



New Jersey Department of Environmental Protection
Division of Science and Research
CN 409, Trenton

Water Monitoring Project
Water Monitoring Management

James E. Mumman, Administrator

December 1997

SHELLFISH GROWING WATER CLASSIFICATION ANNUAL REPORT - 1996 DATA

Water Monitoring Report Prepared by:

Bonnie J. Zimmer, Ph.D.

Project Manager



Bureau of Marine Water Monitoring

William J. Eisele, Jr., Chief

STATE OF NEW JERSEY
CHRISTINE TODD WHITMAN
GOVERNOR

SHELLFISH GROWING WATER CLASSIFICATION
ANNUAL REPORT - 1996 DATA



New Jersey Department of Environmental Protection
ROBERT C. SHINN, Jr.
COMMISSIONER

**This report was funded
by a State General Appropriation,
State Special Appropriation,
and the
Federal Clean Water Act**

Written by: Bonnie J. Zimmer, Ph.D.
Environmental Scientist

Date _____

Reviewed by: William J. Eisele, Jr.
Bureau Chief

Date _____

Approved by: James E. Mumman
Administrator

Date _____

TABLE OF CONTENTS

<u>EXECUTIVE SUMMARY</u>	<u>1</u>
<u>INTRODUCTION</u>	<u>1</u>
<u>SHELLFISH</u>	<u>4</u>
HARVESTING	4
<u>PATTERNS OF USAGE IN SHELLFISH WATERS</u>	<u>6</u>
WILDLIFE	6
RECREATION	7
COMMERCIAL FISHING / SHELLFISHING	7
<u>POTENTIAL IMPACTS / STRESSES ON MARINE AREAS</u>	<u>9</u>
POINT SOURCE DISCHARGES	9
NON-POINT SOURCES OF POLLUTANTS	13
MARINA ACTIVITIES	13
WATERFRONT DEVELOPMENT PERMITS	14
<u>WATER QUALITY STATUS</u>	<u>15</u>
OVERVIEW	15
BACTERIOLOGICAL WATER QUALITY	15
NUTRIENTS	16
MARINE BIOTOXINS	17
SUMMARY BY WATERSHED	18
RARITAN BAY	18
Bacteriological Water Quality	19
Nutrients and Dissolved Oxygen	20
SHARK RIVER / MANASQUAN RIVER	22
Bacteriological Water Quality	22
BARNEGAT BAY / TOMS RIVER	24
Bacteriological Water Quality	25
Nutrients and Dissolved Oxygen	29
Leased Lots Used for Purification of Clams Harvested from Special Restricted Waters	30
Non-point Source Study	30
BACK BAY AREAS FROM GREAT BAY TO CAPE MAY	31
Bacteriological Water Quality	32
Nutrients and Dissolved Oxygen	35

DELAWARE RIVER BAY / MAURICE RIVER / COHANSEY RIVER	37
Bacteriological Water Quality	37
Nutrients and Dissolved Oxygen	40
<u>CONCLUSION:</u>	<u>42</u>
<u>ACKNOWLEDGEMENTS</u>	<u>42</u>
<u>APPENDIX I: ORGANIZATIONAL CHART</u>	<u>43</u>
<u>APPENDIX II: WATER QUALITY SUMMARY (BY WATERSHED)</u>	<u>44</u>
SUMMARY OF BACTERIAL WATER QUALITY FOR THE 30 GROWING AREAS	44
AREA 1/2: RARITAN RIVER BAY / SANDY HOOK BAY	45
AREA 3: NAVESINK RIVER ESTUARY	47
AREA 4: SHREWSBURY RIVER ESTUARY	48
AREA 5: SHARK RIVER ESTUARY	49
AREA 6: MANASQUAN RIVER ESTUARY	50
AREA 7/8: UPPER BARNEGAT BAY	51
AREA 9/10: CENTRAL BARNEGAT BAY TOMS RIVER TO FORKED RIVER	53
AREA 11/12: BARNEGAT BAY TO LITTLE EGG HARBOR	55
AREA 13: LITTLE EGG HARBOR BAY	56
AREA 14/15: MULICA RIVER-GREAT BAY	57
AREA SE-1: REEDS BAY, BRIGANTINE, ABSECON BAY, ABSECON INLET	58
AREA SE-2: GREAT EGG HARBOR AND LAKES BAY	60
AREA SE-3: CORSONS INLET AND CORSONS SOUND	61
AREA SE-4: LUDLAM BAY TO GREAT SOUND	62
AREA SE-5: BACK BAY AREAS - HEREFORD INLET, JENKINS SOUND, GRASSY SOUND, RICHARDSON SOUND	64
AREA SE-6: JARVIS SOUND TO CAPE MAY HARBOR	66
AREA DB-1: EGG ISLAND POINT TO ARTIFICIAL ISLAND	68
AREA DB-2: DELAWARE BAY - CAPE MAY POINT TO EGG ISLAND POINT	70
AREA DB-3: DELAWARE BAY	71
AREA 40-41: CAPE MAY POINT TO STONE HARBOR	72
AREA 42: STONE HARBOR TO SEA ISLE CITY	73
AREA 43:-CORSON INLET,SEA ISLE CITY TO PECK BEACH	74

AREA 44/45: PECK BEACH TO BRIGANTINE	75
AREA 46/47: BRIGANTINE TO SPRAY BEACH	76
AREA 48: PEAHALA PARK TO BARNEGAT INLET	77
AREA 49: BARNEGAT INLET TO SEASIDE PARK	78
AREA 50/51: SEASIDE PARK TO MANTOLOKING	79
AREA 52/53: BAYHEAD TO OCEAN GROVE	81
AREA 54/55: ASBURY PARK TO MONMOUTH BEACH	82
AREA 56/57: SEA BRIGHT TO SANDY HOOK	83

