		6.24		4.33		4.62	
bottom	--		--		--		--		--		--	
pH surface	7.18		7.13		7.84		8.19		7.74		6.86	
bottom	--		--		--		--		--		--	
Secchi (cm)	120		85		70		82		90		65	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden												
Atlantic Silverside			25	84-132								
Atlantic Tomcod												
Bay anchovy		**NO**					6	62-79				
Bluefish												
Gizzard Shad												
Inland Silverside		**CATCH**							1	72		
Mummichog							1	47			4	39 - 76
Northern Pipefish							2	121-139				
Striped Bass							2	101-106	6	103 - 132	5	124 - 156
Striped Killifish												
Summer Flounder												
White Perch					1	112	2	136-137	1	127		
INVERTEBRATES												
Callinectes sapidus					1	51	4	64-93			3	18 - 57
Crangon septemspinosa	12		4				2					
Crassostrea virginica												
Palaemonetes pugio	7		10				30		20		20	
Rhithropanopeus harrisii												

TABLE A-16
Catch and Water Quality at Station S1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

S1	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0388		0419		0450		0476	
Date	11/04/02		3/17/03		5/27/03		8/26/03	
Time	13:20		13:25		12:20		13:55	
Tidal Stage (+hours)	High +5.5		High + 5.5		High + 5.0		High + 5.0	
Depth (feet)	4.0		3.5 to 4.0		4.0		4.0	
Salinity (0/00) surface	14.05		10.68		10.21		12.45	
bottom								
Temp (oC) surface	10.77		9.64		17.50		28.00	
bottom								
air	9		20		21		28	
D.O. (mg/L) surface	6.93		8.24		5.34		4.66	
bottom								
pH surface	7.62		7.68		7.62		7.69	
bottom								
Secchi (cm)	60		100		65		45	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden							1	35
Atlantic Silverside	19	61 - 106	2	117 - 120			2,859	62 - 79
Atlantic Tomcod					2	51 - 53		
Bay anchovy								
Bluefish								
Gizzard Shad	1	142						
Inland Silverside								
Mummichog	6	51 - 77						
Northern Pipefish	1	181						
Striped Bass							1	64
Striped Killifish	7	41 - 74					4	60 - 65
Summer Flounder								
White Perch							36	41 - 73
INVERTEBRATES								
Callinectes sapidus	8	12 - 47			3	14 - 18		
Crangon septemspinosa	9		2		5			
Crassostrea virginica								
Palaemonetes pugio	73				30			
Rhithropanopeus harrisii								

TABLE A-17
Catch and Water Quality at Station S2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

S2	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0002		0059		0080		0106		0149		0154	
Date	8/02/01		9/25/01		10/9/01		11/13/01		12/26/01		01/09/02	
Time	09:30		12:05		11:15		11:30		11:50		12:40	
Tidal Stage (+hours)	High -1		Low +1.5		Low +2.0		High +4.5		Low + 0		Low +0.0	
Depth (feet)	4.0		4.5		5.0		4.0		4.0		4 to 4.5	
Salinity (0/00) surface	11.35		8.95		9.23		14.11		10.44		9.54	
bottom	11.85		--		--		--		--		--	
Temp (oC) surface	27.26		22.62		15.83		10.58		5.94		1.77	
bottom	26.29		--		--		--		--		--	
air			20		16		11		3		1	
D.O. (mg/L) surface	3.60		3.29		3.72		5.74		5.71		8.40	
bottom	3.40		--		--		--		--		--	
pH surface	7.22		6.85		7.18		6.75		6.34		7.20	
bottom	7.21		--		--		--		--		--	
Secchi (cm)	35		65		95		60		130		85	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alosa sp.	1	62										
Alewife	3	46-56										
Atlantic Menhaden												
Atlantic Silverside	437	57-84	2	51-67	83	52-119	1	76				
Bay anchovy					1	69						
Bluefish			3	119-131								
Crevalle Jack	19	39-57										
Gizzard Shad	20	59-105			2	79-140						
Hogchoker												
Inland Silverside					16	51-61			1	68	4	51-70
Mummichog	304	35-110	46	42-110	24	36-94	25	38 - 88	6	38 - 74	2	30-45
Spot												
Striped Bass	6	54-63	5	96-109	3	87-137						
Striped Killifish	344	35-120	3	79-84	43	58-134	93	61 - 143	332	65 - 142		
White Perch	111	41-71	33	60-230	16	59-261	1	125				
Winter Flounder												
INVERTEBRATES												
Callinectes sapidus	4	54-99			6	17-128						
Crangon septemspinosa					5		1		40		1	
Cyathura polita												
Palaeomonetes pugio	300		200		42		80		80		1	
Rhithropanopeus harrisii									1			

TABLE A-17
Catch and Water Quality at Station S2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

S2	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0209		0239		0268		0299		0308		0334	
Date	02/22/02		3/26/02		4/23/02		05/23/02		6/7/02		7/5/02	
Time	10:00		0.43		10:35		10:48		10:57		10:19	
Tidal Stage (+hours)	High +5.0		High +3.5		High +4		High +3.75		High +3.5		High +4.25	
Depth (feet)	4.0		4.00		4.5		3.0		4.5		4.0	
Salinity (0/00) surface	11.95		10.75		9.18		5.49		6.55		7.39	
bottom	--		--		--		--		--		--	
Temp (oC) surface	7.71		7.54		16.55		16.81		21.44		28.79	
bottom	--		--		--		--		--		--	
air	10		4		10		23		17		27	
D.O. (mg/L) surface	7.72		7.66		3.50		6.72		3.62		3.91	
bottom	--		--		--		--		--		--	
pH surface	7.24		7.03		6.21		7.85		7.69		6.71	
bottom	--		--		--		--		--		--	
Secchi (cm)	60		60		75		60		45		40	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alosa sp.												
Alewife												
Atlantic Menhaden									1	39	4	32 - 36
Atlantic Silverside	1	78	3	94-120	15	91-120	2	95-99			66	32 - 102
Bay anchovy												
Bluefish											5	82 - 94
Crevalle Jack												
Gizzard Shad												
Hogchoker					1	48	1	42				
Inland Silverside			1	47	1	60						
Mummichog	1	42			25	34-96	44	52-114	73	69 - 102	197	16 - 106
Spot							1	40			4	80 - 92
Striped Bass							9	81-160	5	88 - 147	3	116 - 159
Striped Killifish	4	80-84	2	63-65	8	57-93	22	67-121	16	78 - 104	97	25 - 130
White Perch					7	76-232			3	87 - 104	3	137 - 184
Winter Flounder							1	44	4	48 - 59		
INVERTEBRATES												
Callinectes sapidus					3	24-91	3	46-127	7	18 - 172	34	28 - 168
Crangon septemspinosa	2				10		1					
Cyathura polita	1											
Palaeomonetes pugio	45		1		50		44		10		130	
Rhithropanopeus harrisii												

TABLE A-17
Catch and Water Quality at Station S2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

S2	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0387		0417		0449		0475	
Date	11/04/02		3/17/03		5/27/03		8/26/03	
Time	12:17		11:48		11:13		12:00	
Tidal Stage (+hours)	High +4.25		High + 4.0		High + 4.0		High + 3.25	
Depth (feet)	4.0		3.5 to 4.0		3.5 to 4.0		4.0	
Salinity (0/00) surface	10.00		7.07		6.06		7.45	
bottom								
Temp (oC) surface	9.89		9.52		16.46		26.28	
bottom								
air	10		21.5		21		28	
D.O. (mg/L) surface	6.01		7.58		5.62		4.20	
bottom								
pH surface	7.57		7.66		7.64		7.56	
bottom								
Secchi (cm)	45		75		55		50	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alosa sp.								
Alewife								
Atlantic Menhaden								
Atlantic Silverside	5	66 - 92	2	87 - 105	2	89 - 99	50	53 - 95
Bay anchovy							14	23 - 44
Bluefish							1	119
Crevalle Jack								
Gizzard Shad								
Hogchoker								
Inland Silverside	19	42 - 66						
Mummichog			1	34	35	49 - 97	374	27 - 107
Spot								
Striped Bass					1	74	17	64 - 108
Striped Killifish	12	49 - 141			2	99 - 104	24	60 - 138
White Perch					2	77 - 96	765	51 - 147
Winter Flounder								
INVERTEBRATES								
Callinectes sapidus					2	42 - 116	2	160 - 165
Crangon septemspinosa								
Cyathura polita								
Palaeomonetes pugio	122		3		7		35	
Rhithropanopeus harrisii								

TABLE A-18
Catch and Water Quality at Station S3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

S3	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0011		0057		0084		0114		0121		0174	
Date	8/20/01		9/21/01		10/15/01		11/15/01		12/03/01		01/17/02	
Time	12:00		10:25		10:55		11:25		11:22		11:19	
Tidal Stage (+ hours)	High		Low +4		High +3		High +2.5		High +1.0		High +0	
Depth (feet)	5.0		4.0		3.0		4.0		4.5		4.0	
Salinity (0/00) surface	8.70		6.83		9.96		11.90		12.60		9.94	
bottom	--		--		--		--		--		--	
Temp (oC) surface	27.02		21.40		19.21		11.04		12.58		4.65	
bottom	--		--		--		--		--		--	
air			24		21		16		11			
D.O. (mg/L) surface	3.50		2.11		3.08		4.55		2.41		7.16	
bottom	--		--		--		--		--		--	
pH surface	7.13		6.85		7.10		6.60		6.68		7.36	
bottom	--		--		--		--		--		--	
Secchi (cm)	70		60		80		80		80		85	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden	3	32-48										
Atlantic Silverside	128	51-85			218	84-109						
Bluefish												
Carp												
Goldfish												
Inland Silverside	5	39-49	1	45	67	40 - 66	1	51	6	39 - 64		
Mummichog	513	29-49	2,815	6-78	88	28-74	261	37 - 65	43	35 - 96	3	41-49
Striped Killifish			4	52-77	6	28-90						
Striped Mullet												
White Perch	1	76			2	70-79						
INVERTEBRATES												
Palaeomonetes pugio			2,425		493		200					
Callinectes sapidus	3	16-140										

TABLE A-18
Catch and Water Quality at Station S3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

S3	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0211		0232		0271		0301		0331		0361	
Date	02/27/02		3/14/02		4/26/02		05/28/02		6/25/01		7/24/02	
Time	11:20		11:01		11:51		11:06		11:01		11:00	
Tidal Stage (+ hours)	High +2.5		High + 1.5		High +3		Low +5.5		High +0		High +1.0	
Depth (feet)	4.0		3.5		4.0		4.0		4.0		4.5	
Salinity (0/00) surface	12.71		8.48		6.47		4.28		4.95		9.45	
bottom	--		--		--		--		--		--	
Temp (oC) surface	8.29		10.38		14.31		21.08		26.44		26.51	
bottom	--		--		--		--		--		--	
air	2		14		12		25		28		23	
D.O. (mg/L) surface	6.70		6.81		4.35		4.00		6.04		4.85	
bottom	--		--		--		--		--		--	
pH surface	7.19		7.29		7.25		7.87		7.06		7.74	
bottom	--		--		--		--		--		--	
Secchi (cm)	65		85		55		50		45		40	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden											25	35 - 62
Atlantic Silverside	1	81	1	79	17	83-116					92	33 - 108
Bluefish											2	106 - 111
Carp							1	605				
Goldfish												
Inland Silverside			2	42-51	6	50-72			1	37	136	34 - 65
Mummichog	9	32-61	3	41-44	48	45-102	226	55-97	711	27 - 103	96	22 - 89
Striped Killifish					12	67-116	58	71-131			21	52 - 114
Striped Mullet					1	31					5	112 - 124
White Perch					1	219	3	95-156				
INVERTEBRATES												
Palaeomonetes pugio	7		5		50		5		7		1	
Callinectes sapidus											1	76

TABLE A-18
Catch and Water Quality at Station S3 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to July 2003

S3	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0365		0420		0451		0459	
Date	10/21/02		3/18/03		6/2/03		7/29/03	
Time	11:13		11:45		11:12		11:25	
Tidal Stage (+ hours)	High +1.0		High + 2.75		Low + 5.5		High + 1.0	
Depth (feet)	4.0		4.0		4.0		4.0	
Salinity (0/00) surface	4.21		3.77		1.45		6.63	
bottom								
Temp (oC) surface	14.29		10.32		18.06		26.61	
bottom								
air	15		24		17		27	
D.O. (mg/L) surface	4.44		6.90		7.50		5.18	
bottom								
pH surface	7.21		7.81		7.53		8.23	
bottom								
Secchi (cm)	60		60		40		40	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden	1	104						
Atlantic Silverside	21	52 - 90					424	43 - 76
Bluefish							4	106 - 137
Carp			5	583 - 730				
Goldfish							1	29
Inland Silverside	13	39 - 61					72	20 - 39
Mummichog	314	17 - 104	9	37 - 78	18	43 - 103	1,474	21 - 84
Striped Killifish	70	65 - 114			16	88 - 129	2	41 - 51
Striped Mullet								
White Perch					5	162 - 327	166	29 - 67
INVERTEBRATES								
Palaeomonetes pugio	500				20			
Callinectes sapidus							1	38

TABLE A-19
Catch and Water Quality at Station GN1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

GN1	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0004		0044		0085		0115		0140		0175	
Date (Set)	8/7/01		9/6/01		10/22/01		11/20/01		12/06/01		01/17/02	
Time (Set)	12:26		11:40		11:43		11:35		13:37		12:35	
Tidal Stage (+hours)	High +.5		High +0		Low +4.0		Low + 5.5		High + 0.75		High +1.0	
Depth (feet)	22 to 35		16 to 38		16 to 35		10 to 28		13 to 37		14 to 26	
Salinity (0/00) surface	18.90		20.46		18.90		22.78		21.47		22.01	
bottom	19.27		20.63		21.42		23.30		21.55		22.06	
Temp (oC) surface	28.03		24.53		17.55		11.62		13.37		4.83	
bottom	28.40		24.36		17.05		11.29		13.33		4.86	
air	36		27		18		7		15		4	
D.O. (mg/L) surface	6.73		5.74		5.40		6.25		6.02		8.00	
bottom	5.39		4.92		4.85		6.33		5.46		7.51	
pH surface	5.66		7.51		7.14		6.49		6.59		7.26	
bottom	7.46		7.49		7.27		6.69		6.75		7.39	
Secchi (cm)	80		85		150		128		100		140	
Length of Set (hr:min)	25:44		25:00		23:30		24:00		22:15		22:10	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden	2	340	1	n/a								
Bluefish					1	231						
Gizzard Shad							1	492				
Spot												
Striped Bass	1	n/a	1	360			1	166	8	190 - 319	1	147
Striped Searobin												
Weakfish												
White Perch	5	195-229	3	260	8	119-260	114	119 - 284	27	163 - 267	3	117-289
INVERTEBRATES												
Amphipoda												
Bryozoa								+				
Callinectes sapidus	29	100-180	33	105-198	9	115-149	3	113 - 158	1	134		
Crassostrea virginica							2				1	
Ctenophora					100's		100					
Isopoda					75							
Mogulus sp.							40					

TABLE A-19
Catch and Water Quality at Station GN1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

GN1	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	204		0234		0264		0293		0328		0332	
Date (Set)	2/19/2002		3/21/02		4/16/02		5/16/02		6/17/02		7/2/02	
Time (Set)	11:45		11:18		10:50		10:55		11:25		11:00	
Tidal Stage (+hours)	Low +4.5		High +3		Low +4.5		Low +4.0		Low + 2.25		Low +1.5	
Depth (feet)	10 to 32		10 to 27		10 to 25		7 to 18		11 to 28		18 to 30	
Salinity (0/00) surface	18.85		13.30		17.56		11.13		10.22		12.86	
bottom	20.54		16.09		17.95		11.17		10.45		14.09	
Temp (oC) surface	7.7		8.32		17.88		16.89		23.29		29.80	
bottom	6.74		8.68		16.75		16.63		22.65		29.64	
air	11		-1		32		24		24		34	
D.O. (mg/L) surface	7.76		8.02		7.56		6.55		3.61		4.31	
bottom	7.65		7.51		6.85		6.14		3.08		3.41	
pH surface	7.28		7.18		7.37		8.05		7.13		6.74	
bottom	7.44		7.21		7.38		8.12		6.98		6.74	
Secchi (cm)	145		65		90		80		75		60	
Length of Set (hr:min)	24:00		24:00		25:55		24:15		23:35		23:45	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden			15	175-190			1	300			2	325 - 352
Bluefish											1	308
Gizzard Shad												
Spot												
Striped Bass	1	385	17	205-770	16	200-740			7	226 - 360	4	195 - 339
Striped Searobin											1	223
Weakfish							1	420	1	229	2	250 - 437
White Perch	2	123-126	76	160-249	51	145-245	8	150-226	15	169 - 286	11	161 - 240
INVERTEBRATES												
Amphipoda											100	
Bryozoa												
Callinectes sapidus					3	109-149	6	62-160	4	105 - 149	10	101 - 173
Crassostrea virginica												
Ctenophora												
Isopoda												
Mogulus sp.												

TABLE A-19
Catch and Water Quality at Station GN1 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

GN1	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0389		0422		0447		0473	
Date (Set)	11/12/02		3/24/03		5/22/03		8/18/03	
Time (Set)	11:30		11:25		10:47		11:40	
Tidal Stage (+hours)	Low +2.5		Low + 3.5		Low + 1.5		Low + 3.5	
Depth (feet)	13 to 27		10.5 to 24		13 to 28		8 to 37	
Salinity (0/00) surface	13.44		5.66		11.36		9.71	
bottom	16.22		5.76		11.36		13.65	
Temp (oC) surface	12.58		10.78		15.70		28.56	
bottom	12.77		10.48		15.81		26.93	
air	11		12		13		28	
D.O. (mg/L) surface	6.91		7.33		4.98		4.50	
bottom	5.21		7.32		4.34		3.34	
pH surface	7.54		7.76		7.48		7.73	
bottom	7.55		7.75		7.48		7.41	
Secchi (cm)	100		70		70		60	
Length of Set (hr:min)	24:17		23:50		24:33		24:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden							3	325 - 366
Bluefish								
Gizzard Shad								
Spot	1	216						
Striped Bass	1	310			5	222 - 352	3	197 - 335
Striped Searobin								
Weakfish					1	265		
White Perch	34	154 - 271	2	221 - 259	16	150 - 265	14	217 - 262
INVERTEBRATES								
Amphipoda								
Bryozoa								many
Callinectes sapidus							10	102 - 163
Crassostrea virginica								
Ctenophora								
Isopoda							50	
Mogulus sp.								