FIGURES

Figure 1: Piles of discarded oyster shells	2
Figure 2: The saline waters adjacent to the New Jersey coastline	3
Figure 3: Harvesting areas	5
Figure 4: Canada	6
Figure 5: Great Blue Heron fishing, Edwin B. Forsythe National Wildlife Refuge.	6
Figure 6: Unloading fin-fish at the dock, Point Pleasant Beach	7
Figure 7: Hard clams being unloaded for depuration, Highlands	7
Figure 8: Clammer's boats at the dock in Highlands Beach	8
Figure 9: Atlantic City as seen across the tidal wetlands	9
Figure 10: Permitted Point Source Discharges adjacent to the Raritan River Estuary	10
Figure 11: Permitted Point Source Discharges South of Barnegat Bay	11
Figure 12: Aerial view of the Ocean County Utility Authority Southern Facility.	12
Figure 13: Domestic Sewage Treatment Facility	12
Figure 14: Storm water outfalls, Long Branch	13
Figure 15: Boats lined up at a dock, Tuckerton	13
Figure 16: Waterfront Development Permits	14
Figure 17: Areas where bacterial water quality improved	15
Figure 18: Nitrate-nitrogen levels in coastal waters of New Jersey	16
Figure 19: Dissolved Oxygen Levels in coastal waters of New Jersey.	17
Figure 20: Saline portions of the Raritan River Watershed	18
Figure 21: Bacteriological Water Quality in the Raritan Bay	19
Figure 22: Nitrate-N levels in the Raritan Bay	20
Figure 23: Surface Dissolved Oxygen Levels in the Raritan Bay	21
Figure 24: Shark River and Manasquan River Watershed Locations	22
Figure 25: Bacteriological Water Quality in the Shark River and Manasquan River.	23
Figure 26: Barnegat Bay	24
Figure 27: Bacteriological Water Quality in Northern Barnegat Bay	25
Figure 28: Bacteriological Water Quality in Northern Barnegat Bay	26
Figure 29: Bacteriological Water Quality in Southern Barnegat Bay	27
Figure 30: Bacteriological Water Quality in Southern Barnegat Bay and Great Bay	28
Figure 31: Nitrate-N Levels in the northern portion of Barnegat Bay.	29
Figure 32: Location of leased relay lots near Laurel Harbor	30
Figure 33: Location of leased relay lots in Tuckerton Cove	30
Figure 34: Location of Back Bay areas	31
Figure 35: Bacteriological Water Quality	32
Figure 36: Bacteriological Water Quality	33
Figure 37: Bacteriological Water Quality	34
Figure 38: Nitrate-N Levels in the Back Bays south of Great Bay.	35
Figure 39: Dissolved Oxygen Levels in Back Bays south of Great Bay.	36
Figure 40: Delaware Bay	37
Figure 41: Bacteriological Water Quality in the Delaware Bay	38
Figure 42: Bacteriological Water Quality in the Delaware Bay	39
Figure 43: Nitrate-N levels in the Delaware Bay.	40
Figure 44: Dissolved Oxygen Levels in the Delaware Bay.	41

EXECUTIVE SUMMARY

The Bureau of Marine Water Monitoring annually evaluates the 30 shellfish growing areas in New Jersey for compliance with the guidelines of the National Shellfish Sanitation Program (NSSP). The NSSP manual requires a written update of the growing area Sanitary Surveys. The Interstate Shellfish Sanitation Conference (ISSC), a cooperative organization encompassing industry and regulatory representatives, provides cooperation in developing the specific NSSP requirements. This report provides a summary of each of the Shellfish Growing Areas for the 1996 sampling year.

Sanitary control of shellfish requires identification of harvest areas of acceptable sanitary quality. Each growing area is classified as *Approved*, *Seasonally Approved* (approved for harvest during all or part of the winter), *Special Restricted* (approved for harvest, followed by depuration or relaying to cleanse bacteria from the shellfish), or *Prohibited*. Maps indicating the classification of all growing areas are published annually. A sanitary survey of each growing area provides the necessary information to determine if the area meets the acceptable criteria for direct consumption of shellfish. The sanitary survey is updated annually and triennially through written reports. A complete sanitary survey is completed every 12 years. If a major change to one or more pollutant sources occurs, or if an upward reclassification is proposed, a new sanitary survey is required.

The annual report includes a review of:

1. Any actual changes to pollutant sources;
2. An evaluation of the analytical results of bacteriological sampling; and
3. A statement as to whether the current classification is correct. This section also includes recommendations for any changes in sampling strategy and/or sampling stations for the next sampling season.

INTRODUCTION

The principles and requirements for the sanitary control of shellfish produced and shipped in interstate commerce in the United States provide the basis used by the Federal Food and Drug Administration (FDA) in evaluating state shellfish sanitation programs.

The authority to provide sanitary control of shellfish is divided between the Department of Environmental Protection (DEP), the Department of Health and Senior Services and the Department of Law and Public Safety. The Bureau of Marine Water Monitoring (BMWM) under the authority of N.J.S.A. 58:24 classifies the shellfish growing waters and administers the special resource recovery programs. Regulations delineating the growing

areas are promulgated at N.J.A.C. 7:12 and are revised annually. Special Permit rules are also found at N.J.A.C. 7:12 and are revised as necessary.

The Bureau of Shellfisheries in the Division of Fish, Game and Wildlife issues harvesting licenses and leases for shellfish grounds under the Authority of N.J.S.A. 50:2 and N.J.A.C. 7:25. This bureau in conjunction with the BMWB administers the Hard Clam Relay Program.

The Bureau of Law Enforcement in the DEP and the Division of State Police in the Department of Law and Public Safety enforce the provisions of the statutes and rules mentioned above.

The Department of Health and Senior Services is responsible for the certification of wholesale shellfish establishments and in conjunction with the BMWB, administers the depuration program. (See Appendix I for organization chart).

Emphasis is placed on the sanitary control of shellfish because of the direct relationship between pollution of shellfish growing areas and the transmission of diseases to humans. Shellfish borne infectious diseases are generally transmitted via a fecal-oral route. The pathway is complex and quite circuitous. The cycle usually begins with fecal contamination of the shellfish growing waters. Sources of contamination are many and varied, reaching waterways via runoff and direct discharges.



Figure 1: Piles of discarded oyster shells mark the location of historic processing facilities in Bivalve, NJ. Shellfish have been harvested in the coastal waters of the state since pre-colonial times.

The Bureau of Marine Water Monitoring is responsible for collecting and analyzing samples for bacterial contamination, nutrients, and dissolved oxygen. These data, in conjunction with shoreline

information, are used to evaluate saline waters as to their suitability for shellfish harvesting. Periodic reports are published which include summaries of water quality data, actual and potential impacts on water quality, and recommendations for classifying the waters.

The Department participates in a cooperative National Environmental Performance Partnership System (NEPPS) with the USEPA which emphasizes ongoing evaluation of issues associated with environmental regulation, including assessing impacts on waterbodies and measuring improvements in various indicators of environmental health. This agreement is roughly patterned after the Netherlands Environmental Policy Plan, which uses attainment of specific environmental goals to measure compliance with environmental statutes.

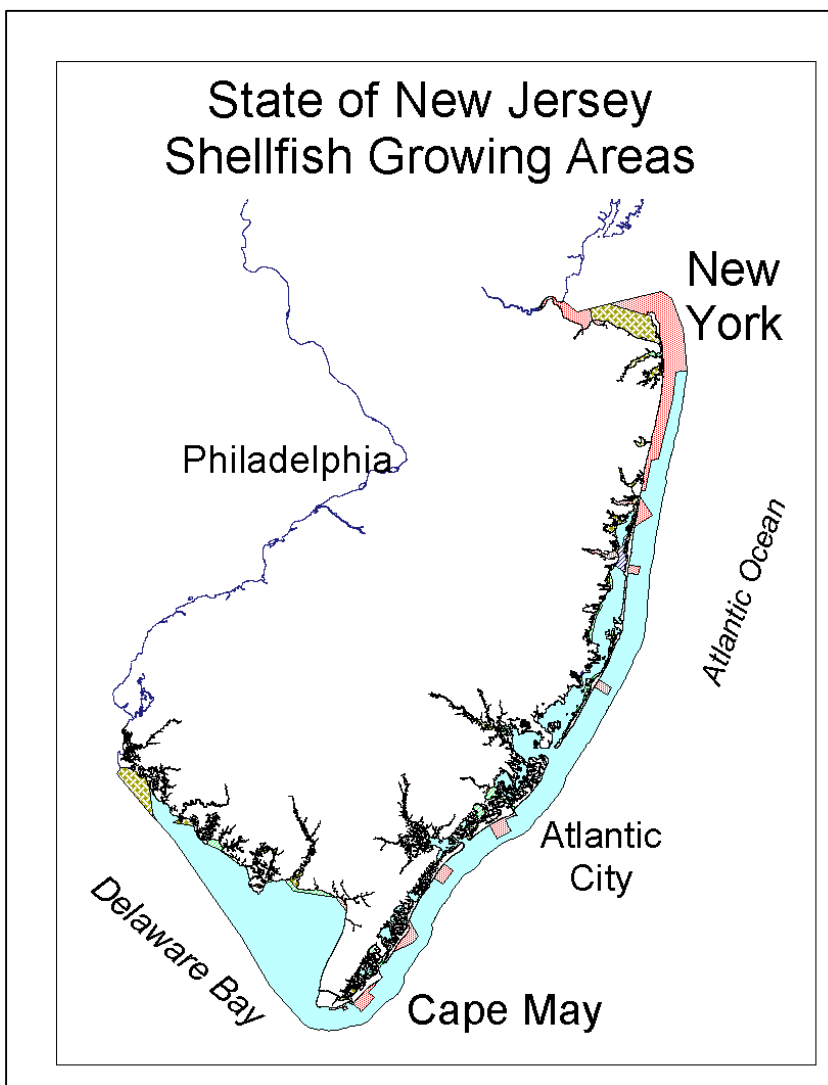


Figure 2: The saline waters adjacent to the New Jersey coastline (from Raritan Bay in the north to the Delaware Bay in the south) are a rich source of shellfish.

The shellfish growing area reports are intended to provide a brief assessment of the growing area, with particular emphasis on those factors that affect the quantity and quality of the shellfish resource. As the Department implements a comprehensive watershed management program in conjunction with the NEPPS program, the shellfish growing area reports provide

valuable information on the overall quality of the saline waters in the most downstream

sections of each major watershed. In addition, the reports assess the quality of the biological resource and provide a reliable indicator of potential areas of concern and/or areas where additional information is needed to accurately assess watershed dynamics.

SHELLFISH

Shellfish found in New Jersey include hard clams, soft clams, blue mussels, surf clams, and oysters. Eggs are laid by the female and the pelagic larvae drift with the tide and current until they settle on a suitable substrate. Mussels and oysters in New Jersey tend to settle on a hard surface, while clams tend to burrow into the bottom. A siphon pumps water over the gills, providing both oxygen and nutrition in the process. Depending on water quality and availability of suitable nutrition, clams may reach marketable size in a few years.

HARVESTING

Human Consumption. Shellfish may be harvested for direct marketing from areas classified as *Approved* or *Seasonally Approved*. Additionally, shellfish may be harvested from areas classified as *Special Restricted* if they undergo a purification process prior to marketing.

Hard and soft clams harvested from *Special Restricted* areas may be purified through depuration, a process of holding the clams for a minimum of 48 hours at a depuration facility where clean water is pumped through the holding containers, followed by tissue analysis to ensure that the shellfish are safe to eat. Two depuration facilities are located in Monmouth County adjacent to Sandy Hook Bay (the eastern area of Raritan Bay). Clams may also be purified by transplanting the clams to an area of *Approved* water for a minimum of 30 days. Clam tissue is analyzed for bacterial contamination prior to harvesting. Relay areas are located in Barnegat Bay and Tuckerton Cove. An additional relay area located in Great Bay was not used in 1996. Harvesting clams for either depuration or relay requires issuance of a Special Permit.

Surf clams are harvested from ocean waters and are used for canned or otherwise processed food items. The surf clam harvest accounts for approximately 75% of the total value of the shellfish harvest in New Jersey.

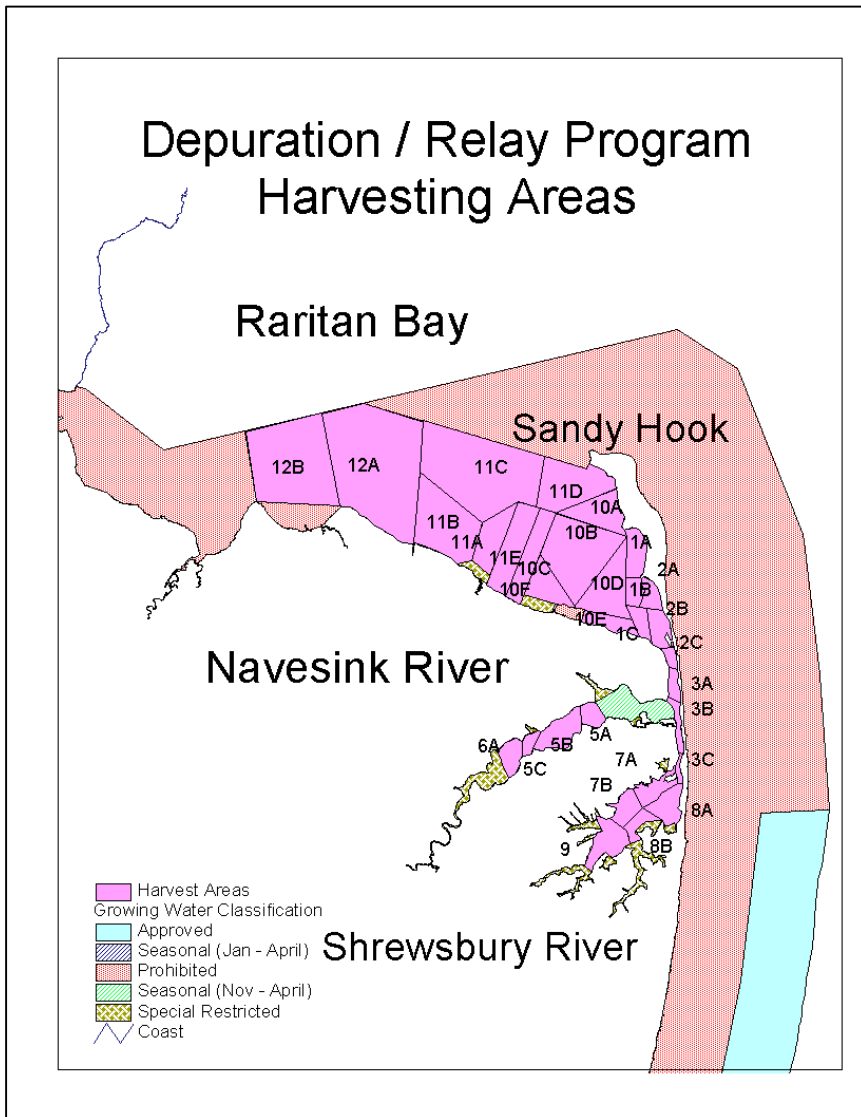


Figure 3:
Harvesting areas
(numbered areas
shown in purple)
where clams may
be taken for relay
and/or depuration.

Clams may also be harvested for uses other than human consumption. Surf clams may be harvested for bait. Shellfish may also be harvested for scientific research. A Special Permit is required in addition to a scientific collecting.