TABLE A-20
Catch and Water Quality at Station GN2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

GN2	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0003		0043		0086		0116		0141		0152	
Date (Set)	8/7/01		9/6/01		10/22/01		11/20/01		12/6/01		01/03/02	
Time (Set)	12:05		11:14		12:10		12:15		14:00		11:25	
Tidal Stage (+hours)	High + 0		High +0		Low +4.5		High + 0		High +1.0		Low +5.5	
Depth (feet)	10 to 18		10 to 20		8 to 20		10 to 20		11 to 21		11 to 22	
Salinity (0/00)surface	12.94		13.59		14.84		17.61		16.97		16.29	
bottom	14.67		13.93		14.92		18.09		17.24		16.47	
Temp (oC) surface	29.75		24.60		16.73		11.08		13.50		2.05	
bottom	30.35		24.66		16.73		11.36		13.70		1.74	
air	36				18		10		15		3	
D.O. (mg/L) surface	6.04		5.93		4.51		5.97		4.41		7.79	
bottom	5.75		5.58		3.89		5.67		5.17		7.86	
pH surface	6.28		7.22		7.27		7.14		6.67		6.44	
bottom	7.38		7.36		7.26		7.11		6.87		6.59	
Secchi (cm)	60		70		140		118		90		85	
Length of Set (hr:min)	24:40		23:36		24:00		24:00		22:51		23:55	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden			8	309-363	27	331-400	13	329 - 391	2	348 - 357		
Bluefish	3	152-171	4	179-215	3	~200(all)						**NO**
Carp												
Gizzard Shad	1	399										**CATCH**
Striped Bass			1	420	2	152-189	3	151 - 722	2	480 - 749		
Weakfish												
White Perch	25	124-259	7	139-189	71	117-250	29	121 - 270	43	153 - 240		
INVERTEBRATES												
Amphipoda												
Balanus improvisus												
Callinectes sapidus	40	62-171	17	94-165	5	153-180						
Rhithropanopeus harrissii												

TABLE A-20
Catch and Water Quality at Station GN2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

GN2	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0205		0233		0263		0292		0329		0333	
Date (Set)	02/19/02		3/21/02		4/16/02		5/16/02		6/17/02		7/2/02	
Time (Set)	12:30		10:55		10:28		10:30		11:53		11:30	
Tidal Stage (+hours)	Low +4.5		Low +3.0		Low +4.25		Low +3.5		Low +2.75		Low +2.0	
Depth (feet)	10 to 16		7 to 14		8 to 15		7 to 13		10 to 15		8 to 16	
Salinity (0/00) surface	15.39		8.48		12.19		7.78		6.62		6.99	
bottom	17.71		9.82		12.91		8.15		7.33		9.45	
Temp (oC) surface	6.68		7.21		21.91		17.32		23.42		29.84	
bottom	6.65		7.53		20.42		17.08		22.04		29.35	
air	11		-1		34		24		24		34	
D.O. (mg/L) surface	7.82		7.09		5.26		6.51		9.63		7.56	
bottom	7.45		6.61		5.24		6.17		3.75		3.43	
pH surface	7.38		7.01		6.94		8.14		7.10		7.17	
bottom	7.42		7.04		6.93		8.12		7.07		7.11	
Secchi (cm)	105		65		65		65		60		40	
Length of Set (hr:min)	23:45		23:50		25:17		24:00		23:48		24:05	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden					4	269-373			2	172	12	204 - 408
Bluefish												
Carp												
Gizzard Shad			2	482-494								
Striped Bass			1	738	19	190-379			5	190 - 222	3	212 - 410
Weakfish												
White Perch	16	209-252	5	163-236	122	154-248	10	163-269	52	151 - 276	34	161 - 240
INVERTEBRATES												
Amphipoda							100					
Balanus improvisus							30					
Callinectes sapidus					1	122	3	146	3	157 - 177	9	90 - 163
Rhithropanopeus harrissii							1					

TABLE A-20
Catch and Water Quality at Station GN2 (Hackensack River)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to September 2003

GN2	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0390		0421		0448		0483	
Date (Set)	11/12/02		3/24/03		5/22/03		9/16/03	
Time (Set)	12:06		10:55		11:25		11:05	
Tidal Stage (+hours)	Low +3.0		Low + 3.0		Low + 2.0		Low + 4.0	
Depth (feet)	7 to 17		7 to 16.5		8 to 15		7.5 to 14	
Salinity (0/00)surface	8.52		2.50		7.45		9.38	
bottom	11.58		3.13		7.96		10.17	
Temp (oC) surface	11.63		11.06		15.84		23.70	
bottom	11.94		10.73		16.12		23.47	
air	9		12		13			
D.O. (mg/L) surface	8.49		7.17		4.98		5.03	
bottom	5.61		6.38		4.12		4.06	
pH surface	7.60		7.70		7.44		7.29	
bottom	7.57		7.68		7.44		7.23	
Secchi (cm)	50		80		75		N/A	
Length of Set (hr:min)	24:29		23:40		24:35		24:00	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Menhaden					1	350	12	322 - 390
Bluefish							21	209 - 237
Carp							1	605
Gizzard Shad	1	251					3	170 - 183
Striped Bass	2	758 - 760			1	750	6	340 - 595
Weakfish							1	203
White Perch	18	150 - 240	8	174 - 256	6	168 - 284	15	162 - 295
INVERTEBRATES								
Amphipoda								
Balanus improvisus								
Callinectes sapidus					1	150		
Rhithropanopeus harrissii								

TABLE A-21
Catch and Water Quality at Station GN3 (Overpeck Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

GN3	AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY	
Collection Number	0030		0058		0090		0120		0148		0155	
Date (Set)	8/27/01		9/24/01		10/29/01		11/28/01		12/26/01		01/10/02	
Time (Set)	11:10		10:30		11:55		11:42		11:00		11:08	
Tidal Stage (+hours)	Low + 0		Low +0		High +5		High +4.5		High + 5.0		High + 4.5	
Depth (feet)	5 to 8		3.5 to 9		7 to 9		6 to 8		5 to 10		5 to 8	
Salinity (0/00) surface	5.22		4.99		6.97		8.42		7.08		5.74	
bottom	6.63		5.65		7.54		9.20		8.27		6.44	
Temp (oC) surface	27.01		22.00		14.06		12.05		4.96		3.75	
bottom	26.14		22.22		13.97		12.35		6.19		3.93	
air	28				15		10		1		5	
D.O. (mg/L) surface	5.28		4.31		6.96		3.79		6.97		8.22	
bottom	1.30		2.64		4.48		2.92		5.61		10.14	
pH surface	7.34		7.01		7.47		6.53		6.95		6.60	
bottom	7.18		6.95		7.40		6.62		6.94		6.82	
Secchi (cm)	70		60		80		80		100		85	
Length of Set (hr:min)	24:00		24:00		23:35		25:18		24:40		24:37	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
Alligator Gar												
Atlantic Menhaden			10	112-124								
Black Crappie			2	110-120			1	N/A				
Blueback Herring												
Brown Bullhead	3	322-332	1	194	2	267-342						
Carp			8	513-681	3	609-648	3	561 - 685				
Gizzard Shad	155	111-139	220	116-147			3	280 - 520	2	478 - 510	2	450
Striped Bass			1	394	14	375-550			6	730 - 800		
White Perch	1	139	26	127-161	9	109-241	4	111 - 181				
INVERTEBRATES												
Amphipoda							100		100			
Balanus improvisus												
Callinectus sapidus												
Congeria leucophaeta												
Rhithropanopeus harrissii												

TABLE A-21
Catch and Water Quality at Station GN3 (Overpeck Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

GN3	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
Collection Number	0185		0240		0270		0296		0330		0360	
Date (Set)	02/07/02		3/26/02		4/23/02		05/20/02		6/20/02		7/22/02	
Time (Set)	11:00		11:18		12:40		10:50		11:23		12:58	
Tidal Stage (+hours)	High +5.5		High +4		Low +0		Low +0		High +5.5		High +4.5	
Depth (feet)	3.5 to 9.0		3 to 10		4 to 6		6 to 10		3 to 7.5		4 to 8.5	
Salinity (0/00) surface	7.70		5.11		4.12		1.22		2.41		5.96	
bottom	7.76		6.09		4.43		1.73		2.74		7.26	
Temp (oC) surface	5.98		8.87		17.82		16.01		24.41		30.81	
bottom	5.66		8.00		16.42		15.72		23.12		28.11	
air	11		11		21		16		24		34	
D.O. (mg/L) surface	8.64		7.31		7.80		7.64		9.15		11.26	
bottom	8.42		5.71		6.32		4.35		2.53		3.56	
pH surface	7.22		7.29		7.66		7.79		7.13		7.83	
bottom	7.46		7.22		7.58		7.73		7.06		7.73	
Secchi (cm)	65		85		60		40		35		25	
Length of Set (hr:min)	25:32		24:32		23:35		24:00		23:32		25:02	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			3	289	1	280						
Alligator Gar									1	529		
Atlantic Menhaden												
Black Crappie		**NO**					1	184	1	144		
Blueback Herring		**CATCH**					2	223-232				
Brown Bullhead												
Carp					6	552-681	7	236-688	5	570 - 654	3	592 - 610
Gizzard Shad												
Striped Bass			2	728-765	2	310-762	3	324-374	2	212 - 218	9	199 - 320
White Perch					4	152-231	29	163-243	28	154 - 233	24	135 - 232
INVERTEBRATES												
Amphipoda												
Balanus improvisus												
Callinectus sapidus											30	65 - 161
Congeria leucophaeta												
Rhithropanopeus harrissii	1				2							

TABLE A-21
Catch and Water Quality at Station GN3 (Overpeck Creek)
NJMC/MERI Hackensack River Fishery Resource Inventory
August 2001 to August 2003

GN3	AUTUMN 2002		WINTER 2002-03		SPRING 2003		SUMMER 2003	
Collection Number	0392		0418		0452		0466	
Date (Set)	11/14/02		3/17/03		6/5/03		8/5/03	
Time (Set)	12:32		12:40		09:47		10:30	
Tidal Stage (+hours)	Low +0		High + 4.0		Low + 2.0		Low + 1.0	
Depth (feet)	3 to 9.7		3 to 10		6 to 11		3.5 to 8.0	
Salinity (0/00) surface	4.25		0.96		0.24		0.47	
bottom	4.94		1.55		0.24		0.46	
Temp (oC) surface	12.79		9.87		16.80		26.55	
bottom	12.14		9.56		16.72		26.48	
air	16		19		20		26	
D.O. (mg/L) surface	6.04		9.31		7.42		3.90	
bottom	4.45		7.82		7.35		3.69	
pH surface	7.45		7.89		7.71		4.65	
bottom	7.44		7.89		7.71		4.58	
Secchi (cm)	50		70		60		65	
Length of Set (hr:min)	24:00		25:00		24:03		24:15	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife	1	N/A						
Alligator Gar								
Atlantic Menhaden								
Black Crappie			2	142 - 149				
Blueback Herring					2	252 - 320		
Brown Bullhead	2	320 - 362	4	266 - 306				
Carp	9	555 - 673			7	605 - 700	6	531 - 689
Gizzard Shad	20	176 - 532	1	445				
Striped Bass	6	329 - 850					2	213 - 219
White Perch	37	161 - 262			14	156 - 261	76	144 - 212
INVERTEBRATES								
Amphipoda								
Balanus improvisus								
Callinectus sapidus								
Congeria leucophaeta								
Rhithropanopeus harrissii								

APPENDIX B

TABLE B-1
Catch and Water Quality at Station T1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T1	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUNE 1987		JULY 1987	
Collection Number			0036-0037		0083-0084		0143-0144		0171-0172		0241-0242	
Date			3/16/87		4/10/87		5/13/87		6/1/87		7/1/87	
Time			10:58		11:11		10:50		11:30		10:52	
Tidal Stage			High +2		High +3		High +1		Low +4		Low +4	
Depth			15.0		20.0		20.0		20.0		20.0	
Salinity (0/00) surface			10.0		2.0		13.0		15.0		16.0	
bottom	**NOT**		10.0		2.0		14.0		15.0		16.0	
Temp (oC) surface			5.5		12.0		16.0		29.0		29.0	
bottom	**SAMPLED**		5.0		12.5		15.0		24.5		27.5	
air			7.0		16.0		16.5		32.0		26.0	
D.O. (mg/L) surface			11.8		7.0		6.3		6.1		3.2	
bottom			11.4		7.6		6.3		7.7		3.1	
pH surface			8.1		7.5		7.9		7.7		7.5	
bottom			8.0		7.5		7.9		7.6		7.6	
Secchi (cm)			120.0		90.0		70.0		60.0		80.0	
# & length of tow (min)			2/3		2/3		2/3		2/3		2/3	
FISH:	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			2	91-111	29	80-175						
American Eel									1	580	1	430
American Shad												
Atlantic Menhaden												
Atlantic Tomcod							24	32-52	1	73		
Bay Anchovy												
Black Crappie					1	125						
Blueback Herring			4	75-90	70	155-172	1	231				
Bluefish												
Mummichog											3	75-105
Northern Pipefish									1	132		
Rainbow Smelt					1	80						
Spot												
Spotted Hake												
Striped Bass											1	160
Weakfish												
Winter Flounder												
INVERTEBRATES												
Aegathoa oculata							1					
balanus improvisus			6				56		15		9	
Callinectes sapidus												
Congeria leucopheata												
Corambella sp.												
Congeria leucopheata					4		4					
Crangon septemspinosa			3		26		227		32		200	
Ctenophora												
Macoma balthica			1									
Neomysis americana							74					
Nereis sp			1									
Palaeomonetes pugio							7		64		91	
Rhithropanopeus harrissi					1		1		1		1	
Carambella sp.												

TABLE B-1
Catch and Water Quality at Station T1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T1	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0276-0277		0345-0346		0433-0434		0460-0461		0528-0529		0609-0610	
Date	8/7/87		9/9/87		10/6/87		11/5/87		12/1/87		1/4/88	
Time	11:18		11:42		10:45		10:29		10:35		11:22	
Tidal Stage	High +3		High +1		High +2		High +2.5		High +5		High +2	
Depth	15.0		20.0		15.0		18.0		15.0		16.0	
Salinity (0/00) surface	15.0		14.5		13.0		10.0		6.0		9.0	
bottom	15.0		16.5		14.0		10.0		7.0		10.0	
Temp (oC) surface	28.0		24.0		17.5		14.0		9.6		4.1	
bottom	28.0		23.0		17.0		14.0		9.9		3.9	
air	29.0		28.0		18.0		16.5		8.0		4.0	
D.O. (mg/L) surface	1.9		3.4		6.1		7.4		7.0		10.5	
bottom	3.2		3.8		6.0		7.1		7.0		10.2	
pH surface	7.4		7.3		7.8		8.0		7.6		7.8	
bottom	7.4		7.4		7.7		7.9		7.6		7.8	
Secchi (cm)	80		70		90		75.0		70.0		80.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH:	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					2	144-237					1	96
American Eel					1	450						
American Shad												
Atlantic Menhaden			1	246								
Atlantic Tomcod					2	126-130	16	130-193	2	186-187		
Bay Anchovy	1	30	5	33-77	13	33-79			2	33-36		
Black Crappie												
Blueback Herring			2	112-206								
Bluefish			2	106-109	1	113						
Mummichog	31	40-98										
Northern Pipefish												
Rainbow Smelt												
Spot												
Spotted Hake												
Striped Bass					1	176						
Weakfish					6	51-124						
Winter Flounder							5	80-145				
INVERTEBRATES												
Aegathoa oculata												
balanus improvisus	160		20		10		50		73			
Callinectes sapidus					4	41-123	5	17-70	2	36-66		
Congeria leucopheata												
Corambella sp.												
Congeria leucopheata									10			
Crangon septemspinosa			17		57		172		10			
Ctenophora			300		100		3					
Macoma balthica												
Neomysis americana												
Nereis sp												
Palaeomonetes pugio	800		3		11		7					
Rhithropanopeus harrissi	6		8		1							
Carambella sp.									1			

TABLE B-1
Catch and Water Quality at Station T1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T1	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0731-0732		0864-0865		0965-0966	
Date			4/21/88		8/3/1988		11/9/88	
Time			11:31		10:57		--	
Tidal Stage			Low +4.0		Low +3		High +2.0	
Depth			20.0		25		20.0	
Salinity (0/00)surface			10.0		8.0		14.0	
bottom	**NOT**		10.0		10.0		14.0	
Temp (oC) surface			10.6		33.0		11.8	
bottom	**SAMPLED**		10.6		30.8		11.6	
air			12.0		27.0		10.0	
D.O. (mg/L) surface			9.4		3.3		6.8	
bottom			9.6		2.9		6.8	
pH surface			8.2		7.4		8.2	
bottom			8.0		7.3		8.1	
Secchi (cm)			80.0		50.0		60.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH:	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel								
American Shad			1	?			1	228
Atlantic Menhaden								
Atlantic Tomcod			1	185			44	117-212
Bay Anchovy								
Black Crappie								
Blueback Herring			53	78-102				
Bluefish								
Mummichog								
Northern Pipefish								
Rainbow Smelt								
Spot							1	123
Spotted Hake			3	103-131				
Striped Bass			2	244-287				
Weakfish							6	78-138
Winter Flounder							12	95-116
INVERTEBRATES								
Aegathoa oculata								
balanus improvisus					2000		44	
Callinectes sapidus					1	155	49	9-156
Congeria leucopheata								
Corambella sp.								
Congeria leucopheata					2			
Crangon septemspinosa			27				53	
Ctenophora								
Macoma balthica								
Neomysis americana								
Nereis sp								
Palaeomonetes pugio					27		9	
Rhithropanopeus harrissi			2		50			
Carambella sp.								

TABLE B-2
Catch and Water Quality at Station T2 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T2	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number	0020-0021		0034-0035		0085-0086		0145-0146		0173-0174		0243-0244	
Date	2/27/87		3/13/87		4/10/1987		5/13/1987		6/1/87		7/1/87	
Time	145:8		14:08		14:18		11:40		12:20		11:31	
Tidal Stage	Low +0		Low +0		High +5		High +2		Low +5		Low +4	
Depth	25.0		30.0		25.0		20.0		20.0		20.0	
Salinity (0/00) surface	9.0		5.0		2.0		10.0		15.0		14.0	
bottom	9.5		5.0		2.0		10.0		15.0		15.0	
Temp (oC) surface	5.0		6.0		16.0		17.5		27.0		28.0	
bottom	4.0		5.0		14.5		17.0		25.5		28.0	
air	8.0		3.5		18.0		16.0		27.0		26.0	
D.O. (mg/L) surface	10.0		12.4		8.4		6.4		7.4		3.1	
bottom	10.2		13.7		8.4		5.8		6.2		4.2	
pH surface	7.6		8.0		7.5		7.8		7.7		7.5	
bottom	7.6		8.3		7.6		7.8		7.6		7.6	
Secchi (cm)	60.0		50.0		100.0		80.0		60.0		70.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					1	90						
American Eel	1	560	1	65	1	510	4	270-470				
Atlantic Menhaden									1	203		
Atlantic Tomcod							1	38				
Bay Anchovy												
Blueback Herring												
Conger Eel												
Mummichog	3	40-72	2	82-93	1	96			4	84-100		
Spot												
Striped Bass												
Striped Killifish			2	88-101								
Weakfish												
White Perch	10	108-267			4	120-210						
Windowpane												
Winter Flounder												
INVERTEBRATES												
Balanus improvisus	600		200		50		75					
Callinectes Sapidus									1	144		
Corophium simile	2											
Crangon septemspinosa	180		200				7		10			
Palaeomonetes pugio	8,500		70		300		49		6,400		473	
Rhithropanopeus harrissii	7		5		1		7		200		2	
Melita sp.	2											
Congeria leucophaeta												
Nereis sp.												

TABLE B-2
Catch and Water Quality at Station T2 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T2	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0278-0279		0347-0348		0435-0436		0462-0463		0530-0531		0611-0612	
Date	8/7/87		9/9/87		10/6/87		11/5/87		12/1/87		1/4/88	
Time	11:59		12:18		11:45		11:21		11:17		12:11	
Tidal Stage	High +4		High +1		High +3		High +3.5		High +5.5		High +2	
Depth	20.0		25.0		25.0		25.0		25.0		20.0	
Salinity (0/00) surface	15.0		14.5		9.2		7.0		5.0		8.0	
bottom	14.0		15.0		11.0		8.0		6.0		7.0	
Temp (oC) surface	28.0		23.0		18.0		14.9		9.4		3.6	
bottom	28.0		23.0		18.0		14.9		9.5		3.6	
air	31.0		28.0		18.0		14.0		9.0		4.0	
D.O. (mg/L) surface	1.4		2.8		5.2		6.7		7.0		9.4	
bottom	3.1		3.7		5.3		7.3		7.0		9.8	
pH surface	7.4		7.4		7.6		7.8		7.5		7.3	
bottom	7.4		7.2		7.5		8.0		7.5		7.1	
Secchi (cm)	80		70		60		50.0		80.0		90.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel			2	210-470	1	385			2	450-510		
Atlantic Menhaden												
Atlantic Tomcod					22	112-141	13	148-195	18	117-207		
Bay Anchovy			21	35-72	1	40						
Blueback Herring												
Conger Eel												
Mummichog	4	61-77	7	44-104	1	105			1	101	1	86
Spot												
Striped Bass												
Striped Killifish									1	108		
Weakfish			6	35-52	10	51-120						
White Perch									2	90-102		
Windowpane												
Winter Flounder					7	77-120						
INVERTEBRATES												
Balanus improvisus	3,000		15		100		2,515		100,000			
Callinectes Sapidus			6	24-190	3	38-120	1	65	1	50		
Corophium simile												
Crangon septemspinosa			250		110		30		1		2	
Palaeomonetes pugio	57		260		220						24	
Rhithropanopeus harrissii	10		45		5		51		18		8	
Melita sp.												
Congeria leucophaeta												
Nereis sp.												

TABLE B-2
Catch and Water Quality at Station T2 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T2	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0733-0734		0866-0867		0967-0968	
Date			4/21/88		8/3/88		11/9/88	
Time			12:36		11:41		11:56	
Tidal Stage			Low +5		Low +3.5		High +3	
Depth			20.0		10.0		25.0	
Salinity (0/00) surface			10.0		9.0		10.0	
bottom	**NOT**		9.0		10.0		10.0	
Temp (oC) surface			10.7		31.1		12.5	
bottom	**SAMPLED**		10.8		31.1		12.5	
air			12.0		28.0		9.5	
D.O. (mg/L) surface			9.5		2.9		6.4	
bottom			9.8		2.9		6.6	
pH surface			8.0		7.3		8.1	
bottom			8.0		7.2		7.9	
Secchi (cm)			90.0		50.0		50.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel							4	200-560
Atlantic Menhaden								
Atlantic Tomcod							80	174-230
Bay Anchovy								
Blueback Herring			1	160				
Conger Eel							1	127
Mummichog								
Spot							1	134
Striped Bass			1	235				
Striped Killifish								
Weakfish							11	85-115
White Perch								
Windowpane							1	85
Winter Flounder							4	63-130
INVERTEBRATES								
Balanus improvisus			12		350		75,000	
Callinectes Sapidus			2	56-60	3	110-113	32	22-66
Corophium simile								
Crangon septemspinosa			4				53	
Palaeomonetes pugio			2		125		5	
Rhithropanopeus harrissii			7		55		22	
Melita sp.								
Congeria leucophaeta					20			
Nereis sp.							1	

TABLE B-3
Catch and Water Quality at Station T3 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T3	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number	0010-0011		0032-0033		0091-0092		0147-0148		0185-0186		0247-0248	
Date	2/25/87		3/13/87		4/16/87		5/13/87		6/5/87		7/1/87	
Time	10:15		13:20		12:53		14:30		12:25		12:54	
Tidal Stage	High +3		High +5		High +1		High +4		Low +2		High +0	
Depth	20.0		32.0		25.0		20.0		20.0		15.0	
Salinity (0/00) surface	8.5		2.0		0.0		5.0		8.0		11.0	
bottom	9.0		3.0		0.0		5.0		8.0		13.0	
Temp (oC) surface	3.0		8.0		12.0		19.5		26.0		27.0	
bottom	3.0		6.0		12.5		19.5		25.0		27.0	
air	5.0		3.0		9.0		20.0		21.5		26.0	
D.O. (mg/L) surface	9.8		12.4		7.0		4.4		2.5		5.9	
bottom	9.8		14.0		7.2		5.3		2.6		4.2	
pH surface	7.6		7.7		7.5		7.6		7.6		7.7	
bottom	7.5		7.8		7.6		7.6		7.5		7.6	
Secchi (cm)	60.0		60.0		70.0		80.0		50.0		70.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife	2	123-137					1	250			1	130
American Eel	1	60			1	440	3	320-490			7	225-460
American Shad												
Atlantic Menhaden												
Atlantic Tomcod							1	43				
Bay Anchovy												
Blueback Herring					1	87	8	107-128				
Mummichog	2	34-85	3	44-65	2	49-68	13	71-100	2	50-73	64	50-97
Pumpkinseed												
Seaboard Goby												
Spot												
Striped Bass							1	125				
Striped Killifish												
Weakfish												
White Perch	3	95-131			2	87-92						
Winter Flounder												
INVERTEBRATES												
Balanus improvisus	10						15					
Callinectes sapidus												
Crangon septemspinosa	8		105									
Gammarus tigrinus	1						6					
Neomysis americana	7											
Palaemonetes pugio	16		1060		35		321		4		87	
Rhithropanopeus harrisii	3				1		4		5		1	

TABLE B-3
Catch and Water Quality at Station T3 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T3	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0280-0281		0349-0350		0437-0438		0464-0465		0532-0533		0613-0614	
Date	8/7/87		9/9/87		10/6/87		11/5/87		12/1/87		1/4/88	
Time	12:48		13:11		12:45		12:14		12:07		12:48	
Tidal Stage	High +4		High +2		High +3		High +4		Low +0		High +3	
Depth	15.0		20.0		20.0		20.0		15.0		20.0	
Salinity (0/00) surface	12.0		11.0		7.0		8.0		5.0		4.0	
bottom	15.0		12.5		7.5		6.0		5.0		4.0	
Temp (oC) surface	29.0		24.0		17.5		15.3		9.7		3.1	
bottom	28.0		24.0		17.5		15.5		9.2		3.0	
air	31.0		28.0		18.0		16.0		8.0		4.0	
D.O. (mg/L) surface	1.9		3.0		4.3		6.8		5.6		8.8	
bottom	3.2		2.9		5.2		6.8		5.4		9.0	
pH surface	7.3		7.4		7.4		7.8		7.5		7.0	
bottom	7.2		7.3		7.5		7.8		7.5		7.1	
Secchi (cm)	65		60		50		50.0		80.0		80.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife									1	175		
American Eel	1	232	3	310-410	2	445-460	3	135-245	1	520		
American Shad												
Atlantic Menhaden					3	214-287						
Atlantic Tomcod					2	110-114	49	122-189			1	210
Bay Anchovy			27	23-60	3	55-75	2	20-42				
Blueback Herring			2	139-147								
Mummichog	9	49-79	54	38-107	10	40-80	2	63-69	53	40-98		
Pumpkinseed							1	39				
Seaboard Goby							1	18				
Spot												
Striped Bass												
Striped Killifish									6	65-110	1	92
Weakfish							4	65-120				
White Perch												
Winter Flounder					1	75	1	112	1	108		
INVERTEBRATES												
Balanus improvisus											25	
Callinectes sapidus			2	155-179	2	35-102	1	21				
Crangon septemspinosa					45		33		45			
Gammarus tigrinus												
Neomysis americana							16					
Palaemonetes pugio	200		6500		30		7		26		52	
Rhithropanopeus harrisii	1						3		2			

TABLE B-3
Catch and Water Quality at Station T3 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T3	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0735-0736		0868-0869		0956-0957	
Date			4/21/88		8/3/88		10/28/88	
Time			13:19		12:42		13:08	
Tidal Stage			Low +5.5		Low +5		High +0	
Depth			15.0		20.0		20.0	
Salinity (0/00) surface			7.0		8.0		12.0	
bottom	**NOT**		8.0		8.0		14.0	
Temp (oC) surface			12.5		30.9		12.9	
bottom	**SAMPLED**		11.3		31.0		12.9	
air			12.0		29.0		13.0	
D.O. (mg/L) surface			11.6		4.3		6.8	
bottom			10.6		2.9		6.6	
pH surface			8.2		7.3		7.8	
bottom			8.2		7.2		7.8	
Secchi (cm)			70.0		50.0		60.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel					1	480		
American Shad			1	148				
Atlantic Menhaden								
Atlantic Tomcod							3	170-189
Bay Anchovy								
Blueback Herring								
Mummichog								
Pumpkinseed								
Seaboard Goby								
Spot							22	117-150
Striped Bass								
Striped Killifish								
Weakfish							7	72-157
White Perch								
Winter Flounder								
INVERTEBRATES								
Balanus improvisus					6			
Callinectes sapidus			1	45			10	26-63
Crangon septemspinosa			15		92		92	
Gammarus tigrinus								
Neomysis americana								
Palaemonetes pugio			3		340	10		
Rhithropanopeus harrisii			1		3			

TABLE B-4
Catch and Water Quality at Station T4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T4	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number	0014-0015		0030-0031		0074-0075		0155-0156		0187-0188		0254-0255	
Date	2/25/87		3/13/87		4/3/87		5/14/87		6/5/87		7/6/87	
Time	14:21		11:39		13:22		15:01		13:08		13:24	
Tidal Stage	Low +1		High +3		High +0		High +5		Low +2		Low +2	
Depth	15.0		12.0		15.0		15.0		20.0		20.0	
Salinity (0/00) surface	6.0		0.0		4.0		3.0		6.0		8.0	
bottom	6.0		2.0		4.0		4.0		8.0		10.0	
Temp (oC) surface	8.0		8.0		16.0		24.0		27.0		28.5	
bottom	9.0		6.5		13.5		23.0		26.0		28.0	
air	7.0		2.0		16.0		21.0		24.0		24.0	
D.O. (mg/L) surface	5.0		12.0		7.8		3.2		2.8		4.5	
bottom	5.8		12.2		6.2		3.6		2.5		2.7	
pH surface	7.4		7.5		7.7		7.6		7.5		7.6	
bottom	7.4		7.7		7.6		7.6		7.5		7.5	
Secchi (cm)	40.0		50.0		70.0		65.0		50.0		70.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel			1	65								
American Shad												
Atlantic Tomcod												
Bay Anchovy												
Blueback Herring												
Brown Bullhead					1	313						
Inland Silverside												
Mummichog	175	27-91	287	37-98	27	50-107	3	69-78			58	55-88
Spot												
Striped Bass												
Striped Killifish	1	85										
Weakfish												
White Perch	1	100	1	105								
INVERTEBRATES												
Balanus improvisus									50			
callinectes sapidus												
Congeria leucopheata	2								15			
Crangon septemspinosa	1		20									
Palaeomonetes pugio	15		200		1100		100		1		167	
Rhithropanopeus harrissi	3		6		4		7		2			

TABLE B-4
Catch and Water Quality at Station T4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T4	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0282-0283		0351-0352		0439-0440		0466-0467		0534-0535		0615-0616	
Date	8/7/87		9/9/87		10/6/87		11/5/87		12/1/87		1/4/88	
Time	13:28		13:59		13:32		13:07		13:00		13:25	
Tidal Stage	High +5		High +3		High +4		High +4.5		Low +0.5		High +3.5	
Depth	20.0		20.0		15.0		22.0		20.0		20.0	
Salinity (0/00) surface	8.0		7.0		3.5		5.0		3.0		0.0	
bottom	5.0		9.0		4.5		5.0		3.0		2.0	
Temp (oC) surface	29.0		25.0		19.0		16.5		12.1		5.7	
bottom	28.0		23.0		18.0		15.3		11.0		3.1	
air	26.0		28.0		18.0		16.0		8.0		4.0	
D.O. (mg/L) surface	3.5		2.8		2.8		3.6		5.4		7.6	
bottom	3.0		2.0		2.2		4.4		5.4		8.2	
pH surface	7.4		7.2		7.3		7.6		7.0		7.0	
bottom	7.3		7.3		7.3		7.5		7.2		7.1	
Secchi (cm)	45		60		60		60.0		70.0		70.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							1	130	1	133		
American Eel					1	100	4	284-500				
American Shad												
Atlantic Tomcod							1	138				
Bay Anchovy			1	28			1	43	1	30		
Blueback Herring												
Brown Bullhead												
Inland Silverside												
Mummichog	8	38-82	3	59-69	43	45-86	58	43-104	127	35-104	89	40-88
Spot												
Striped Bass												
Striped Killifish												
Weakfish												
White Perch												
INVERTEBRATES												
Balanus improvisus											50	
callinectes sapidus												
Congeria leucopheata	30						10				250	
Crangon septemspinosa							300		35			
Palaeomonetes pugio	10		35		3700		8000		140		45	
Rhithropanopeus harrissi			3								1	

TABLE B-4
Catch and Water Quality at Station T4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T4	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0744-0745		0881-0882		0954-0955	
Date			4/28/88		9/19/88		10/28/88	
Time			13:02		11:45		12:20	
Tidal Stage			High +5		Low +3.0		High +0	
Depth			15.0		15.0		25.0	
Salinity (0/00) surface			4.0		6.0		11.0	
bottom	**NOT**		4.0		9.0		11.0	
Temp (oC) surface			18.9		23.7		12.5	
bottom	**SAMPLED**		17.5		22.0		12.5	
air			14.0		22.0		13.0	
D.O. (mg/L) surface			13.8		4.7		6.6	
bottom			12.1		2.5		6.4	
pH surface			8.3		7.2		7.6	
bottom			8.2		7.1		7.7	
Secchi (cm)			40.0		70.0		60.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel			2	205-235				
American Shad					3	160 - 190		
Atlantic Tomcod							23	143-202
Bay Anchovy								
Blueback Herring					14	111-150		
Brown Bullhead								
Inland Silverside					1	79		
Mummichog			6	55-99	80	52-101		
Spot					113	114-152	54	115-152
Striped Bass			1	325				
Striped Killifish								
Weakfish					2	47-81	5	72-114
White Perch								
INVERTEBRATES								
Balanus improvisus					22			
callinectes sapidus			2	41-62	4	25-32	5	35-65
Congeria leucopheata			7		15			
Crangon septemspinosa			10				132	
Palaeomonetes pugio			200		17000		3	
Rhithropanopeus harrissi					4			

TABLE B-5
Catch and Water Quality at Station T5 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T5	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number	0016-0017		0028-0029		0072-0073		0157-0158		0189-0190		0256-0257	
Date	2/27/87		3/13/87		4/3/87		5/21/87		6/5/87		7/6/87	
Time	11:18		10:43		12:04		10:45		13:47		14:14	
Tidal Stage	High +2		High +2		Low +5		High +4		Low +3		Low +2	
Depth	20.0		20.0		20.0		15.0		15.0		15.0	
Salinity (0/00) surface	6.0		0.0		0.0		2.0		6.0		7.0	
bottom	6.0		1.0		1.0		2.0		6.0		8.0	
Temp (oC) surface	12.0		11.0		16.0		22.5		28.0		29.5	
bottom	8.0		8.0		14.0		21.5		26.5		29.0	
air	6.0		3.0		15.0		19.0		24.0		24.0	
D.O. (mg/L) surface	5.6		11.4		8.4		1.7		3.5		4.1	
bottom	6.8		11.7		7.2		2.0		2.0		3.3	
pH surface	7.4		7.6		7.7		7.5		7.5		7.6	
bottom	7.5		7.6		7.6		7.5		7.5		7.5	
Secchi (cm)	60.0		70.0		60.0		80.0		80.0		70.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel	1	59										
Blueback Herring												
Brown Bullhead					3	105-300						
Gizzard Shad												
Mummichog	41	46-95	61	48-91	212	41-111	2	75-90	1	48	17	56-90
Spot												
White Perch			1	103								
INVERTEBRATES												
Balanus improvisus	206		200									
callinectes sapidus												
Congeria leucopheata	305											
Palaeomonetes pugio	4		2		520							
Crangon septemspinosa												
Rhithropanopeus harrisii	3				1							

TABLE B-5
Catch and Water Quality at Station T5 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T5	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0290-0291		0357-0358		0441-0442		0468-0469		0536-0537		0628-0629	
Date	8/12/87		9/10/87		10/6/87		11/5/87		12/1/87		1/19/88	
Time	11:20		12:10		14:13		14:06		13:48		14:29	
Tidal Stage	Low +4		High +0		High +4.5		High +5		Low +1		High +5	
Depth	20.0		15.0		15.0		18.0		20.0		16.0	
Salinity (0/00) surface	5.0		5.5		3.0		3.0		2.0		2.0	
bottom	8.0		7.5		3.5		4.0		1.0		2.0	
Temp (oC) surface	31.5		29.0		22.0		20.0		13.7		10.1	
bottom	27.5		25.0		19.3		17.5		14.0		11.0	
air	27.0		26.0		18.0		16.0		10.0		7.5	
D.O. (mg/L) surface	1.9		2.4		3.1		3.0		5.8		4.6	
bottom	2.4		1.7		3.5		3.2		6.0		5.2	
pH surface	7.3		7.4		7.5		7.7		7.4		7.2	
bottom	7.4		7.2		7.5		7.7		7.3		7.2	
Secchi (cm)	70		70		60		50.0		60.0		40.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel												
Blueback Herring												
Brown Bullhead									1	300		
Gizzard Shad												
Mummichog			2	60-65	127	36-86	17	39-88	4	53-90	9	33-89
Spot												
White Perch												
INVERTEBRATES												
Balanus improvisus	10											
callinectes sapidus												
Congeria leucopheata	5											
Palaeomonetes pugio			10		110		335		20		24	
Crangon septemspinosa							15					
Rhithropanopeus harrisii												