PATTERNS OF USAGE IN SHELLFISH WATERS

WILDLIFE



The coastal areas, particularly south of Manasquan Inlet are prime areas for wildlife. The coastline is located in the migratory flyway so that large numbers of transitory birds pass through the area in spring and fall.

Figure 4: Canada geese frequently overwinter and raise their young at various sites along the coastline.

A diverse group of aquatic birds can be found in the wetlands adjacent to the waterways throughout the summer and numerous species overwinter. In areas of particularly dense populations, elevated levels of pathogens are sometimes reported. The estuarine waters function as a nursery ground for various species of commercially important fish.

Large populations of birds, especially Canada Geese and various species of seagulls can also adversely impact the bacterial water quality by depositing fecal material near feeding and/or nesting sites.

Figure 5: Great Blue Heron fishing, Edwin B. Forsythe National Wildlife Refuge.



RECREATION

The coastal area is an important source of tourism dollars for the State. Much of the area adjacent to the ocean is a summer resort, with weekend summer populations frequently an order of magnitude higher than the year-round population. This influx places stresses on the infrastructure of shore communities, but also provides a strong economic base. The vitality of the tourism industry is directly related to public perception of the cleanliness of the bathing waters and the quality of the fish and shellfish which are taken from the waters. The coastal area is also used extensively for recreational fishing and shellfishing.

COMMERCIAL FISHING / SHELLFISHING



Figure 6: Unloading fin-fish at the dock, Point Pleasant Beach

A significant commercial fishing and shellfishing industry is an important factor in the local economy. Commercial fishing fleets operate out of Cape May, Atlantic City, the Manasquan Inlet area, and the Highlands area.

Figure 7: Hard clams being unloaded for depuration, Highlands

Commercial shellfishing is also economically important. Over 31 million hard clams were harvested for depuration and relay in 1996, accounting for more than 50% of the total hard clam harvest. The exvessel value of the surf clam harvest in New Jersey in 1996 exceeded \$27 million.

Clams are harvested throughout the year in approved waters by both commercial and



recreational clammers. Clams may be harvested in seasonal waters from November through April or from January through April, depending on the specific location, for either recreational or commercial harvesting. In addition, clams are harvested by commercial clammers for relay and/or depuration from *Special Restricted* waters. The areas where clams may be harvested under this program are located in the Raritan and Sandy Hook Bays, the Navesink River, and the Shrewsbury River. Although other areas are classified as *Special Restricted*, there was no harvesting from other areas during 1996. In previous years *Special Restricted* areas in Cape May and Atlantic Counties have been harvested during special harvesting periods. Clams taken from those areas were taken to relay beds in Great Bay for purification.



Figure 8: Clammer's boats at the dock in Highlands Beach. Vessels display the permit number and the owner's name. Commercial clammers harvest year-round except in dangerous weather conditions.

POTENTIAL IMPACTS / STRESSES ON MARINE AREAS

The coastal area in New Jersey is heavily impacted by a wide variety of land use patterns as well as by activities which are directly related to marine resources (such as recreational uses and commercial fishing). The maps included in each of the following sections demonstrate the distribution of discharges to ambient waters, locations of contaminated sites, and graphical representations of water quality.



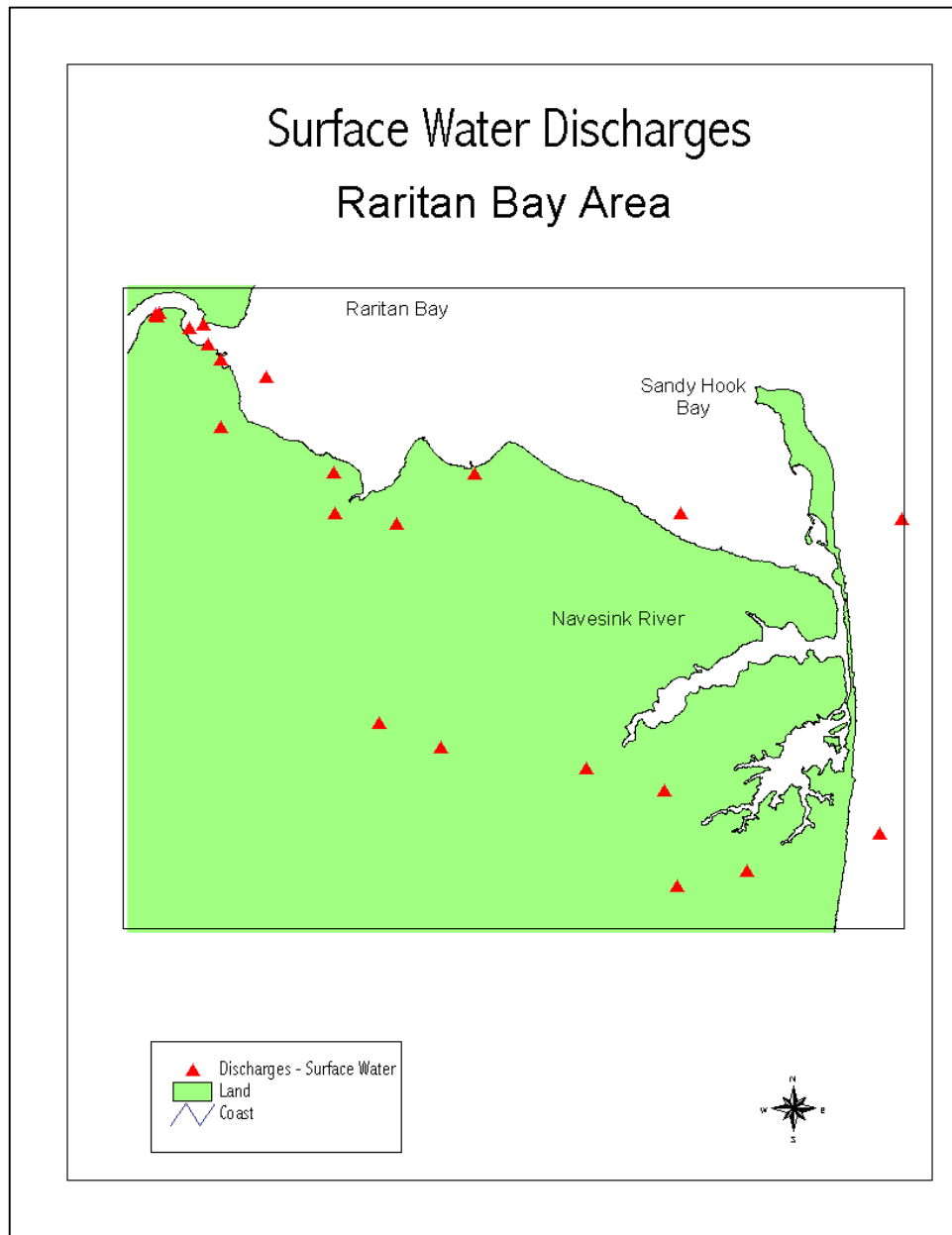
**Figure 9:
Atlantic City as
seen across the
tidal wetlands at
Edwin B.
Forsythe
National Wildlife
Refuge**

POINT SOURCE DISCHARGES

Domestic wastewater discharges have the potential to contaminate ambient water with pathogens as well as nutrients, substances which cause the quantity of dissolved oxygen to be depleted, and various chemicals with toxic effects on living organisms. Point source discharges are regulated under the New Jersey Pollutant Discharge Elimination System. Discharge permits issued in accordance with this program regulate the quantity and quality of the wastewater. A buffer zone of *Prohibited* water is maintained around each outfall to provide a margin of safety and to protect public health.