TABLE B-5
Catch and Water Quality at Station T5 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T5	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number	**not**		0746-0747		0879-0880		0952-0953	
Date	**sampled**		4/28/88		9/19/88		10/28/88	
Time			13:48		11:00		11:30	
Tidal Stage			High +5.5		Low +2.0		Low +5.0	
Depth			12.0		17.0		20.0	
Salinity (0/00) surface			4.0		6.0		7.0	
bottom			4.0		6.0		6.0	
Temp (oC) surface			24.2		26.2		12.7	
bottom			18.9		22.7		12.5	
air			14.0		28.0		13.0	
D.O. (mg/L) surface			13.2		2.5		5.6	
bottom			10.2		1.2		5.4	
pH surface			8.2		6.9		7.9	
bottom			7.9		6.9		7.7	
Secchi (cm)			40.0		50.0		50.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel			2	300-325				
Blueback Herring			2	175-196				
Brown Bullhead								
Gizzard Shad			1	193				
Mummichog			11	56-98	2	35-47	1	43
Spot							9	120-135
White Perch								
INVERTEBRATES								
Balanus improvisus								
callinectes sapidus					1	20	4	27-71
Congeria leucopheata								
Palaeomonetes pugio			5				220	
Crangon septemspinosa			15				135	
Rhithropanopeus harrisii								

TABLE B-6
Catch and Water Quality at Station T6 (Sawmill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T6	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number	0008-0009		0038-0039		0093-0094		0149-0150		0180-0181		0245-0246	
Date	2/24/87		3/16/87		4/16/87		5/14/87		6/5/87		7/1/87	
Time	13:10		12:26		13:51		10:54		10:36		12:13	
Tidal Stage	Low +1		High +2		High +2		High		Low		Low +5	
Depth	10.0		10.0		20.0		20.0		10.0		15.0	
Salinity (0/00) surface	9.0		8.0		0.0		8.0		10.0		14.0	
bottom	9.0		8.0		0.0		10.0		10.0		15.0	
Temp (oC) surface	5.0		8.0		12.0		18.5		22.5		28.0	
bottom	5.0		8.0		12.0		17.0		22.5		28.0	
air	9.0		13.0		8.5		17.0		24.0		26.0	
D.O. (mg/L) surface	11.2		16.4		8.2		5.4		2.7		2.6	
bottom	11.2		16.4		8.2		5.9		4.1		4.1	
pH surface	7.7		8.5		7.6		7.6		7.6		7.5	
bottom	7.7		8.5		7.6		7.6		7.5		7.5	
Secchi (cm)	40.0		60.0		80.0		70.0		70.0		60.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel									7	300-470		
Atlantic Tomcod							1	39				
Bay Anchovy												
Blueback Herring												
Crevalle Jack												
Mummichog	12	32-70			1	88	3	90-98	294	53-95	3	78-80
Spot												
Striped Bass												
Weakfish												
White Perch					3	180-192	1	215	1	260		
INVERTEBRATES												
Balanus improvisus	112				250		10000				650	
Callinectes sapidus							2	110-159				
Congeria leaucopheata	24											
Crangon septemspinosa	20						2					
Chironomidae	2											
Corophium sp.	46											
Ctenophora												
Melita nitida	6											
Nereis sp.									1			
Panopeus herbstii	1											
Rhithropanopeus harrisii	18		4		7		7		35		18	
Palaemonetes pugio	350				40		2		190		10	
Uca pugnax	1											

TABLE B-6
Catch and Water Quality at Station T6 (Sawmill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T6	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0284-0285		0353-0354		0445-0446		0472-0473		0544-0545		0626-0627	
Date	8/11/87		9/10/87		10/8/87		11/10/87		12/3/87		1/19/88	
Time	11:37		10:40		11:37		10:19		12:53		13:25	
Tidal Stage	High +0		Low +5		High +0		Low +5		High +5		High +4	
Depth	15.0		15.0		20.0		18.0		13.0		15.0	
Salinity (0/00) surface	14.0		13.0		9.0		5.0		4.0		8.0	
bottom	15.0		13.0		11.0		5.0		4.0		8.0	
Temp (oC) surface	27.0		25.0		17.0		12.0		7.2		3.8	
bottom	26.5		25.0		17.0		12.5		7.1		4.1	
air	26.0		26.0		17.5		8.0		4.0		7.0	
D.O. (mg/L) surface	2.4		2.4		4.5		6.9		8.8		8.6	
bottom	4.1		2.6		5.5		6.1		8.8		9.2	
pH surface	7.4		7.4		7.5		7.9		7.6		7.6	
bottom	7.3		7.3		7.6		7.8		7.6		7.5	
Secchi (cm)	70		50		90		50.0		60.0		50.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel							2	390-420				
Atlantic Tomcod							10	149-210				
Bay Anchovy	1	30			1	47						
Blueback Herring			1	132								
Crevalle Jack												
Mummichog	20	63-108	8	69-90	16	51-92			13	35-105	2	43-86
Spot												
Striped Bass					1	370						
Weakfish					1	80						
White Perch			1	173			1	199				
INVERTEBRATES												
Balanus improvisus	70		100		8		3650		50		30	
Callinectes sapidus	3	140-170					2	40-49				
Congeria leaucopheata	130		40				1050		100			
Crangon septemspinosa							2					
Chironomidae												
Corophium sp.												
Ctenophora			5		2							
Melita nitida												
Nereis sp.												
Panopeus herbstii												
Rhithropanopeus harrisii	30		33		14		3					
Palaemonetes pugio	70		28		4				20		75	
Uca pugnax												

TABLE B-6
Catch and Water Quality at Station T6 (Sawmill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T6	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0740-0741		0887-0888		0969-0970	
Date			4/28/88		9/20/88		11/9/88	
Time			10:44		10:56		13:25	
Tidal Stage			High +3.0		Low +1.0		High +4.5	
Depth			14.0		14.0		12.0	
Salinity (0/00) surface			10.0		11.0		9.0	
bottom	**NOT**		10.0		12.0		9.0	
Temp (oC) surface			13.2		22.3		12.0	
bottom	**SAMPLED**		13.6		22.4		12.0	
air			14.0		24.0		10.0	
D.O. (mg/L) surface			11.2		5.0		8.4	
bottom			11.4		4.6		8.4	
pH surface			8.3		7.5		8.2	
bottom			8.4		7.5		8.1	
Secchi (cm)			60.0		50.0		40.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel					4	275-495		
Atlantic Tomcod							15	172-266
Bay Anchovy								
Blueback Herring								
Crevalle Jack					1	79		
Mummichog					67	49-108		
Spot					12	120-157		
Striped Bass			3	113-135			6	176-207
Weakfish					3	74-97		
White Perch					14	165-268	2	157-233
INVERTEBRATES								
Balanus improvisus					3400		600	
Callinectes sapidus			3	49-78	5	27-172	13	18-64
Congeria leaucopheata					100		50	
Crangon septemspinosa								
Chironomidae								
Corophium sp.								
Ctenophora							2	
Melita nitida								
Nereis sp.								
Panopeus herbstii								
Rhithropanopeus harrisii			2		100		4	
Palaemonetes pugio			7		50		15	
Uca pugnax								

TABLE B-7
Catch and Water Quality at Station T7 (Berry's Creek Canal)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T7	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number	0012-0013		0040-0041		0089-0090		0151-0152		0183-0184		0252-0253	
Date	2/25/87		3/16/87		4/16/87		5/14/87		6/5/87		7/6/87	
Time	11:30		13:01		12:02		12:13		11:30		12:20	
Tidal Stage	High +4		High +3		High +0		High +1		Low +1		Low +1	
Depth	10.0		12.0		14.0		12.0		12.0		10.0	
Salinity (0/00) surface	5.5		6.0		0.0		5.0		6.0		8.0	
bottom	7.0		6.0		0.0		6.0		8.0		8.0	
Temp (oC) surface	3.5		7.5		12.5		19.0		23.0		28.0	
bottom	3.0		7.5		12.5		18.0		23.5		27.0	
air	4.0		6.0		8.0		17.0		23.0		24.0	
D.O. (mg/L) surface	5.0		13.2		6.8		5.1		1.6		4.9	
bottom	7.0		13.2		6.8		4.3		1.9		3.9	
pH surface	7.4		8.1		7.5		7.6		7.5		7.8	
bottom	7.4		8.1		7.5		7.6		7.4		7.5	
Secchi (cm)	50.0		60.0		60.0		100.0		50.0		60.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife	1	136					2	110-124				
American Eel	2	57-64			1	272	1	405				
American Shad												
Atlantic Silverside												
Atlantic Tomcod												
Bay Anchovy												
Blueback Herring							1	130				
Bluefish												
Bluegill					1	135						
Golden Shiner	1	167										
Mummichog	56	39-86	49	40-97			2	83-104			116	54-89
Pumpkinseed												
Spot												
Striped Bass												
Weakfish												
INVERTEBRATES												
Balanus improvisus	75								5			
Congeria leucopheata	1											
Crangon septemspinosa	5		30									
Hypaniola grayi	1											
macoma balthica	5		4									
Neomysis americana												
Orchestia uhleri												
Rhithropanopeus harrissii	37		20				14		40			
Palaetomonetes pugio	14		190		100		250		10		20	
Callinectes sapidus												

TABLE B-7
Catch and Water Quality at Station T7 (Berry's Creek Canal)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T7	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0286-0287		0355-0356		0447-0448		0474-0475		0542-0543		0624-0625	
Date	8/11/87		9/10/87		10/8/87		11/10/87		12/3/87		1/19/88	
Time	12:29		11:27		12:36		11:12		12:08		12:43	
Tidal Stage	High +1		Low +5		High +1		Low +5		High +4		High +4	
Depth	15.0		14.0		15.0		15.0		12.0		12.0	
Salinity (0/00) surface	12.0		11.0		8.0		2.0		1.0		4.0	
bottom	14.0		11.0		8.0		2.0		1.0		4.5	
Temp (oC) surface	27.0		25.0		17.5		11.0		8.4		2.9	
bottom	26.5		25.0		17.5		11.5		8.2		3.1	
air	28.0		26.0		13.0		8.2		5.0		7.0	
D.O. (mg/L) surface	2.3		2.0		5.7		6.2		3.8		7.0	
bottom	3.0		2.0		5.6		6.3		3.8		7.2	
pH surface	7.3		7.3		7.7		7.7		7.4		7.6	
bottom	7.3		7.4		7.7		7.7		7.2		7.4	
Secchi (cm)	90		60		60		60.0		50.0		40.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							1	114				
American Eel					3	121-560						
American Shad												
Atlantic Silverside												
Atlantic Tomcod					5	109-122						
Bay Anchovy			2	23-49	9	23-57	1	69				
Blueback Herring												
Bluefish												
Bluegill												
Golden Shiner												
Mummichog	3	33-164	4	55-84	30	53-100			36	57-88	9	45-84
Pumpkinseed												
Spot												
Striped Bass												
Weakfish					1	64						
INVERTEBRATES												
Balanus improvisus	20						9		50			
Congeria leucopheata									70			
Crangon septemspinosa					247		1		2		1	
Hypaniola grayi												
macoma balthica												
Neomysis americana					6							
Orchestia uhleri					2							
Rhithropanopeus harrissii			7									
Palaetomonetes pugio	830		2400		1214		3		28		2	
Callinectes sapidus												

TABLE B-7
Catch and Water Quality at Station T7 (Berry's Creek Canal)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

T7	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0742-0743		0889-0890		0958-0959	
Date			4/28/88		9/20/88		10/28/88	
Time			12:01		11:50		13:51	
Tidal Stage			High +4		Low +2.0		High +1.0	
Depth			12.0		10.0		16.0	
Salinity (0/00) surface			4.0		8.0		12.0	
bottom	**NOT**		6.0		8.0		12.0	
Temp (oC) surface			13.8		22.2		12.7	
bottom	**SAMPLED**		13.7		22.3		12.8	
air			14.0		24.0		13.0	
D.O. (mg/L) surface			14.4		7.6		6.6	
bottom			13.0		4.6		5.9	
pH surface			8.7		7.4		8.0	
bottom			8.5		7.4		7.9	
Secchi (cm)			40.0		80.0		60.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			1	104	10	87 - 98		
American Eel							1	483
American Shad			1	157	13	81 - 120		
Atlantic Silverside					25	67-81		
Atlantic Tomcod							23	163-201
Bay Anchovy					1,187	26-82		
Blueback Herring			1	254	18	96-152		
Bluefish					1	78		
Bluegill								
Golden Shiner								
Mummichog			42	50-112	68	44-94		
Pumpkinseed					4	83-112		
Spot					34	116-162	11	121-150
Striped Bass					1	302		
Weakfish					16	50-103	5	71-114
INVERTEBRATES								
Balanus improvisus					12			
Congeria leucopheata					2			
Crangon septemspinosa			60		226		30	
Hypaniola grayi								
macoma balthica								
Neomysis americana					2			
Orchestia uhleri							4	
Rhithropanopeus harrissii			4		217			
Palaetomonetes pugio			65		2243		60	
Callinectes sapidus			3	65-72	15	10-174	11	41-57

TABLE B-8
Catch and Water Quality at Station T8 (Mill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T8	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number			0042-0043		0087-0088		0160-0161		0203-0204		0261-0262	
Date			3/18/87		4/16/87		5/28/87		6/10/87		7/10/87	
Time			10:48		10:32		12:20		10:18		10:30	
Tidal Stage			High +0		Low +4		High +1		High +1		High +0	
Depth			12.0		10.0		10.0		14.0		10.0	
Salinity (0/00) surface			5.0		0.0		5.0		6.0		8.0	
bottom	**NOT**		5.0		0.0.		6.0		6.0		8.0	
Temp (oC) surface			10.0		13.0		21.0		24.0		29.0	
bottom	**SAMPLED**		10.0		13.0		20.5		24.0		29.0	
air			14.0		8.5		27.0		18.0		27.5	
D.O. (mg/L) surface			12.4		4.6		2.5		3.1		1.4	
bottom			12.4		4.6		4.8		4.1		2.9	
pH surface			8.1		7.5		7.6		7.5		7.5	
bottom			8.1		7.5		7.5		7.5		7.5	
Secchi (cm)			40.0		70.0		90.0		80.0		80.0	
# & length of tow (min)			2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel			1	65								
Gizzard Shad												
Mummichog			22	34-86	30	45-90	13	46-90	37	50-76	5	30-76
Spot												
INVERTEBRATES												
Balanus improvisus			1015						95		4200	
Callinectes sapidus												
Chironomidae											2	
Congeria leucopheata			200				10		115		60	
Ctenophorans												
Palaeomonetes pugio			21									
Rhithropanopeus harrissii												

TABLE B-8
Catch and Water Quality at Station T8 (Mill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T8	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0316-0317		0359-0360		0443-0444		0476		0540-0541		0620-0621	
Date	8/24/87		9/10/87		10/8/87		11/10/87		12/3/87		11/19/88	
Time	10:21		12:52		10:39		11:57		11:11		10:49	
Tidal Stage	High +0		High +0		Low +5.5		Low +5.5		High +3		High +2	
Depth	10.0		12.0		15.0		10.0		6.0		10.0	
Salinity (0/00) surface	8.0		8.5		3.0		0.0		0.0		7.0	
bottom	8.0		9.0		3.0		0.0		0.0		6.0	
Temp (oC) surface	25.0		25.0		17.0		12.0		9.8		3.6	
bottom	25.0		25.0		17.0		12.0		9.3		3.5	
air	22.0		27.0		N/A		8.5		3.5		9.0	
D.O. (mg/L) surface	1.7		3.1		5.5		4.4		4.5		6.6	
bottom	2.8		4.2		5.5		4.6		4.2		7.0	
pH surface	7.5		7.4		7.5		7.1		7.2		7.8	
bottom	7.5		7.5		7.6		7.1		7.1		7.3	
Secchi (cm)	90		80		50		60.0		60.0		40.0	
# & length of tow (min)	2/3		2/3		2/3		**1/3**		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel												
Gizzard Shad							11	113-125	1	282		
Mummichog	64	27-82					10	47-73	62	33-79	14	34-77
Spot												
INVERTEBRATES												
Balanus improvisus	1100		200		150		100		11500		40	
Callinectes sapidus												
Chironomidae												
Congeria leucopheata	600		80		490		300		6000		450	
Ctenophorans												
Palaeomonetes pugio					20							
Rhithropanopeus harrissii	1											

TABLE B-8
Catch and Water Quality at Station T8 (Mill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T8	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0748-0749		0885-0886		0977-0978	
Date			5/3/88		9/19/88		11/29/88	
Time			12:47		13:45		14:30	
Tidal Stage			High +1.5		Low +5.0		High +0.5	
Depth			10.0		8.0		10.0	
Salinity (0/00) surface			6.0		8.0		0.0	
bottom	**NOT**		6.0		7.0		0.0	
Temp (oC) surface			15.7		23.1		9.7	
bottom	**SAMPLED**		15.7		23.2		9.7	
air			12.0		24.0		7.0	
D.O. (mg/L) surface			11.4		2.2		5.4	
bottom			11.2		2.0		5.4	
pH surface			8.2		7.0		8.1	
bottom			8.2		7.2		8.0	
Secchi (cm)			50.0		50.0		40.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel								
Gizzard Shad								
Mummichog			13	49-100	11	43-81	661	38-88
Spot					2	113-126		
INVERTEBRATES								
Balanus improvisus			160		50		10000	
Callinectes sapidus			1	55				
Chironomidae								
Congeria leucopheata			50		20		10000	
Ctenophorans					1			
Palaeomonetes pugio			1		1			
Rhithropanopeus harrissii								