Numerous surface water discharges are located in the Raritan River watershed, the urban area near Atlantic City, and adjacent to Great Egg Harbor River (see Figures 10 and 11). There are no remaining permitted discharges of domestic waste to the coastal estuaries between Sandy Hook and Cape May; wastewater is treated by regional facilities and

discharged offshore. Numerous permitted discharges of industrial waste remain. Although these discharges are unlikely to affect pathogen levels in ambient waters, they have the potential to contribute nutrients, toxics, and oxygen depleting substances.

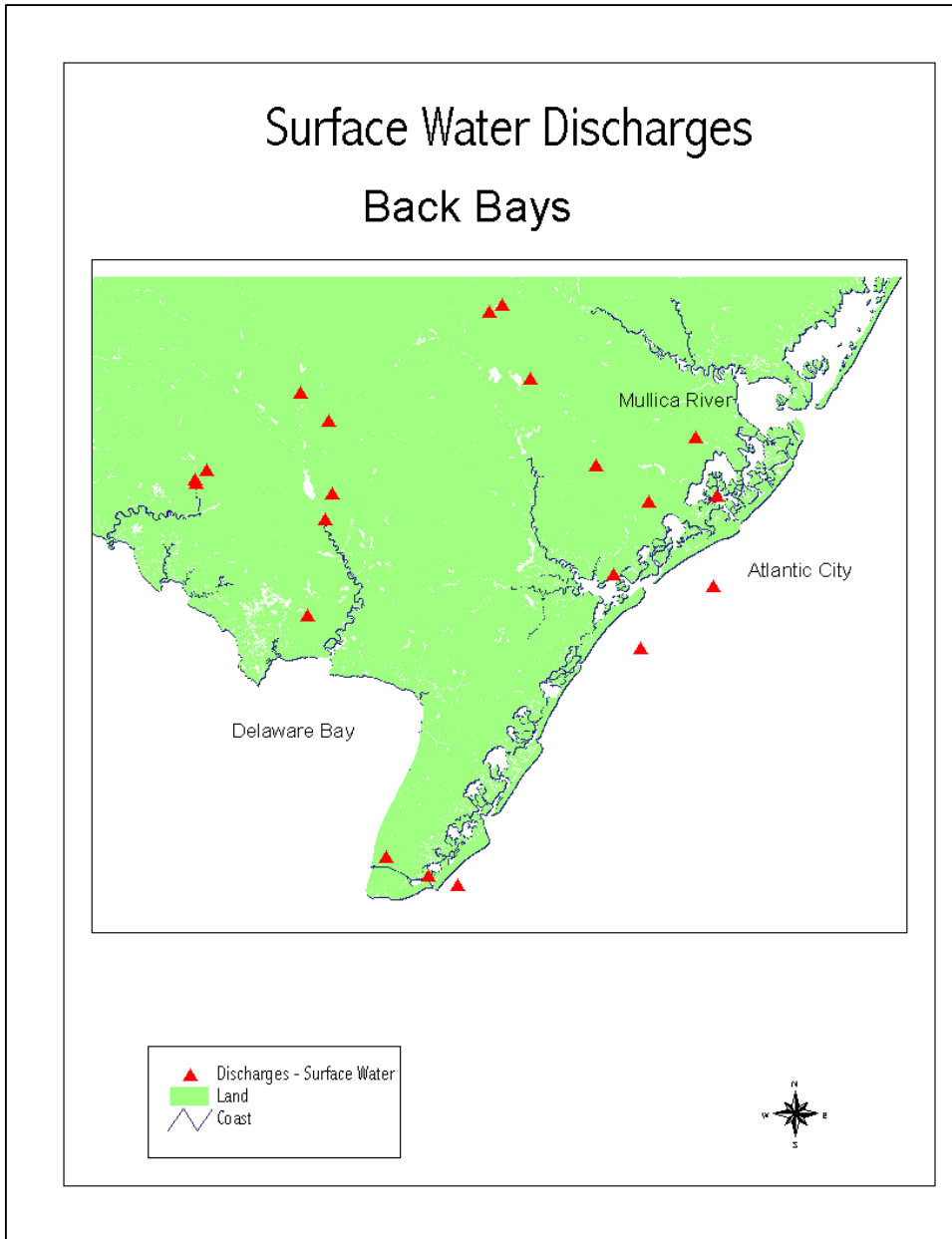


**Figure 10:
Permitted
Point Source
Discharges
adjacent to
the Raritan
River Estuary**

Domestic waste is directed to one of three regional sewage treatment facilities located in Middletown, Union Beach, and Monmouth Beach. The treated waste is discharged into the Atlantic Ocean. Several small industrial discharges remain along streams draining to the Shrewsbury River, Navesink River, and Raritan Bay.

Wastewater generated in southern Monmouth County and in Ocean County is treated at regional facilities and discharged to the ocean. There are no significant discharges to the estuaries in this area.

In the area south of Barnegat Bay, domestic waste is treated at one of four regional facilities operated by the Atlantic County or Cape May County Municipal Utilities Authorities. The treated waste is discharged to the Atlantic Ocean. Several small industrial facilities discharge directly to tributary streams.



**Figure 11:
Permitted
Point Source
Discharges
South of
Barnegat
Bay. Note
that
domestic
discharges to
the back
bays have
been
eliminated.**



Figure 12: Aerial view of the Ocean County Utility Authority Southern Facility.

Figure 13: Domestic Sewage Treatment Facility. Aeration tanks are at the rear, settling tanks in the foreground.



Treatment of domestic waste usually includes biological treatment of substances which lower oxygen levels in the receiving water, settling to remove solid material, and disinfection to kill disease causing bacteria. Treatment may also include removal of nutrients such as nitrogen and phosphorus which contribute to algal blooms.

While buffer zones are established around each domestic outfall, the size of the required zones can be decreased when a facility has demonstrated reliable treatment over a period of time. The buffer zone around the outfall of the Ocean County facility shown above was decreased in 1996 as a result of an excellent treatment record. The buffer zone around the Cape May County treatment facility located in Ocean City is scheduled to be reduced in 1998.

NON-POINT SOURCES OF POLLUTANTS

Pollutants, including pathogens, nutrients, and toxics, can also enter the water through stormwater runoff or from agricultural activities. Various management practices, such as green belts adjacent to waterbodies, detention basins, diversion of storm water, frequent street cleaning, modification in timing of fertilizer and/or pesticide applications, and management of animal waste, can be effective in reducing the non-point source inputs into ambient water.

As development pressures increase in coastal areas, the potential impact of stormwater runoff also increases.



Figure 14: Storm water outfalls, Long Branch. Discharges from a beach replenishment project can be seen in background.