TABLE B-9
Catch and Water Quality at Station T9 (Cromakill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T9	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number	0018-0019		0044-0045		0076-0077		0153-0154		0205-0206		0269-0270	
Date	2/27/87		3/18/87		4/3/87		5/14/87		6/10/87		7/27/87	
Time	12:28		11:35		14:12		13:10		11:10		11:51	
Tidal Stage	High +3		High +1		High +1		High +2		High +2		High +0	
Depth	10.0		10.0		10.0		10.0		10.0		10.0	
Salinity (0/00) surface	3.5		4.0		0.0		2.0		5.0		7.0	
bottom	3.5		4.0		0.0		3.0		6.0		7.0	
Temp (oC) surface	7.0		9.5		15.5		19.5		23.0		32.0	
bottom	7.0		9.5		15.5		20.0		23.0		32.0	
air	8.0		11.0		14.0		17.0		18.0		19.0	
D.O. (mg/L) surface	3.6		12.0		7.8		1.4		2.3		3.1	
bottom	3.6		12.0		7.8		2.5		2.8		3.8	
pH surface	7.4		8.2		7.7		7.6		7.5		7.9	
bottom	7.4		8.2		7.7		7.6		7.5		7.9	
Secchi (cm)	20.0		60.0		70.0		45.0		60.0		80.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel	2	68-73										
Gizzard Shad												
Mummichog	47	35-78	4	39-70	84	39-89	1	55			3	23-26
Pumpkinseed					1	105						
INVERTEBRATES												
Balanus improvisus	25		23								25	
Callinectes sapidus												
Congeria leucophaeta	50										3	
Palaeomonetes pugio												
Rhithropanopeus harisii	1											

TABLE B-9
Catch and Water Quality at Station T9 (Cromakill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T9	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0288-0289		0387-0388		0449-0450		0470-0471		0538-0539		0622-0623	
Date	8/11/87		9/21/87		10/8/87		11/9/87		12/3/87		1/19/88	
Time	13:50		12:20		13:47		10:27		10:32		11:32	
Tidal Stage	High +2		High +3		High +3		Low +5		High +2.5		High +2.5	
Depth	10.0		10.0		7.0		10.0		6.0		8.0	
Salinity (0/00) surface	10.0		2.5		3.8		5.0		0.0		2.0	
bottom	10.0		3.0		3.5		4.0		0.0		2.0	
Temp (oC) surface	28.0		20.0		17.0		14.0		8.7		4.1	
bottom	27.0		20.0		17.0		14.0		9.1		3.9	
air	28.0		20.0		13.0		16.0		4.0		6.0	
D.O. (mg/L) surface	3.9		1.0		2.7		5.9		2.2		4.4	
bottom	2.7		2.2		3.3		3.6		3.6		5.4	
pH surface	7.3		7.4		7.7		7.6		7.5		7.2	
bottom	7.2		7.4		7.7		7.6		7.3		7.2	
Secchi (cm)	70		70		50		50.0		50.0		50.0	
# & length of tow (min)	2/3		2/3		2/3		2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel												
Gizzard Shad									1	160		
Mummichog	41	30-97	23	30-69	48	35-80	94	38-87	126	30-90	9	24-75
Pumpkinseed												
INVERTEBRATES												
Balanus improvisus												
Callinectes sapidus												
Congeria leucophaeta												
Palaeomonetes pugio	5				2							
Rhithropanopeus harisii												

TABLE B-9
Catch and Water Quality at Station T9 (Cromakill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

T9	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0749A-0749B		0883-0884		0975-0976	
Date			5/3/88		9/19/88		11/29/88	
Time			13:35		12:57		13:30	
Tidal Stage			High +2		Low +4.0		Low +5.0	
Depth			6.0		6.0		6.0	
Salinity (0/00) surface			2.0		5.0		2.0	
bottom	**NOT**		4.0		6.0		0.0	
Temp (oC) surface			15.0		22.9		9.2	
bottom	**SAMPLED**		15.0		21.6		9.0	
air			12.0		23.5		7.0	
D.O. (mg/L) surface			5.6		3.3		4.7	
bottom			8.0		1.4		4.8	
pH surface			7.4		6.9		8.2	
bottom			7.5		7.0		8.0	
Secchi (cm)			40.0		60.0		60.0	
# & length of tow (min)			2/3		2/3		2/3	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
American Eel								
Gizzard Shad								
Mummichog			23	42-87	11	33-80	703	40-92
Pumpkinseed								
INVERTEBRATES								
Balanus improvisus								
Callinectes sapidus			2	42-49				
Congeria leucophaeta								
Palaeomonetes pugio					1			
Rhithropanopeus harisii								

TABLE B-10
Catch and Water Quality at Station TN1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN1	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number			0048		0078		0122		0215		0258 (*)	
Date (Set)			3/23/87		4/8/87		5/7/87		6/18/87		7/9/87	
Time (Set)			10:35		11:18		11:45		11:06		13:30	
Tidal Stage			Low +0		Low +0		Low +0		Low +1		Low +0	
Depth			4.0		3.0		2.0		5.0		3.0	
Salinity (0/00) surface			10.0		0.0		6.0		13.0		15.0	
bottom	**NOT**		10.0		0.0							
Temp (oC) surface			10.0		11.5		15.0		31.5		31.0	
bottom	**SAMPLED**		10.0		11.5							
air			15.5		12.0				25.5		28.0	
D.O. (mg/L) surface			14.8		7.2		8.0		4.1		2.5	
bottom			14.8		7.2							
pH surface			8.5		7.5		7.7		7.5		7.5	
bottom			8.5		7.5							
Secchi (cm)			60.0		90.0		60.0		60.0		70.0	
Length of Set			24.0		24.0		24.5		25.0		22.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel					4	390-560						
American Shad												
Atlantic Menhaden												
Atlantic Silverside							2	113-127				
Atlantic Tomcod												
Bay Anchovy												
Black Crappie					1	128						
Blueback Herring							1	242				
Bluefish												
Bluegill					1	125						
Carp					2	402-434	2	440-565				
Crevalle Jack												
Mummichog			1	110	2	100-108	1	84	58	69-100	13	88-162
Northern Pipefish												
Pumpkinseed					4	55-97	2	100-107				
Spotted Hake												
Striped Bass												
Striped Killifish												
Weakfish												
White Perch			3	215-320	5	147-270						
Winter Flounder												
INVERTEBRATES												
Bryozoa											1000	
Callinectes sapidus									2	170		
Crangon septemspinosa												
Palaeomonetes pugio											25	
Rhithropanopeus harrissii					2						6	
REPTILES												
Diamond Back Terrapin							7		11		1	

* Net leader twisted & one pole missing on retrieve, net re-set on 7/21/87

TABLE B-10
Catch and Water Quality at Station TN1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN1	JUL 1987		AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0268 (#)		0309		0343		0458		0503					
Date (Set)	7/21/87		8/17/87		9/3/87		10/22/87		11/19/87					
Time (Set)	12:34		11:20		12:20		15:05		14:00					
Tidal Stage	High +5		Low +1		Low +2		High +5		Low +0					
Depth	4.0		5.0		4.0		3.0		3.0					
Salinity (0/00) surface	12.0		12.0		11.5		10.0		8.0					
bottom											**NOT**		**NOT**	
Temp (oC) surface	37.0		34.0		23.0		20.0		18.5					
bottom											**SAMPLED**		**SAMPLED**	
air	29.0						13.0		7.5					
D.O. (mg/L) surface	2.0		3.3		4.2		7.2		5.2					
bottom														
pH surface	7.7		7.5		7.5		7.8		7.2					
bottom														
Secchi (cm)	80.0		60		50		40		50.0					
Length of Set	23.0		24		24		23.5		24					
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							8	94-152	2	96				
American Eel			2	282-440										
American Shad														
Atlantic Menhaden							2	245-274						
Atlantic Silverside														
Atlantic Tomcod					1	107								
Bay Anchovy							1	83						
Black Crappie														
Blueback Herring			2				1	155						
Bluefish					2	85-90	2	127						
Bluegill														
Carp							1	454						
Crevalle Jack					11	55-110	13	74-125						
Mummichog	1	77	170	70-113					6	78-92				
Northern Pipefish														
Pumpkinseed			1	70	2	120-122								
Spotted Hake														
Striped Bass					10	94-112			4	405-505				
Striped Killifish			1	103										
Weakfish														
White Perch							3	225-272	17	155-285				
Winter Flounder							1	65						
INVERTEBRATES														
Bryozoa														
Callinectes sapidus														
Crangon septemspinosa							3							
Palaeomonetes pugio	2								10					
Rhithropanopeus harrissii	7						2							
REPTILES														
Diamond Back Terrapin					4									

Re-set of 7/9/87 collection. One pole missing on retrieve, but net still standing up.

TABLE B-10
Catch and Water Quality at Station TN1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN1	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number	0699		0752		0870		0933	
Date (Set)	3/15/88		5/10/88		8/8/88		10/20/88	
Time (Set)	13:50		10:50		12:55		12:15	
Tidal Stage	Low +0.5		Low +0		Low +0		Low +1.5	
Depth	4.0		4.0		3.0		5.0	
Salinity (0/00) surface	6.0		9.0		15.0		13.0	
bottom								
Temp (oC) surface	7.0		15.6		39.0		24.0	
bottom								
air	5.0		15.0		32.0		10.0	
D.O. (mg/L) surface	10.8		10.4		4.0		8.8	
bottom								
pH surface	8.1		7.6		7.2		8.2	
bottom								
Secchi (cm)	50.0		60.0		80.0		50.0	
Length of Set	24		24		24		24	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			3	117 - 121			4	99-135
American Eel			3	495-560				
American Shad			1	133				
Atlantic Menhaden								
Atlantic Silverside			1	118	2	52-77		
Atlantic Tomcod								
Bay Anchovy								
Black Crappie								
Blueback Herring			11					
Bluefish							5	102-144
Bluegill								
Carp								
Crevalle Jack							69	
Mummichog	4	49-88			59	73-118		
Northern Pipefish			1	185				
Pumpkinseed			1	83	1	65		
Spotted Hake			8	115-150				
Striped Bass			4	112-340				
Striped Killifish								
Weakfish							7	100-182
White Perch			8	149-305			1	304
Winter Flounder			1	116				
INVERTEBRATES								
Bryozoa								
Callinectes sapidus			6	59-110	38	83-185	9	30-85
Crangon septemspinosa								
Palaeomonetes pugio								
Rhithropanopeus harrissii								
REPTILES								
Diamond Back Terrapin			1		3			

TABLE B-11
Catch and Water Quality at Station TN2 (Sawmill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN2	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number			0049		0079		0121		0214		0263	
Date (Set)			3/25/87		4/8/87		5/7/87		6/18/87		7/14/87	
Time (Set)			10:55		12:05		11:30		10:48		08:20	
Tidal Stage			High +5		Low +1		Low +0		Low +0		Low +2	
Depth			3.0		4.0		4.0		5.0		5.0	
Salinity (0/00) surface			8.0		0.0		6.0		12.0		10.0	
bottom	**NOT**		8.0		0.0							
Temp (oC) surface			11.5		12.0		17.0		25.5		23.0	
bottom	**SAMPLED**		11.5		12.0							
air			17.0		11.0				27.0		21.0	
D.O. (mg/L) surface			13.4		9.1		8.8		5.1		3.2	
bottom			13.4		9.1							
pH surface			8.6		7.8		8.0		7.6		7.6	
bottom			8.6		7.8							
Secchi (cm)			60.0		50.0		60.0		60.0		60.0	
Length of Set			24		24		24.5		24		25	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel			1	560	20	320-530	2	470-540	10	485-620	1	570
American Shad												
Black Crappie					4	120-162						
Bluegill					1	117						
Carp					7	440-560	11	420-590	1	457		
Gizzard Shad												
Mummichog			48	70-109	350	52-110	37	71-105	69	67-135	60	86-95
Pumpkinseed					5	57-85	1	81	1	80		
Spot												
Striped Bass												
Striped Killifish			1	101								
White Perch			6	103-247	18	106-270	23	100-280	42	107-300	3	212-250
Window Pane												
Winter Flounder												
INVERTEBRATES												
Callinectes sapidus									1	152		
Crangon septemspinosa												
Palaeomonetes pugio											20	
Rhithropanopeus harrissii												
REPTILES												
Diamond Back Terrapin											2	

TABLE B-11
Catch and Water Quality at Station TN2 (Sawmill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN2	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0308		0344		0456		0502					
Date (Set)	8/17/87		9/3/87		10/19/87		11/19/87					
Time (Set)	11:00		12:35		14:20		13:40					
Tidal Stage	Low +0		Low +2		Low +1		Low +0					
Depth	7.0		5.0		4.0		3.0					
Salinity (0/00) surface	10.0		10.5		10.0		7.0					
bottom									**NOT**		**NOT**	
Temp (oC) surface	30.0		23.0		18.0		12.0					
bottom									**SAMPLED**		**SAMPLED**	
air	28.5				16.0		10.0					
D.O. (mg/L) surface	8.6		10.0		15.5		6.8					
bottom												
pH surface	8.0		8.1		8.7		7.5					
bottom												
Secchi (cm)	30		30		40		60.0					
Length of Set	24		24.5		23.5		23.5					
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							1	80				
American Eel			1	560								
American Shad												
Black Crappie												
Bluegill												
Carp												
Gizzard Shad			1	106								
Mummichog	11	72-96	10	70-96	57	40-104	6	32-93				
Pumpkinseed												
Spot					1	139						
Striped Bass												
Striped Killifish					2	90-97						
White Perch	26	112-290	1	134	11	174-247	7	252				
Window Pane												
Winter Flounder												
INVERTEBRATES												
Callinectes sapidus	10	146-187	2	180-181	1	72						
Crangon septemspinosa												
Palaeomonetes pugio												
Rhithropanopeus harrissii	20											
REPTILES												
Diamond Back Terrapin	3											

TABLE B-11
Catch and Water Quality at Station TN2 (Sawmill Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN2	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number	0698		0753		0863		0932	
Date (Set)	3/15/88		5/10/88		7/19/88		10/20/88	
Time (Set)	13:35		11:42		09:45		11:25	
Tidal Stage	Low +0		Low +0		Low +2		Low +1.5	
Depth	3.0		4.0		3.0		5.0	
Salinity (0/00) surface	4.0		8.0		10.0		12.0	
bottom								
Temp (oC) surface	6.5		16.1		26.7		12.9	
bottom								
air	4.0		15.0		25.0		10.0	
D.O. (mg/L) surface	13.2		11.2		1.8		13.0	
bottom								
pH surface	8.5		7.7		7.3		8.7	
bottom								
Secchi (cm)	50.0		30.0		60.0			
Length of Set	24		23.5		24.5		23.5	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel			2	360-395	2	432-580	5	550-630
American Shad							24	89 - 115
Black Crappie								
Bluegill								
Carp			1	610				
Gizzard Shad								
Mummichog	290	39-113	1	90	47	72-108	39	57-92
Pumpkinseed					6	69-87		
Spot							16	110-131
Striped Bass							3	385-575
Striped Killifish	8	80-119					40	86-140
White Perch	1	156	4	165-225	8	173-275	16	195-275
Window Pane							1	120
Winter Flounder							2	98-150
INVERTEBRATES								
Callinectes sapidus			3	33-60	30	95-146	3	50-190
Crangon septemspinosa	1							
Palaeomonetes pugio							25	
Rhithropanopeus harrissii								
REPTILES								
Diamond Back Terrapin					13			

TABLE B-12
Catch and Water Quality at Station TN3 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN3	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number					0116		0120		0213		0251	
Date (Set)					4/29/87		5/7/87		6/18/87		7/6/87	
Time (Set)					15:30		10:45		10:23		12:00	
Tidal Stage					High +4		LOW +0		LOW +0		LOW +0	
Depth					2.0		3.0		4.0		4.0	
Salinity (0/00) surface					1.0		4.0		10.0		8.0	
bottom	**NOT**		**NOT**		1.0							
Temp (oC) surface					14.0		17.0		27.0		27.0	
bottom	**SAMPLED**		**SAMPLED**		14.0		17.0					
air					14.0				27.0		20.0	
D.O. (mg/L) surface					9.6		9.0		5.3		2.7	
bottom					9.6		9.0					
pH surface					7.8		7.7		7.6		7.5	
bottom					7.8		7.7					
Secchi (cm)					60.0		50.0		60.0		70.0	
Length of Set					23.5		24.5		24		23.5	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							1	249	2	100-120		
American Eel							1	450	6	280-540		
American Shad												
Atlantic Menhaden									2	220-230		
Atlantic Tomcod												
Blueback Herring							161	90-117				
Brown Bullhead					2	320-335			4	260-305		
Carp							2	505-530	3	485-560		
Crevalle Jack												
Green Sunfish									1	81	3	79-80
Mummichog					70	61-105	37	76-126	98	78-115	121	72-101
Pumpkinseed					1	90	1	90	4	77-102	15	77-96
Spot												
Striped Bass									3	111-157		
Striped Killifish												
White Perch					2	216-255	34	133-308	49	110-297	5	121-200
Winter Flounder												
INVERTEBRATES												
Callinectes sapidus									5	130-205		
Rhithropanopeus harrissii												
Palaemonetes pugio												
REPTILE												
Diamond Back Terrapin							13		3			

NOTE; The one Yellow Bullhead identified inTN3 Coll 0758 (Spring 1988) was actually a Brown Bullhead (based on examination of the preserved specimen), and has been corrected here.