MARINA ACTIVITIES

There are numerous marinas located throughout the coastal region, particularly in the estuaries. Waters within the confines of marinas are classified as *Prohibited*, due to the potential for contamination by pathogens released from porta-potties as well as residues from petroleum products, painting activities, and regular maintenance activities. Areas adjacent to marinas may be classified as either *Approved* or as *Special Restricted*. In addition, dredging activities in marinas to maintain water depth can affect water quality in adjacent areas.

Figure 15: Boats lined up at a dock, Tuckerton



WATERFRONT DEVELOPMENT PERMITS

Waterfront development permits are issued for projects which have the potential to affect environmental quality in areas adjacent to waterbodies. The Bureau of Marine Water Monitoring reviews those applications where the development could adversely affect either the quantity or quality of shellfish resources. Projects reviewed during 1996 included expansion of existing marinas, maintenance dredging, and construction of housing adjacent to saline waters. Many of the proposed projects were located in northern Monmouth County (Raritan Bay watershed), southern Ocean County (Barnegat Bay watershed), or near Atlantic City.

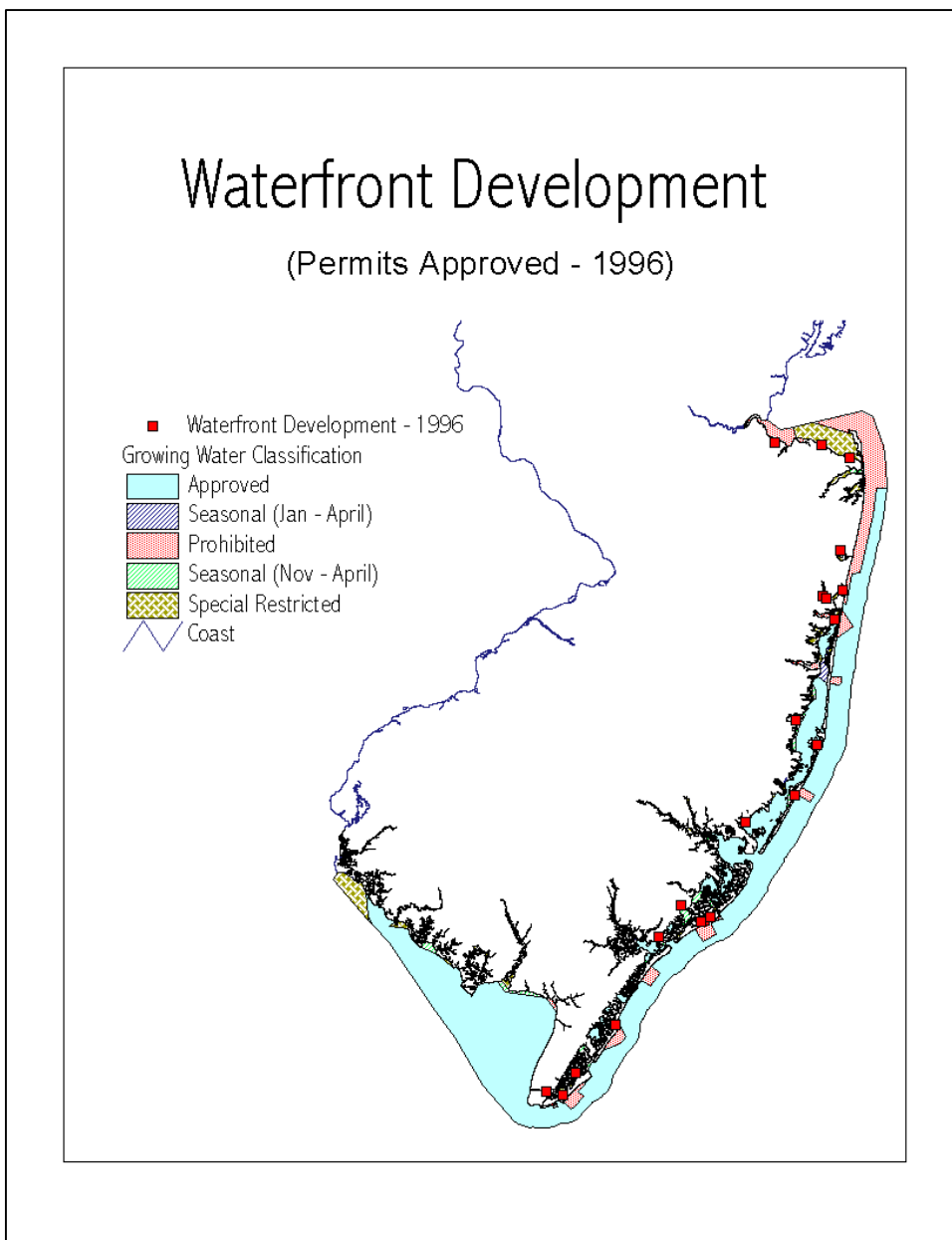


Figure 16:
Waterfront
Development
Permits are
issued for
various
activities
ranging from
maintenance
dredging to
construction
of new docks
or boat slips.

Permits
recommended
for approval
by the Bureau
of Marine
Water
Monitoring
are indicated
by red
squares.

WATER QUALITY STATUS

OVERVIEW

Bacteriological Water Quality

Bacteriological water quality in New Jersey's coastal waters has continued to improve. Classification of shellfish waters depends on the bacteriological water quality. As water

quality improves, areas may be upgraded to allow harvesting of shellfish under less restrictive conditions. Four shellfish areas were upgraded in 1996 as a result of these improvements.

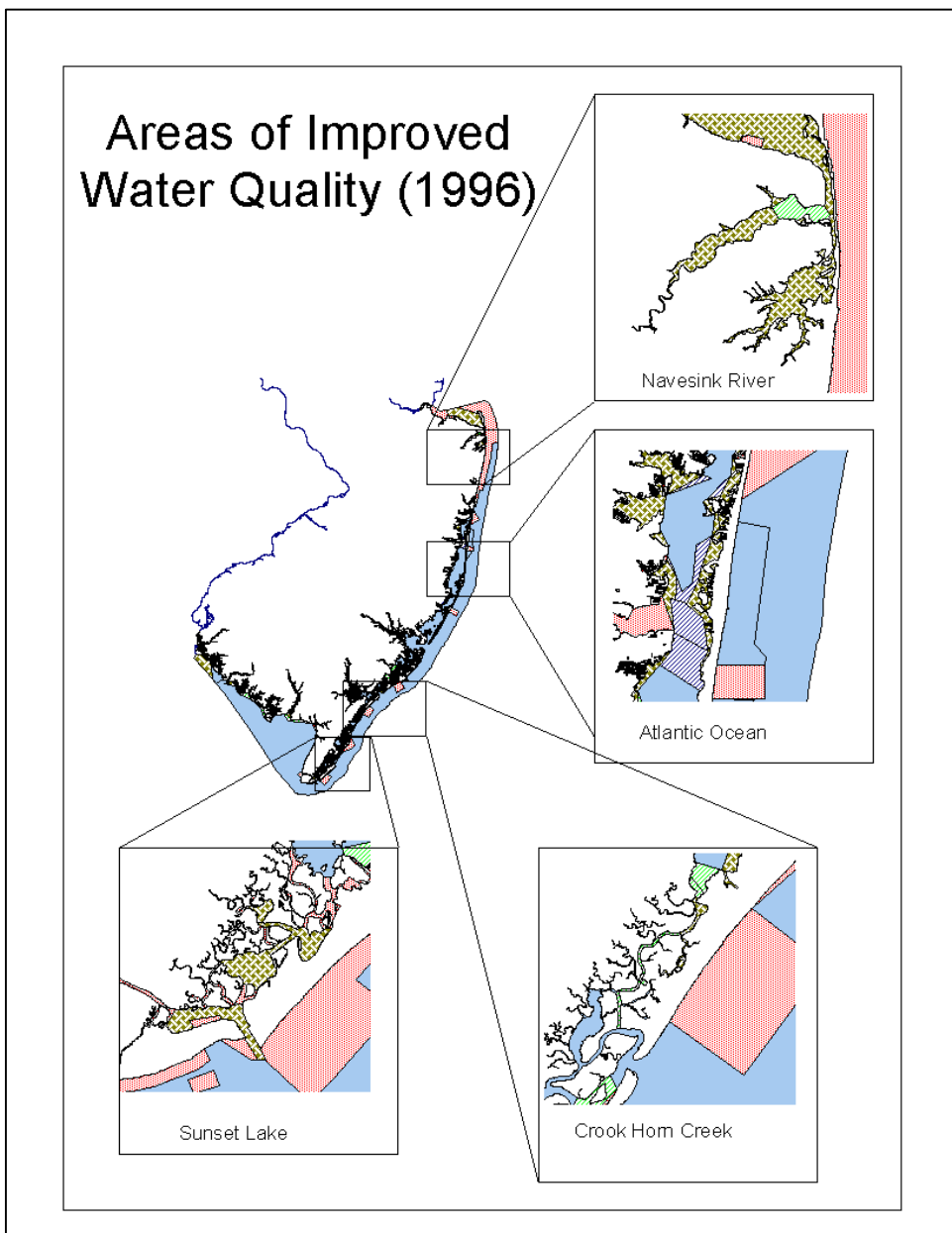


Figure 17:
Areas where
bacterial
water quality
improved
sufficiently to
allow
upgrading the
growing
water
classification

Nutrients

Elevated nutrients, particularly nitrate-nitrogen, and depressed levels of dissolved oxygen also pose water quality issues. Nutrients stimulate the growth of plants, including algae. Algal blooms pose potential nuisance problems. In addition, as the algae die, the oxygen in the water is depleted, which can cause the death of other organisms such as fish.

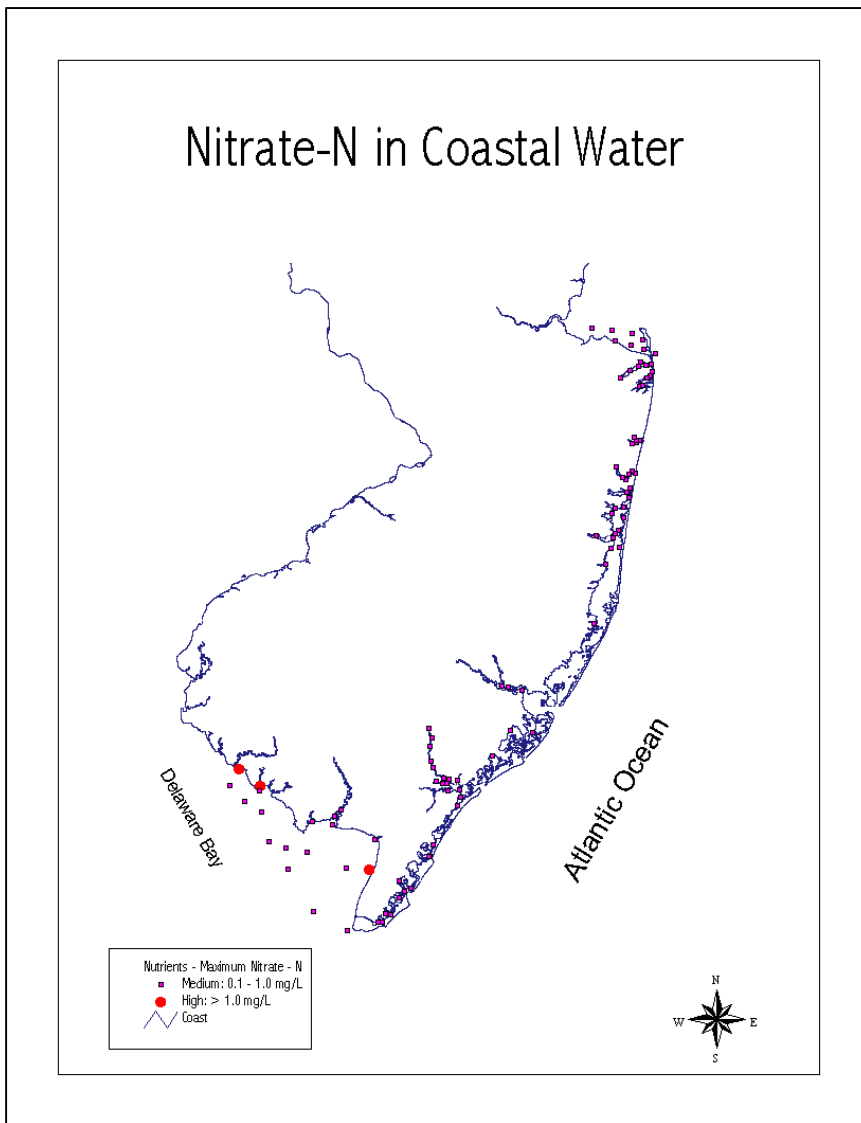


Figure 18: Nitrate-nitrogen levels in coastal waters of New Jersey. Blue dots indicate areas where nitrate-nitrogen levels are considered "medium", while red dots indicate areas where nitrate-nitrogen levels are "high".

Elevated nitrate-nitrogen levels are found in the Raritan Bay, the upper portion of Barnegat Bay, back bays between Great Bay and Great Egg Harbor Inlet, and the Delaware Bay.