TABLE B-12
Catch and Water Quality at Station TN3 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN3	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0307		0340		0451		0483					
Date (Set)	8/17/87		9/2/87		10/14/87		11/16/87					
Time (Set)	10:40		12:00		09:52		11:35					
Tidal Stage	Low +0		Low +1		Low +0.5		LOW +0					
Depth	3.0		5.0		3.0		4.0					
Salinity (0/00) surface	7.5		7.0		4.0		4.0					
bottom									**NOT**		**NOT**	
Temp (oC) surface	30.0		23.5		15.0		10.8					
bottom									**SAMPLED**		**SAMPLED**	
air	28.5		17.0		17.0		14.0					
D.O. (mg/L) surface	4.2		3.2		5.8		3.6					
bottom												
pH surface	7.5		7.5		7.8		8.7					
bottom												
Secchi (cm)	60		65		70		80.0					
Length of Set	24.0		23		24		24.5					
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife					3	97-116						
American Eel												
American Shad							2	121-225				
Atlantic Menhaden												
Atlantic Tomcod												
Blueback Herring	3	121-137	15	127-145	1	130						
Brown Bullhead												
Carp					1	505	1	512				
Crevalle Jack	2	46	1	50								
Green Sunfish			2	90-98			1	89				
Mummichog	6	44-83	107	67-105	20	53-102	249	46-105				
Pumpkinseed	7	64-87	24	81-109	7	80-115	7	89-122				
Spot												
Striped Bass							1	312				
Striped Killifish												
White Perch	26	115-200	2	135-140	11	136-250	5	108-290				
Winter Flounder												
INVERTEBRATES												
Callinectes sapidus	7	140-181	4	151-172			2	36-40				
Rhithropanopeus harrissii							6					
Palaemonetes pugio												
REPTILE												
Diamond Back Terrapin			2		2							

TABLE B-12
Catch and Water Quality at Station TN3 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN3	WINTER 1988		SPRING 1988		SPRING 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number	0697		0755 *		0758 #		0797 #		0871		0931	
Date (Set)	3/15/88		5/11/88		5/24/88		6/13/88		8/8/88		10/20/88	
Time (Set)	13:05		12:25		10:20		15:40		14:15		10:30	
Tidal Stage	LOW +0		LOW +0		LOW +0		LOW +0		LOW +1		LOW +0.5	
Depth	4.0		5.0		4.0		5.0		5.0		3.0	
Salinity (0/00) surface	2.0		6.0		2.0		5.0		8.0		9.0	
bottom												
Temp (oC) surface	9.1		19.0		20.9		25.1		31.9		16.0	
bottom												
air	6.5		18.0		13.0				32.0		10.0	
D.O. (mg/L) surface	7.4		10.4		2.4		9.4		7.1		9.0	
bottom												
pH surface	7.8		7.9		7.3		8.1		7.5		7.9	
bottom												
Secchi (cm)	60.0		60.0		80.0		50.0		80.0		50.0	
Length of Set	24		24		24		23.5		24		23	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			1	110							7	112-134
American Eel					2	360-490	1	370				
American Shad											42	
Atlantic Menhaden												
Atlantic Tomcod											7	162-207
Blueback Herring			1	112							1	272
Brown Bullhead			1	35	6	245-300						
Carp					2	570-750			1	555		
Crevalle Jack									1	52		
Green Sunfish					1	112					1	98
Mummichog	7	76-100	1	97	5	80-105			40	75-93	59	72-111
Pumpkinseed									1	78	8	73-130
Spot									1	131	5	110-140
Striped Bass			1	490	1	100	4	115-132			2	200-297
Striped Killifish			3								1	98
White Perch	1	109	2	111-245	14	130-280			1	153	6	163-267
Winter Flounder											1	147
INVERTEBRATES												
Callinectes sapidus			4	62-76			1	112				
Rhithropanopeus harrissii	35		4									
Palaemonetes pugio	10		6									
REPTILE												
Diamond Back Terrapin												

* Net frame down in water upon retrieve

\# These collections made to collect tissue for lab analysis, and were not part of regular fisheries inventory, but the data has been included.

TABLE B-13
Catch and Water Quality at Station TN4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN4	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUN 1987		JUL 1987	
Collection Number			0047		0082		0119		0202(*)		0232 (*)		0250	
Date (Set)			3/18/87		4/9/87		5/5/87		6/9/87		6/23/87		7/6/87	
Time (Set)			13:37		14:45		11:40		13:20		15:15		11:30	
Tidal Stage			HIGH +2		Low +2		LOW +1		HIGH +5		LOW +1		LOW +0	
Depth			3.0		2.0		3.0		5.0		3.0		3.0	
Salinity (0/00) surface			5.0		0.0		0.0		6.0		7.0		6.0	
bottom	**NOT**		5.0		0.0		0.0							
Temp (oC) surface			13.0		13.5		16.0		25.5		30.0		28.5	
bottom	**SAMPLED**		13.0		13.5		16.0							
air			14.0		21.0		14.0		18.0				20.0	
D.O. (mg/L) surface			12.0		5.8		8.2		5.4		3.9		1.9	
bottom			12.0		5.8		8.2							
pH surface			7.9		7.5		7.7		7.5		7.5		7.5	
bottom			7.9		7.5		7.7							
Secchi (cm)			50.0		60.0		50.0		45.0		90.0		70.0	
Length of Set			24.5		24.0		24.0		24.0		24.0		23.5	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife														
American Eel					4	410-500	4	330-540					1	540
American Shad														
Atlantic Tomcod														
Black Crappie							1	190						
Blueback Herring			1	166			1	105						
Brown Bullhead			2	308-335	6	265-340	15	230-355	1	338	1	330	5	272-330
Carp					1	590	8	300-560						
Mummichog			106	38-102	910	68-105	160	70-94	25	46-76	4165	111-130	680	75-105
Pumpkinseed					5	80-120	3	78-125					3	76-93
Spot														
Striped Killifish														
Weakfish														
White Catfish														
White Perch					11	132-230	34	130-285	1	112	1	110	5	120-186
INVERTEBRATES														
Callinectes sapidus														
Hydrobia totteni														
Laeoneries sp.			1											
Palaemonetes pugio														
Rhithropanopeus harrisii													1	
REPTILES														
Diamond Back Terrapin														

(*) Net pulled off poles by the tide. The net was re-set on 6/23/87 (Coll. # 0232). All data included in analysis.

TABLE B-13
Catch and Water Quality at Station TN4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN4	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0274		0337		0452		0482					
Date (Set)	8/14/87		9/1/87		10/14/87		11/16/87					
Time (Set)	11:07		11:00		10:06		11:20					
Tidal Stage	Low +0		Low+2		Low +0.5		LOW +0					
Depth	4.0		4.0		2.0		4.0					
Salinity (0/00) surface	10.0		5.5		2.0		3.0					
bottom									**NOT**		**NOT**	
Temp (oC) surface	31.0		23.5		17.0		12.3					
bottom									**SAMPLED**		**SAMPLED**	
air	27.5		18.0		17.0		14.3					
D.O. (mg/L) surface	2.6		2.3		3.8		2.8					
bottom												
pH surface	7.3		7.5		7.6		8.6					
bottom												
Secchi (cm)	70.0		70.0		70.0		50.0					
Length of Set	27.0		24.5		24.5		24.0					
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife			5	120-145								
American Eel			1	530	1	535						
American Shad												
Atlantic Tomcod												
Black Crappie												
Blueback Herring					1	124						
Brown Bullhead	2	235-280					2	328-350				
Carp												
Mummichog	221	66-111	1250	55-105	96	69-109	178	73-103				
Pumpkinseed	6	87-92	2	95-105	1	101						
Spot												
Striped Killifish			2	99-104								
Weakfish												
White Catfish												
White Perch			2	150-190								
INVERTEBRATES												
Callinectes sapidus												
Hydrobia totteni												
Laeoneries sp.												
Palaemonetes pugio												
Rhithropanopeus harrisii												
REPTILES												
Diamond Back Terrapin			1									

TABLE B-13
Catch and Water Quality at Station TN4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN4	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number	0700		0754		0872		0928	
Date (Set)	3/15/88		5/10/88		8/9/88		10/19/88	
Time (Set)	14:15		12:15		13:55		09:45	
Tidal Stage	LOW +1		LOW +0		LOW +0		LOW +2.0	
Depth	3.0		6.0		6.0		4.0	
Salinity (0/00) surface	0.0		4.0		5.0		7.0	
bottom								
Temp (oC) surface	11.5		20.7		34.6		17.5	
bottom								
air	5.0		16.0		30.0		13.0	
D.O. (mg/L) surface	4.8		8.4		4.0		5.9	
bottom								
pH surface	7.6		7.5		7.3		7.5	
bottom								
Secchi (cm)	60.0		50.0		75.0		60.0	
Length of Set	24		24		23.5		23	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
American Eel								
American Shad							24	102 - 129
Atlantic Tomcod							1	163
Black Crappie								
Blueback Herring							6	116 - 153
Brown Bullhead	1	325					1	362
Carp								
Mummichog	18	76-90	22	47-88	12	78-114	18	71-90
Pumpkinseed								
Spot							2	120-131
Striped Killifish								
Weakfish							2	84-85
White Catfish							1	360
White Perch			8	165-240			1	225
INVERTEBRATES								
Callinectes sapidus			1	42	8	119-159	7	36-50
Hydrobia totteni					10,000			
Laeoneries sp.								
Palaemonetes pugio					1			
Rhithropanopeus harrisii								
REPTILES								
Diamond Back Terrapin								

TABLE B-14
Catch and Water Quality at Station TN5 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN5	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number			0046		0080		0118		0201		0264	
Date (Set)			3/18/87		4/8/87		5/5/87		6/9/87		7/14/87	
Time (Set)			13:15		13:02		11:28		13:00		08:45	
Tidal Stage			High +2		Low +1		Low +1		High +5		Low +2	
Depth			3.0		2.0		3.0		4.0		4.0	
Salinity (0/00) surface			6.0		0.0		0.0		4.0		8.0	
bottom	**NOT**		6.0		0.0		0.0					
Temp (oC) surface			14.0		13.0		18.0		27.0		29.5	
bottom	**SAMPLED**		14.0		13.0		18.0					
air			16.0		11.0		16.0		18.0		24.0	
D.O. (mg/L) surface			10.6		7.6		6.8		4.0		1.5	
bottom			10.6		7.6		6.8					
pH surface			7.7		7.5		7.8		7.5		7.5	
bottom			7.7		7.5		7.8					
Secchi (cm)			50.0		70.0		50.0		60.0		70.0	
Length of Set			24		24		24		24		28.5	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Unidentified Clupeid												
Alewife					1	127						
American Eel					2	450-520						
Black Crappie									3	128-187		
Blueback Herring									3	245-270		
Brown Bullhead			24	220-345			14	280-350	9	196-330	1	325
Carp			3	483-590			9	360-800	3	335-580	2	385-575
Gizzard Shad												
Golden Shiner							1					
Green Sunfish												
Mummichog			14	69-87	80	68-96	6	49-92	312	61-101	5	71-84
Pumpkinseed					7	55-102			6	68-75		
Spot												
Weakfish												
White Perch					5	125-226	1	180	3	151-237		
INVERTEBRATES												
Calinectes sapidus												
Rhithropanopeus harrissii												
Palaeomonetes pugio							10					
REPTILES												
Snapping Turtle									2		2	
E. Painted turtle												

TABLE B-14
Catch and Water Quality at Station TN5 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN5	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0273		0338		0453		0481					
Date (Set)	8/4/87		9/1/87		10/14/87		11/16/87					
Time (Set)	10:55		11:15		10:12		11:10					
Tidal Stage	Low+0		Low +2		Low +0.5		High +5					
Depth	5.0		4.0		3.0		5.0					
Salinity (0/00) surface	7.0		5.0		2.0		2.0					
bottom									**NOT**		**NOT**	
Temp (oC) surface	33.0		24.5		20.0		11.9					
bottom									**SAMPLED**		**SAMPLED**	
air	27.5		18.0		18.0		17.0					
D.O. (mg/L) surface	2.9		3.5		4.2		3.8					
bottom												
pH surface	7.2		7.4		7.6							
bottom												
Secchi (cm)	70		70		80		70.0					
Length of Set	24.0		22.5		24		24					
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Unidentified Clupeid												
Alewife					4	101-209						
American Eel												
Black Crappie												
Blueback Herring					11	100-125						
Brown Bullhead	2	289-300	5	99-389	6	295-343	11	285-335				
Carp	2	368-570	3	410-510								
Gizzard Shad			3	90-170								
Golden Shiner												
Green Sunfish	1	110										
Mummichog	60	43-88	17	70-105	85	67-87	36	63-86				
Pumpkinseed	1	87			9	61-91						
Spot												
Weakfish												
White Perch			3	136-164								
INVERTEBRATES												
Calinectes sapidus												
Rhithropanopeus harrissii												
Palaeomonetes pugio												
REPTILES												
Snapping Turtle												
E. Painted turtle												

TABLE B-14
Catch and Water Quality at Station TN5 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN5	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number	0649		0738		0862		0929	
Date (Set)	2/25/88		4/26/88		7/19/88		10/9/88	
Time (Set)	11:20		13:15		09:00		11:05	
Tidal Stage	Low +1		Low +0		Low +1		Low +2	
Depth	6.0		3.0		1.0		3.0	
Salinity (0/00) surface	0.0		4.0		9.0		6.0	
bottom								
Temp (oC) surface	12.5		21.1		31.9		19.8	
bottom								
air	-1.0		18.0		25.0		6.0	
D.O. (mg/L) surface	6.8		14.0		2.0		6.0	
bottom								
pH surface	7.8		8.3		7.0		7.8	
bottom								
Secchi (cm)	50.0		40.0		75.0		60.0	
Length of Set	23.5		23.5		29.5		23.5	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Unidentified Clupeid					1	?		
Alewife								
American Eel								
Black Crappie								
Blueback Herring			6	92-180			2	110-141
Brown Bullhead	3	265-311	40	179-365			3	305-356
Carp			3	435-490				
Gizzard Shad					1	84		
Golden Shiner								
Green Sunfish								
Mummichog	18	66-90	12	83-94	37	74-96	3	70-84
Pumpkinseed	4	71-135						
Spot							2	114-134
Weakfish							1	90
White Perch			24	121-260				
INVERTEBRATES								
Calinectes sapidus			6	40-99	3	99-147	1	50
Rhithropanopeus harrissii	1							
Palaeomonetes pugio								
REPTILES								
Snapping Turtle								
E. Painted turtle					2			

TABLE B-15
Catch and Water Quality at Station TN6 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN6	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number			0050		0081		0117		0200		0249	
Date (Set)			3/25/87		4/8/87		5/5/87		6/9/87		7/6/87	
Time (Set)			11:50		13:21		11:14		12:45		11:00	
Tidal Stage			Low +0		Low +1		Low +1		High +5		High +5	
Depth			4.0		3.0		3.0		5.0		4.0	
Salinity (0/00) surface			4.0		0.0		0.0		5.0		5.0	
bottom	**NOT**				0.0		0.0					
Temp (oC) surface			15.5		13.0		14.0		25.0		29.0	
bottom	**SAMPLED**				13.0		14.0					
air			15.5		19.0		15.0		24.0		20.5	
D.O. (mg/L) surface			6.4		9.8		7.8		4.1		1.8	
bottom					9.8		7.8					
pH surface			7.6		7.7		7.8		7.5		7.5	
bottom			7.6		7.7		7.8					
Secchi (cm)			40.0		60.0		50.0		60.0		50.0	
Length of Set			24		24		24		24		23.5	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel							1	380				
Blueback Herring									1	135		
Brown Bullhead			31	235-350	3	210-337	15	195-345			16	156-340
Carp							1	525				
Gizzard Shad												
Golden Shiner					1	216	4	109-187				
Green Sunfish												
Mummichog			178	56-115	90	70-102	6	80-100	175	62-105	47	75-95
Pumpkinseed			1	96	1	92			1	109		
Spot												
Striped Bass											2	125-136
White Perch			1	205	1	117	8	85-235	10	122-235	13	125-188
Yellow Perch							2	180-205				
INVERTEBRATES												
Cambarus diogenes												
Rhithropanopeus harrissii			1									

TABLE B-15
Catch and Water Quality at Station TN6 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN6	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0272		0339		0454		0480					
Date (Set)	8/4/87		9/1/87		10/14/87		11/16/87					
Time (Set)	10:30		11:37		10:23		10:50					
Tidal Stage	Low +0		Low +2		Low +1		High +5					
Depth	5.0		4.0		3.0		4.0					
Salinity (0/00) surface	7.0		4.0		2.0		2.0					
bottom									**NOT**		**NOT**	
Temp (oC) surface	31.0		22.0		16.0		10.0					
bottom									**SAMPLED**		**SAMPLED**	
air	27.5		18.0		19.5		17.0					
D.O. (mg/L) surface	1.3		5.2		4.5		4.4					
bottom												
pH surface	7.2		7.5		7.7		9.0					
bottom												
Secchi (cm)	70.0		50.0		60.0		50.0					
Length of Set	24		23.0		25		24					
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
American Eel												
Blueback Herring												
Brown Bullhead	2	68-84	4	107-310	16	215-335	2	145-320				
Carp			1	375	1	465						
Gizzard Shad			14	83-150								
Golden Shiner												
Green Sunfish												
Mummichog	424	70-93	53	47-96	17	73-910	46	70-85				
Pumpkinseed	1	115	2	114-130	2	94-101						
Spot												
Striped Bass												
White Perch			47	95-233	14	113-200	22	67-205				
Yellow Perch												
INVERTEBRATES												
Cambarus diogenes												
Rhithropanopeus harrissii												

TABLE B-15
Catch and Water Quality at Station TN6 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

TN6	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number	0648		0739		0873		0930	
Date (Set)	2/25/88		4/26/88		8/9/88		10/19/88	
Time (Set)	11:00		13:30		14:15		11:20	
Tidal Stage	Low +0.5		Low +0.5		Low +0		Low +2.5	
Depth	5.0		5.0		3.0		4.0	
Salinity (0/00) surface	0.0		4.0		4.0		5.0	
bottom								
Temp (oC) surface	6.6		17.6		32.8		17.1	
bottom								
air	-1.0		18.0		30.0		9.0	
D.O. (mg/L) surface	9.2		14.4		5.7		7.8	
bottom								
pH surface	7.7		8.4		7.2		7.9	
bottom								
Secchi (cm)	90.0		40.0		55.0		60.0	
Length of Set	23.5		24.0		24		23.5	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							4	110-186
American Eel			2	510-520				
Blueback Herring			1	137			2	162-264
Brown Bullhead	19	107-358	74	105-364			56	200-370
Carp			2	495-600			2	167-550
Gizzard Shad								
Golden Shiner								
Green Sunfish	1	97					2	72-110
Mummichog	321	47-95	6	76-84	245	75-100	63	79-99
Pumpkinseed	1	76						
Spot							19	120-150
Striped Bass								
White Perch	3	151-260	58	115-340			26	86-309
Yellow Perch								
INVERTEBRATES								
Cambarus diogenes							1	
Rhithropanopeus harrissii								

TABLE B-16
Catch and Water Quality at Station S1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
Februaury 1987 to November 1988

S1	FEB 1987		MARCH 1987		APR 1987		MAY 1987		JUNE 1987		JUL 1987	
Collection Number	0001		0027		0095		0123		0177		0259	
Date	2/5/1987		3/11/1987		4/20/1987		5/7/1987		6/4/1987		7/9/1987	
Time	9:50		13:20		10:35		12:13		10:28		13:45	
Tidal Stage	Low +1		Low +1		Low +1		Low +0		Low +0.5		Low +0	
Depth	3-4		4-5		4-5		3-4.5		5		4-5	
Salinity (0/00) surface	8.0		4.0		2.0		5.0		10.0		14.0	
bottom	8.0		4.0		2.0		5.0					
Temp (oC) surface	3.0		6.0		15.0		18.0		24.0		30.5	
bottom	3.0		6.0		15.0		18.0					
air	-3.0		2.0		17.5		22.0		18.0		33.0	
D.O. (mg/L) surface	10.0		15.0		7.0		8.7		4.1		2.1	
bottom	10.0		15.0		7.0		8.7					
pH surface	7.5		8.0		7.8		7.9		7.7		7.5	
bottom	7.5		8.0		7.8		7.9					
Secchi (cm)	60.0		70.0		70.0		75.0		60.0		90.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Silverside							2	63-83	4	64-114	34	30-68
Bay Anchovy									1	92		
Blueback Herring					1	120						
Bluefish							1	455	1	50		
Crevalle Jack												
Goldfish												
Inland Silverside			7	37-53							1	68
Mummichog	1	36	1	37	9	35-115	4	39-46	77	45-117	3685	25-119
Northern Pipefish									2	147-169		
Striped Bass							1	375				
Striped Killifish									3	74-100	2	40-99
White Perch											1	155
INVERTEBRATES	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Balanus improvisus											20	
Callinectes sapidus									2	39-72	1	180
Crangon septemspinosa			1									
Palaemonetes pugio			1		1800		155		6			
Rhithropanopeus harrisii					2							

TABLE B-16
Catch and Water Quality at Station S1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
Februaury 1987 to November 1988

S1	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0310		0364		0430		0504		0606		0618	
Date	8/17/87		9/14/87		10/2/87		11/19/1987		12/17/1987		1/12/1988	
Time	11:45		11:10		10:49		14:10		11:55		11:20	
Tidal Stage	Low +1		Low +2		High +5		Low +0		High +5.5		Low +2.5	
Depth	4.0		4.0		4-5		3-4		4		4-5	
Salinity (0/00) surface	13.0		6.0		9.0		7.0		5.0		8.0	
bottom	N/A		N/A		N/A							
Temp (oC) surface	29.5		25.0		21.0		13.0		7.5		3.6	
bottom	N/A		N/A		N/A							
air	31.0		24.0		17.0		12.0		5.0		-1.0	
D.O. (mg/L) surface	3.4		2.5		4.6		5.6		8.6		10.0	
bottom	N/A		N/A		N/A							
pH surface	7.6		7.3		7.6				7.7		7.6	
bottom	N/A		N/A		N/A							
Secchi (cm)	60		100		70		70.0		60.0		110.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Silverside	11	46-80	63	67-99	952	66-110	4	72-97	4	65-93		
Bay Anchovy												
Blueback Herring												
Bluefish							1	124				
Crevalle Jack												
Goldfish												
Inland Silverside	12	38-71	3	42-75			19	36-63	7	49-61		
Mummichog	49	27-107	34	23-112	16	39-98	61	27-100	4	38-64	1	31
Northern Pipefish												
Striped Bass												
Striped Killifish					2	58-69	2	77-92				
White Perch												
INVERTEBRATES	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Balanus improvisus							100					
Callinectes sapidus												
Crangon septemspinosa												
Palaemonetes pugio	200		300		600		1300		20			
Rhithropanopeus harrisii					1							

TABLE B-16
Catch and Water Quality at Station S1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
Februaury 1987 to November 1988

S1	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0761		0876		0962	
Date			6/7/88		8/22/88		11/3/88	
Time			10:45		11:15		10:54	
Tidal Stage			Low +0		Low +1		Low +0	
Depth			4.0		4.0		3.0	
Salinity (0/00) surface			6.0		12.0		10.0	
bottom	**NOT**							
Temp (oC) surface			21.3		26.3		9.0	
bottom	**SAMPLED**							
air			20.0		24.0		9.0	
D.O. (mg/L) surface			5.6		3.8		7.5	
bottom								
pH surface			7.4		7.0		8.0	
bottom								
Secchi (cm)			70.0		95.0		80.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Silverside			4	80-113	18	64-94	7	66 - 76
Bay Anchovy			14	55-67			2	38 - 38
Blueback Herring								
Bluefish								
Crevalle Jack					2	63-77		
Goldfish					1	53		
Inland Silverside							38	38 - 62
Mummichog			4	59-91	771	19-129	50	35-89
Northern Pipefish								
Striped Bass								
Striped Killifish								
White Perch								
INVERTEBRATES	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Balanus improvisus					100			
Callinectes sapidus								
Crangon septemspinosa								
Palaemonetes pugio			78		500		60	
Rhithropanopeus harrisii								

TABLE B-17
Catch and Water Quality at Station S2 (Hackensack River)
HMDC Hackensack River Fishery Inventory
February 1987 to November 1988

S2	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUNE 1987		JULY 1987	
Collection Number	0004		0026		0096		0124		0178		0260	
Date	2/5/1987		3/9/1987		4/20/1987		5/7/1987		6/4/1987		7/9/1987	
Time	10:30		12:30		11:50		13:06		11:15		14:27	
Tidal Stage	Low +2		Low +1		Low +2		Low +1		Low +1		Low +0	
Depth	5.0		4.5		4.0		5.0		5.0		5.0	
Salinity (0/00) surface	7.0		2.0		1.0		2.0		6.0		8.0	
bottom	7.0		2.0		1.0		2.0					
Temp (oC) surface	3.0		11.0		17.0		18.0		24.5		29.0	
bottom	3.0		11.0		17.0		18.0					
air	-1.0		12.5		20.5		26.5		18.5		28.0	
D.O. (mg/L) surface	7.8		8.8		7.4		10.2		2.2		4.6	
bottom	7.8		8.8		7.4		10.2					
pH surface	7.4		7.5		7.5		8.1		7.6		7.5	
bottom	7.4		7.5		7.5		8.1					
Secchi (cm)			70.0		70.0		75.0		80.0		70.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Silverside												
Bay anchovy												
Blueback Herring							4	95-99				
Carp							2	506-550				
Inland Silverside	1	54	3	46-50	8	56-67	13	49-102	7	57-72	11	23-72
Mummichog	69	27-63	248	30-94	1140	35-115	30	41-77	2683	43-99	1500	22-80
Pumpkinseed												
Striped Bass							1	125				
Striped Killifish									1	92		
Striped Mullet												
Weakfish												
White Perch					1	116	2	219-227				
Window pane												
Winter flounder												
INVERTEBRATES												
Balanus improvisus	2											
Callinectes sapidus											1	87
Congeria leucophaeta	1											
Crangon septemspinosa												
Macoma balthica												
Palaeomonetes pugio	2		33				3				142	
Rhithropanopeus harrissii											2	

TABLE B-17
Catch and Water Quality at Station S2 (Hackensack River)
HMDC Hackensack River Fishery Inventory
February 1987 to November 1988

S2	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0311		0361		0431		0501		0607		0617	
Date	8/17/87		9/14/87		10/2/87		11/19/1987		12/17/1987		1/12/1987	
Time	12:15		10:10		11:45		12:50		12:35		10:45	
Tidal Stage	Low +2		Low +1		Low +0		High +5.5		Low +0		Low +2	
Depth	5.0		4.0		4.0		4.0		4.0		4.0	
Salinity (0/00) surface	---		6.0		5.5		5.0		0.0		2.0	
bottom	N/A		N/A		N/A							
Temp (oC) surface	31.0		25.0		21.5		11.0		7.5		2.9	
bottom	N/A		N/A		N/A							
air	---		24.0		17.0		12.0		4.0		-1.0	
D.O. (mg/L) surface	7.6?		2.2		2.3		2.8		5.2		8.2	
bottom	N/A		N/A		N/A							
pH surface	7.7		7.2		7.6				7.5		7.5	
bottom	N/A		N/A		N/A							
Secchi (cm)	60		100		80		60.0		60.0		80.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Silverside	10	47-70			9	76-95	1	75			1	81
Bay anchovy					1	58						
Blueback Herring												
Carp												
Inland Silverside	52	37-63	182	45-62	140	45-68	70	39-61	11	45-57	7	45-58
Mummichog	655	23-108	2890	30-115	467	29-87	734	26-97	1400	26-84	7	28-58
Pumpkinseed	1	84	2	42-94								
Striped Bass												
Striped Killifish			8	59-123	16	41-121	6	60-130	6	65-100		
Striped Mullet												
Weakfish												
White Perch	1	105										
Window pane												
Winter flounder												
INVERTEBRATES												
Balanus improvisus							130		30		25	
Callinectes sapidus												
Congeria leucophaeta												
Crangon septemspinosa							6		3			
Macoma balthica									1			
Palaeomonetes pugio					1,700		15		10		1	
Rhithropanopeus harrissii												

TABLE B-17
Catch and Water Quality at Station S2 (Hackensack River)
HMDC Hackensack River Fishery Inventory
February 1987 to November 1988

S2	Winter 1988		Spring 1988		Summer 1988		Fall 1988	
Collection Number			0762		0877		0963	
Date			6/7/1988		8/22/1988		11/3/1988	
Time			11:30		12:15		11:35	
Tidal Stage	**NOT**		Low +1		Low +2		Low +0.5	
Depth			4.0		4.0		3.0	
Salinity (0/00) surface			5.0		10.0		5.0	
bottom	**SAMPLED**							
Temp (oC) surface			21.5		27.3		11.2	
bottom								
air			21.0		24.0		9.0	
D.O. (mg/L) surface			5.4		3.5		6.0	
bottom								
pH surface			7.5		6.8		7.9	
bottom								
Secchi (cm)			60.0		100.0		60.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Atlantic Silverside					686	52-140	11	71 - 103
Bay anchovy								
Blueback Herring								
Carp								
Inland Silverside					230	36-66	204	37 - 69
Mummichog			600	49-90	3638	27-95	2206	31-89
Pumpkinseed			1	57	2	85-88		
Striped Bass			4	90-110				
Striped Killifish			12	82-132	50	34-125	125	43-140
Striped Mullet			1	41				
Weakfish							1	80
White Perch			1	240			2	206-260
Window pane							1	88
Winter flounder							1	101
INVERTEBRATES								
Balanus improvisus							35	
Callinectes sapidus			6	39-92	5	131-165	3	40-47
Congeria leucophaeta								
Crangon septemspinosa							36	
Macoma balthica								
Palaeomonetes pugio			40		200		1,764	
Rhithropanopeus harrissii								

TABLE B-18
Catch and Water Quality at Station S4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

S4	FEB 1987		MAR 1987		APR 1987		MAY 1987		JUN 1987		JUL 1987	
Collection Number	0006		0025		0099		0125		0179		0265	
Date	2/5/1987		3/9/1987		4/21/1987		5/7/1987		6/4/1987		7/14/1987	
Time	12:15		11:02		12:15		13:40		12:05		9:00	
Tidal Stage	Low +3		Low +0		Low +1		Low +2		Low +4		Low +2	
Depth	4.0		4.0		4.0		4.0		5.0		4.0	
Salinity (0/00) surface	3.5		2.0		0.0		5.5		4.0		6.0	
bottom	3.5		2.0		0.0		5.5					
Temp (oC) surface	4.0		13.0		19.5		21.0		25.5		32.0	
bottom	4.0		13.0		19.5		21.0					
air	0.0		15.0		23.0		31.0		18.0		26.5	
D.O. (mg/L) surface	8.8		8.3		5.3		9.0		1.6		1.5	
bottom	8.8		8.3		5.3		9.0					
pH surface	7.4		7.5		7.5		7.8		7.6		7.4	
bottom	7.4		7.5		7.5		7.8					
Secchi (cm)	20.0		60.0		80.0		75.0		50.0		60.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Gizzard Shad												
Inland Silverside							6	52-72				
Mummichog	127	30-90	245	31-87	810	33-97	217	41-72	925	44-96	450	24-97
Pumpkinseed									5	53-94	5	52-96
Striped Killifish												
White Perch							1	184				
INVERTEBRATES												
Congeria leucophaeta	1											
Palaeomonetes pugio					30		1		2			
Rhithropanopeus harrissii							1					

TABLE B-18
Catch and Water Quality at Station S4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

S4	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0312		0365		0432		0527		0608		0619	
Date	8/17/87		9/14/87		10/2/87		11/30/1987		12/28/1987		1/12/1987	
Time	12:55		11:50		12:30		10:45		11:15		12:05	
Tidal Stage	Low +2		Low +3		Low +0		High +5		Low +1		Low +3	
Depth	5.0		4.0		4.0		3.0		4.0		5.0	
Salinity (0/00)surface	6.0		5.0		4.0		3.0		0.0		0.0	
bottom	N/A		N/A		N/A							
Temp (oC) surface	34.0		27.0		24.0		12.0		7.0		7.5	
bottom	N/A		N/A		N/A							
air	31.0		24.0		17.0		13.0		-1.0		0.0	
D.O. (mg/L) surface	9.2		4.0		1.9		5.5		4.4		7.5	
bottom	N/A		N/A		N/A							
pH surface	7.7		7.4		7.6		7.6		7.8		7.4	
bottom	N/A		N/A		N/A							
Secchi (cm)	60		100		80		70.0		80.0		60.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Gizzard Shad	6	118-145										
Inland Silverside	24	39-49	20	42-55	13	42-60	2				1	82
Mummichog	558	24-90	1,050	33-172	1,170	27-80	3,360	28-97		25-104**	81	33-63
Pumpkinseed												
Striped Killifish			4	49-124								
White Perch												
INVERTEBRATES												
Congeria leucophaeta												
Palaeomonetes pugio			5									
Rhithropanopeus harrissii												

* *On this date an unconfirmed estimate of 29,212 mummichogs was logged,but the data were omitted due to their anomalous nature.

TABLE B-18
Catch and Water Quality at Station S4 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

S4	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0763		0878		0964	
Date			6/7/88		8/55/88		11/3/88	
Time			1215		1320		1300	
Tidal Stage	**NOT**		Low +2		Low +3		Low +2	
Depth			3.0		4.0		4.0	
Salinity (0/00)surface					8.0		4.0	
bottom	**SAMPLED**							
Temp (oC) surface					30.1		15.0	
bottom								
air					21.0		11.0	
D.O. (mg/L) surface					6.2		5.8	
bottom								
pH surface					7.1		7.9	
bottom								
Secchi (cm)					80.0		60.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Gizzard Shad								
Inland Silverside					151	38-78	147	44 - 63
Mummichog			404	50-95	3,071	25-104	624	29-88
Pumpkinseed					1	86		
Striped Killifish					6	37-91	1	91
White Perch					1	83		
INVERTEBRATES								
Congeria leucophaeta								
Palaeomonetes pugio							30	
Rhithropanopeus harrissii								

TABLE B-19
Catch and Water Quality at Station GN1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN1	FEB 1987		MARCH 1987		APR 1987		MAY 1987		JUNE 1987		JULY 1987	
Collection Number	0002		0023		0098		0130		0176		0267	
Date (Set)	2/5/87		3/5/1987		4/21/1987		5/11/87		6/3/1987		7/20/1987	
Time (Set)	10:00		11:08		11:04		11:58		13:10		12:30	
Tidal Stage	Low +1		Low +4+		Low +1		High +3		Low +4		Low +1	
Depth			40.0		40.0		40.0		40.0		30.0	
Salinity (0/00) surface			7.0		4.0		10.0		15.0		12.0	
bottom			7.6		4.0		18.0		23.0		14.0	
Temp (oC) surface	4.0		7.0		17.0		18.0		23.0		31.0	
bottom	4.0		6.0		16.5		18.0		22.0		30.0	
air	4.5		5.0		21.0		26.0		18.0		29.0	
D.O. (mg/L) surface	9.4		10.8		7.3		5.0		6.6		2.3	
bottom	9.3		9.8		7.7		5.6		6.1		3.4	
pH surface	7.5		7.7		7.7		7.5		7.6			
bottom	7.5		8.0		7.7		7.6		7.6			
Secchi (cm)	115.0		70.0		80.0		70.0		50.0		95.0	
Length of Set (hr)	23.5		24		24		24		25		24	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
Atlantic Menhaden							2	272	16	220-294	3	145-275
Atlantic Tomcod	2	171-195		**NO**	1	194	1	168				
Blueback Herring							2	191-200				
Bluefish				**CATCH**								
Spot												
Striped Bass												
White Perch											1	245
INVERTEBRATES												
Amphipoda			15									
Balanus improvisus			200									
Bryozoa											100,000	
Callinectes sapidus									1	150	1	175
Congeria leucphaeta			1									
Molgula sp.											2	
Nereis succinea			2									
Rhithropanopeus harrissii			17								200	
Palaemonetes pugio												

TABLE B-19
Catch and Water Quality at Station GN1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN1	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1987	
Collection Number	0315		0363		0457		0479		0605			
Date (Set)	8/19/87		9/14/87		10/19/87		11/12/87		12/16/87			
Time (Set)	11:30		11:00		15:15		11:00		11:15			
Tidal Stage	High +5		Low +2		Low +1.5		Low +4		Low +0		**NOT**	
Depth	40.0		30.0		30.0		40.0		40.0			
Salinity (0/00) surface	14.0		10.0		10.0		8.0		4.0		**SAMPLED**	
bottom	14.5		12.0		10.0		8.0		4.0			
Temp (oC) surface	30.0		25.0		18.0		11.5		7.6			
bottom	29.0		25.0		18.0		11.2		7.6			
air	28.0		21.0		16.0		10.0		4.0			
D.O. (mg/L) surface	3.6		3.0		8.8		8.4		8.8			
bottom	3.9		3.3		8.6		8.1		9.2			
pH surface	7.5		7.5		7.9				7.7			
bottom	7.5		7.5		7.9				7.7			
Secchi (cm)	70.0		110.0		45.0		80.0		50.0			
Length of Set (hr)	24		23.5		24		24.5		24			
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife							1	285				
Atlantic Menhaden	11	248-280										
Atlantic Tomcod				**NO**	7	150-170	33	144-185	8	172-183		
Blueback Herring												
Bluefish				**CATCH**	1	183						
Spot												
Striped Bass												
White Perch	1	210										
INVERTEBRATES												
Amphipoda												
Balanus improvisus									50			
Bryozoa	100,000		150,000		100,000							
Callinectes sapidus	11	107-195	4	175-194	1	70						
Congeria leucphaeta												
Molgula sp.												
Nereis succinea												
Rhithropanopeus harrissii	200		150		30				12			
Palaemonetes pugio												

TABLE B-19
Catch and Water Quality at Station GN1 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN1	Winter 1988		Spring 1988		Summer 1988		Fall 1988	
Collection Number	0696		0751		0875		0961	
Date (Set)	3/9/88		5/9/88		8/22/88		11/3/88	
Time (Set)	10:25		11:30		11:00		10:45	
Tidal Stage	Low +4.5		Low +1		Low +0.5		Low +0	
Depth	30.0		32.0		30.0		40.0	
Salinity (0/00) surface	5.5		8.0		15.0		12.0	
bottom	6.0		8.0		16.0		12.0	
Temp (oC) surface	6.8		15.6		26.2		11.4	
bottom	6.5		15.5		26.3		11.5	
air	5.0		15.0		21.0		12.0	
D.O. (mg/L) surface	11.0		11.0		3.1		7.0	
bottom	10.9		10.6		2.7		7.0	
pH surface	7.8		8.2		6.9		8.0	
bottom	7.8		8.2		6.8		8.1	
Secchi (cm)	80.0		70.0		90.0		80.0	
Length of Set (hr)	24		23.5		24		24	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
Atlantic Menhaden			1	368	2	230-277		
Atlantic Tomcod	1	197	1	215			10	160-190
Blueback Herring			1	177				
Bluefish								
Spot					3	120-130	10	121-132
Striped Bass					1		1	450
White Perch								
INVERTEBRATES								
Amphipoda							5	
Balanus improvisus								
Bryozoa					500,000			
Callinectes sapidus					21	112-178	1	95
Congeria leucphaeta								
Molgula sp.								
Nereis succinea								
Rhithropanopeus harrissii					800		5	
Palaemonetes pugio							20	

TABLE B-20
Catch and Water Quality at Station GN2 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN2	FEB 1987		MARCH 1987		APRIL 1987		MAY 1987		JUNE 1987		JULY 1987	
Collection Number	0003		0022		0097		0129		0175		0266	
Date (Set)	2/5/1987		3/5/1987		4/20/1987		5/11/1987		6/3/1987		7/20/1987	
Time (Set)	10:40		10:45		13:00		11:40		12:53		11:50	
Tidal Stage	Low +1		Low +4		Low +4		High +3		Low +4		Low +0	
Depth	20.0		20.0		20.0		20.0		20.0		20.0	
Salinity (0/00) surface			2.0		5.0		7.0		8.0		10.0	
bottom			2.0		5.0		7.0		8.0		12.0	
Temp (oC) surface	4.0		7.0		17.0		19.0		24.5		29.0	
bottom	3.5		7.0		16.5		18.50		24.5		29.5	
air	3.0		8.0		19.0		26.0		18.0		33.0	
D.O. (mg/L) surface	7.8		9.0		7.0		3.1		2.8		2.6	
bottom	8.2		9.0		6.8		5.0		3.6		3.6	
pH surface	7.4		7.6		7.6		7.6		7.4		7.8	
bottom	7.4		7.5		7.6		7.6		7.5		8.1	
Secchi (cm)	80.0		80.0		80.0		80.0		60.0		80.0	
Length of Set (hr)	24		24		24		24.5		24		24	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife									5	149-269		
Atlantic Menhaden							1	263	33	140-275		
Atlantic Tomcod												
Blueback Herring				**NO**								**NO**
Gizzard Shad												
Striped Bass				**CATCH**					22	149-330		**CATCH**
Striped Killifish												
White Perch	1	254			1	124	1	135	38	119-305		
Winter Flounder												
INVERTEBRATES												
Callinectus sapidus												
Rhithropanopeus harrissii												

TABLE B-20
Catch and Water Quality at Station GN2 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN2	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0314		0362		0455		0478		0604			
Date (Set)	8/19/87		9/14/87		10/15/87		11/12/1987		12/16/1987			
Time (Set)	10:50		10:45		10:20		10:45		10:45			
Tidal Stage	High +4		Low +2		High +5		Low +3.5		High +5.5		**NOT**	
Depth	20.0		15.0		20.0		25.0		15.0			
Salinity (0/00) surface	9.5		6.0		6.0		4.0		2.0		**SAMPLED**	
bottom	10.5		8.0		6.0		4.0		2.0			
Temp (oC) surface	29.0		25.0		16.0		8.5		7.3			
bottom	29.0		24.0		16.0		8.2		7.4			
air	28.0		21.0		14.0		10.0		4.0			
D.O. (mg/L) surface	3.5		2.0		5.3		6.8		6.9			
bottom	3.4		3.7		5.2		7.1		7.4			
pH surface	7.5		7.4		7.7				7.7			
bottom	7.5		7.5		7.7				7.2			
Secchi (cm)	80		90		70		60.0		60.0			
Length of Set (hr)	24		23.5		24		24		24			
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife												
Atlantic Menhaden	13	215-300			6	209-273						
Atlantic Tomcod							12	145-185	1	176		
Blueback Herring				**NO**	1	166						
Gizzard Shad												
Striped Bass	1	155		**CATCH**	1	465						
Striped Killifish									1	135		
White Perch	7	130-230			2	208-244						
Winter Flounder												
INVERTEBRATES												
Callinectus sapidus	7	116-210										
Rhithropanopeus harrissii	10		30									

TABLE B-20
Catch and Water Quality at Station GN2 (Hackensack River)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN2	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number	0695		0750		0874		0960	
Date (Set)	3/9/88		5/9/88		8/22/88		11/3/88	
Time (Set)	10:10		10:50		10:40		10:30	
Tidal Stage	Low +4		Low +0		Low +0		Low +0	
Depth	15.0		15.0		15.0		20.0	
Salinity (0/00) surface	2.0		6.0		10.0		8.0	
bottom	4.0		6.0		12.0		9.0	
Temp (oC) surface	8.4		16.7		26.3		11.2	
bottom	8.0		16.4		25.8		10.6	
air	5.0		15.0		22.0		13.0	
D.O. (mg/L) surface	10.2		11.4		2.5		6.2	
bottom	10.1		11.3		2.7		6.5	
pH surface	7.5		8.1		6.9		7.7	
bottom	7.5		8.1		6.8		7.7	
Secchi (cm)	60.0		70.0		90.0		80.0	
Length of Set (hr)	24.0		23.5		24.0		24.0	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Alewife								
Atlantic Menhaden			8	270-325	1	290		
Atlantic Tomcod							24	154-182
Blueback Herring		**NO**						
Gizzard Shad					1	162		
Striped Bass		**CATCH**						
Striped Killifish								
White Perch							2	130-215
Winter Flounder							1	124
INVERTEBRATES								
Callinectus sapidus			1	50	12	96-152		
Rhithropanopeus harrissii	30		70				50	

TABLE B-21
Catch and Water Quality at Station GN3 (Overpeck Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN3	FEB 1987		MARCH 1987		APR 1987		MAY 1987		JUNE 1987		JULY 1987	
Collection Number	0007		0024		0115		0159		0228		0271	
Date (Set)	2/19/1987		3/9/1987		4/29/1987		5/21/1987		6/23/1987		7/27/1987	
Time (Set)	11:30		10:50		14:30		11:45		14:00		14:50	
Tidal Stage	Low +4		Low +0		High +3		Low +0		Low +0		High +3	
Depth	4.0		5.0		10.0		10.0		10.0		12.0	
Salinity (0/00) surface	4.5		0.0		0.0		2.0		7.0		7.0	
bottom	4.5		0.0		0.0		2.0		8.0		7.0	
Temp (oC) surface	9.0		8.0		19.0		21.0		28.0		32.0	
bottom	9.0		8.0		18.0		21.00		28.0		32.0	
air	6.0		1.0		15.0		22.0		28.0		29.0	
D.O. (mg/L) surface	7.8		10.8		7.1		1.8		2.9		3.2	
bottom	7.8		10.8		6.2		3.3		2.7		2.1	
pH surface	7.1		7.6		7.6		7.6		7.5		7.8	
bottom	7.1		7.6		7.6		7.5		7.5		7.8	
Secchi (cm)	50.0		70.0		50.0		70.0		90.0		60.0	
Length of Set (hr)	24		49		44		24		24		24	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Brown Bullhead					1	320						
Carp		**NO**		**NO**	2	420-560		**NO**		**NO**		**NO**
Gizzard Shad		**CATCH**		**CATCH**				**CATCH**		**CATCH**		**CATCH**
Golden Shiner					1	175						
INVERTEBRATES												
Balanus improvisus												
Congeria leucophaeta												
Rhithropanopeus harrissii					1							

TABLE B-21
Catch and Water Quality at Station GN3 (Overpeck Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN3	AUG 1987		SEPT 1987		OCT 1987		NOV 1987		DEC 1987		JAN 1988	
Collection Number	0318		0410		0459		0526					
Date (Set)	8/24/87		9/28/87		10/27/87		11/24/1987					
Time (Set)	13:30		11:00		10:58		11:15					
Tidal Stage	High +3		Low +4		Low +0		High +0		**NOT**		**NOT**	
Depth	15.0		10.0		10.0		15.0					
Salinity (0/00) surface	7.0		3.5		4.0		2.0		**SAMPLED**		**SAMPLED**	
bottom	7.0		3.5		2.0		2.0					
Temp (oC) surface	25.5		28.0		18.0		8.0					
bottom	25.5		27.5		17.8		8.2					
air	22.0		26.0		15.0		8.8					
D.O. (mg/L) surface	2.2		1.9		5.0		5.6					
bottom	1.0		1.7		4.8		5.8					
pH surface	7.5		7.5		7.9		7.7					
bottom	7.5		7.5		7.8		7.5					
Secchi (cm)	70		70		50		50.0					
Length of Set (hr)	24		---*		24		24					
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Brown Bullhead					1	290						
Carp			**SET**					**NO**				
Gizzard Shad	31	139-162	**INTERRUPTED**		4	125-193		**CATCH**				
Golden Shiner												
INVERTEBRATES												
Balanus improvisus							15					
Congeria leucophaeta							80					
Rhithropanopeus harrissii							1					

*** Net caught by boat prop 3 hours after set. Net removed by angry boater.**
NO SET FOR SEPTEMBER 1987.

TABLE B-21
Catch and Water Quality at Station GN3 (Overpeck Creek)
HMDC Hackensack River Fishery Resource Inventory
February 1987 to November 1988

GN3	WINTER 1988		SPRING 1988		SUMMER 1988		FALL 1988	
Collection Number			0861		0891		0974	
Date (Set)			6/23/88		9/22/88		11/14/88	
Time (Set)			11:30		12:00		10:30	
Tidal Stage	**NOT**		Low +0		High +4.5		Low +5.0	
Depth			10.0		10.0		14.8	
Salinity (0/00) surface	**SAMPLED**		4.0		6.0		4.0	
bottom			4.0		8.0		3.0	
Temp (oC) surface			29.2		26.0		15.7	
bottom			29.1		25.0		15.6	
air					25.0		12.0	
D.O. (mg/L) surface			1.2		2.0		4.0	
bottom			1.9		2.3		4.2	
pH surface			5.6				7.6	
bottom			5.4				7.5	
Secchi (cm)			40.0		80.0		50.0	
Length of Set (hr)			24		24		23.5	
FISH	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**	**#**	**Size Range**
Brown Bullhead								
Carp				**NO**		**NO**		
Gizzard Shad				**CATCH**		**CATCH**	1	131
Golden Shiner								
INVERTEBRATES								
Balanus improvisus								
Congeria leucophaeta								
Rhithropanopeus harrissii								

TABLE B-22
Summary of All Trap Net Collections
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

SITE	TN 1	TN 2	TN 3	TN 4	TN 5	TN 6	TOTALS
No. of Collections Made	**14**	**13**	**14**	**14**	**13**	**13**	**81**
FISH							
Unidentified Clupeidae					1		**1**
Alewife	17	1	14	5	5	4	**46**
American Eel	9	44	10	11	2	3	**79**
American Shad	1	24	44	24			**93**
Atlantic Menhaden	2		2				**4**
Atlantic Silverside	5						**5**
Atlantic Tomcod	1		7	1			**9**
Bay Anchovy	1						**1**
Black Crappie	1	4		1	3		**9**
Blueback Herring	15		182	9	22	4	**232**
Bluefish	9						**9**
Bluegill	1	1					**2**
Brown Bullhead			13	36	118	238	**405**
Carp	5	20	10	9	25	7	**76**
Crevalle Jack	93		4				**97**
Gizzard Shad		1			4	14	**19**
Golden Shiner					1	5	**6**
Green Sunfish			9		1	3	**13**
Mummichog	315	1025	820	7861	685	1671	**12,377**
Northern Pipefish	1						**1**
Pumpkinseed	11	13	75	20	27	9	**155**
Spot		17	6	2	2	19	**46**
Spotted Hake	8						**8**
Striped Bass	18	3	12			2	**35**
Striped Killifish	1	51	4	2			**58**
Weakfish	7			2	1		**10**
White Catfish				1			**1**
White Perch	37	166	158	63	36	203	**663**
Window Pane		1					**1**
Winter Flounder	2	2	1				**5**
Yellow Perch						2	**2**
Total # of Taxa Collected	**22**	**15**	**17**	**15**	**14**	**14**	**30**
Total # of Fish Collected	**560**	**1,373**	**1,371**	**8,047**	**933**	**2,184**	**14,468**
INVERTEBRATES							
Amphipods							
Bryozoa	1000						1,000
Hydobia Snail				10000			10,000
Clam Worm				1			1
Sand Shrimp	3	1					4
Blue Crab	55	50	23	16	10		154
Isopod							
Grass Shrimp	37	45	16	1	10		109
White-fingered mud crab	17	20	45	1		1	84
REPTILES							
Snapping Turtle					4		4
Red-Eared Slider							
Eastern Painted Turtle					2		2
Diamond Back Terrapin	27	18	20	1			66

Notes;

No TN collections were made during Feb. & Dec. 1987 or Jan. 1988

TN1 - Two collections were made during July 1987.

TN3 - No collection was made during March 1987.

TN4 - Two collections were made during June 1987.

TN3 - 3 collections were made in Spring 1988, all of which are included here.

Unidentified Clupeidae not counted as a separate taxa.

TABLE B-23
Summary of All Trawl Collections
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

SITE	T1	T2	T3	T4	T5	T6	T7	T8	T9	TOTALS
No. of Collections Made	28	30	30	30	30	30	30	27	30	**265**
FISH										
Alewife	34	1	5	2			15			**57**
American Eel	3	16	23	8	3	13	8	1	2	**77**
American Shad	2		1	3			14			**20**
Atlantic Menhaden	1	1	3							**5**
Atlantic Silverside							25			**25**
Atlantic Tomcod	90	134	56	24		26	28			**358**
Bay Anchovy	21	22	32	3		2	1199			**1,279**
Black Crappie	1									**1**
Blueback Herring	130	1	11	14	2	1	20			**179**
Bluefish	3						1			**4**
Bluegill							1			**1**
Brown Bullhead				1	4					**5**
Conger Eel		1								**1**
Crevalle Jack						1				**1**
Gizzard Shad					1			12	1	**14**
Golden Shiner							1			**1**
Inland Silverside				1						**1**
Mummichog	34	24	214	964	507	439	415	942	1217	**4,756**
Northern Pipefish	1									**1**
Pumpkinseed			1				4		1	**6**
Rainbow Smelt	1									**1**
Seaboard Goby			1							**1**
Spot	1	1	22	167	9	12	45	2		**259**
Spotted Hake	3									**3**
Striped Bass	4	1	1	1		10	1			**18**
Striped Killifish		3	7	1						**11**
Weakfish	12	27	11	7		4	22			**83**
White Perch		16	5	2	1	23				**47**
Windowpane		1								**1**
Winter Flounder	17	11	3							**31**
Total # of Taxa Collected	**17**	**15**	**16**	**14**	**7**	**10**	**15**	**4**	**4**	**30**
Total # of Fish Collected	**358**	**260**	**396**	**1198**	**527**	**531**	**1799**	**957**	**1221**	**7,247**
INVERTEBRATES										
Amphipod		2				6				8
Amphipod		2	7			46				55
Baltic Macoma	1						9			10
Bay Barnacle	2443	181917	56	122	416	18920	171	28610	73	232,728
Blue Crab	61	49	16	11	5	28	29	1	2	202
Comb jelly	403					9		1		413
Fiddler Crab						1				1
Grass Shrimp	1019	16485	8681	30716	1250	861	7429	43	8	66,492
Isopod	1									1
Isopod						2	7	2		11
Midge larvae	74		23				6			103
Mysid shrimp	18			307	310	1344	73	8305	53	10,410
Platform Mussel	2	20		22		150	3	10070		10,267
Polychaete worm	1					1				2
Polychaete worm	74	791	236	356	15	24	286			1,782
Sand Shrimp	81	57	199	142	150		316			945
Sea Slug						1				1
Black-fingered mud crab	19	359	20	26	4	169	118	1	1	717
White-fingered mud crab	52	84	4	4		106	221			471

Notes:
The 2 trawl collections made at location T3 on 5/07/88 for a public program are not included here.
No winter trawl collections were made in 1988.

TABLE B-24
Summary of All Seine Collections
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

SITE	S1	S2	S4	TOTALS
No. of Collections Made	**15**	**15**	**15**	**45**
FISH				
Atlantic Silverside	1103	718		**1,821**
Bay anchovy	17	1		**18**
Blueback Herring	1	4		**5**
Bluefish	3			**3**
Carp		2		**2**
Crevalle Jack	2			**2**
Gizzard Shad			6	**6**
Goldfish	1			**1**
Inland Silverside	87	939	364	**1,390**
Mummichog	4767	18267	13092	**36,126**
Northern Pipefish	2			**2**
Pumpkinseed		6	11	**17**
Striped Bass	1	5		**6**
Striped Killifish	9	224	11	**244**
Striped Mullet		1		**1**
Weakfish		1		**1**
White Perch	1	7	2	**10**
Window Pane		1		**1**
Winter Flounder		1		**1**
Total # of Taxa Collected	**12**	**14**	**6**	**19**
Total # of Fish Collected	**5,994**	**20,177**	**13,486**	**39,657**
INVERTEBRATES				
Baltic Macoma		1		**1**
Bay Barnacle	200	197		**397**
Blue Crab	3	15		**18**
Grass Shrimp	1276	3099	68	**4,443**
Platform mussel		1	1	**2**
Sand Shrimp		45		**45**
White-fingered mud crab		2	1	**3**

TABLE B-25
Summary of All Gill Net Collections
HMDC Hackensack River Fishery Resource Inventory
February 1987 to October 1988

SITE	GN1	GN2	GN3	TOTALS
No. of Collections Made	**15**	**15**	**12**	**42**
FISH				
Alewife	1	5		**6**
Atlantic Menhaden	35	62		**97**
Atlantic Tomcod	64	37		**101**
Blueback Herring	3	1		**4**
Bluefish	1			**1**
Brown Bullhead			2	**2**
Carp			2	**2**
Gizzard Shad		1	36	**37**
Golden Shiner			1	**1**
Spot	13			**13**
Striped Bass	2	24		**26**
Striped Killifish		1		**1**
White Perch	2	52		**54**
Winter Flounder		1		**1**
Total # of Taxa Collected	**8**	**9**	**4**	**14**
Total # of Fish Collected	**121**	**184**	**41**	**346**
INVERTEBRATES				
Amphipods	20			**20**
Bay Barnacle	250		15	**265**
Bryozoa	950,000			**950,000**
Blue Crab	40	20		**60**
Grass Shrimp	20			**20**
Platform Mussel	1		80	**81**
Sea Squirts	2			**2**
Clam Worm	2			**2**
White-fingered mud crab	631	190	2	**823**