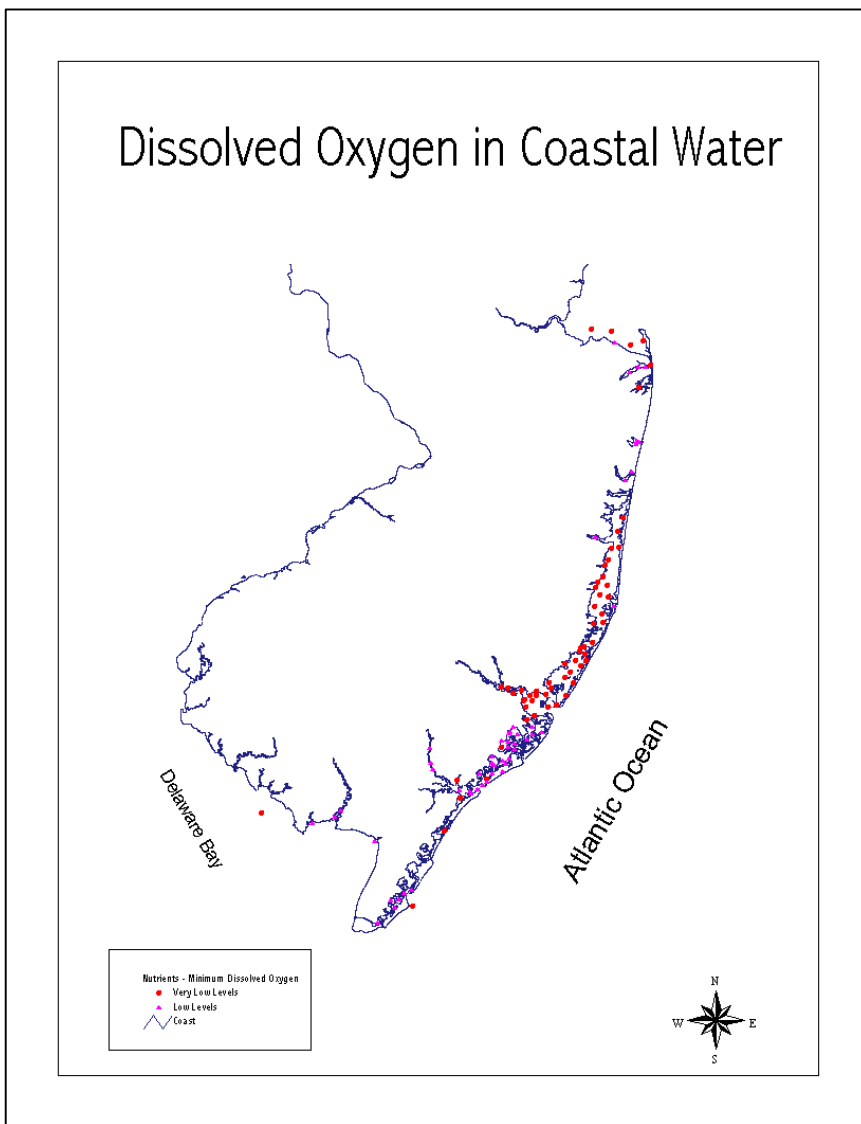


Figure 19:
Dissolved Oxygen
Levels in coastal
waters of New
Jersey.

Red dots indicate areas where very low dissolved oxygen poses potentially serious problems for some aquatic life. Purple dots indicate areas where water quality criteria are not achieved.

Depressed dissolved oxygen are found in the Navesink River, back bay areas between Great Bay and Cape May, and the Great Egg Harbor River.

Marine Biotoxins

The Department samples regularly throughout the summer for the presence of marine biotoxins. No algal blooms capable of producing biotoxins were identified during 1996. The Bureau of Freshwater and Biological Monitoring collects this information and prepares regular summaries of the data.

SUMMARY BY WATERSHED

Raritan Bay

The Raritan Bay includes shellfish waters in the Raritan Bay and Sandy Hook Bay (Growing Area N 1-2), as well as in the Navesink and Shrewsbury Rivers (Growing Areas N-3 and N-4). Water from Raritan Bay potentially impacts offshore shellfish resources (Growing Areas 54/55 and 56/57).

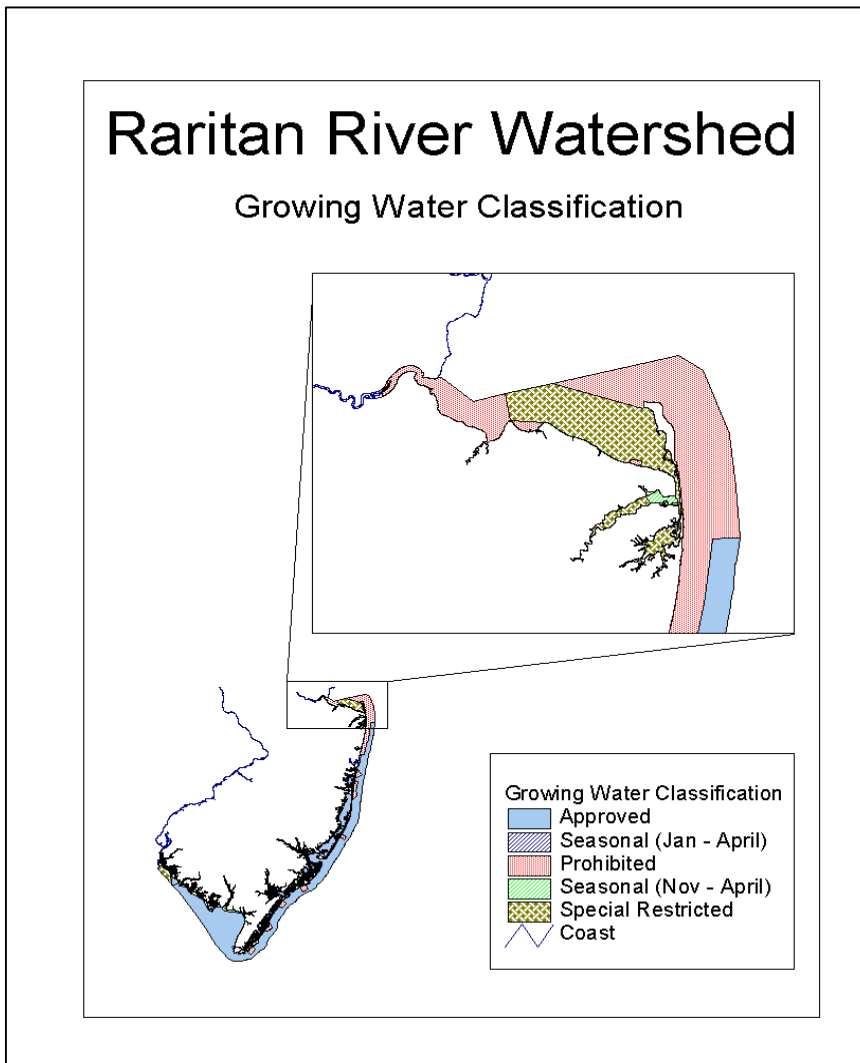


Figure 20: Saline portions of the Raritan River Watershed, including Raritan Bay, Sandy Hook Bay, Navesink River, and Shrewsbury River. Offshore areas are also impacted by water quality in the Bay.

Bacteriological Water Quality

The best water quality is found in the lower Navesink River, while the worst water quality is found in the upper estuaries and in the offshore areas. Approximately 624 acres of the lower Navesink (Oceanic Bridge to the mouth of the river) were upgraded from *Special Restricted* to *Seasonally Approved*.

Water quality is adversely affected by nonpoint sources of pollutants, including storm runoff from agricultural, suburban, and urban areas. Over the last ten years significant progress has been made, particularly in the Navesink River area, to reduce the quantity of pollutants entering the water from nonpoint sources. As a result, in January 1997 the lower Navesink River was opened to shellfish harvesting for the first time in 25 years.

Water quality is also adversely affected by input of inadequately treated domestic waste. Repeated overflows and bypasses in northern Monmouth County resulted in closing harvesting area 12B, located in the western portion of Raritan Bay. Closing a harvesting

area in *Special Restricted* waters means that the shellfish may not be harvested for subsequent treatment at the depuration facility or by planting them on a relay lot.

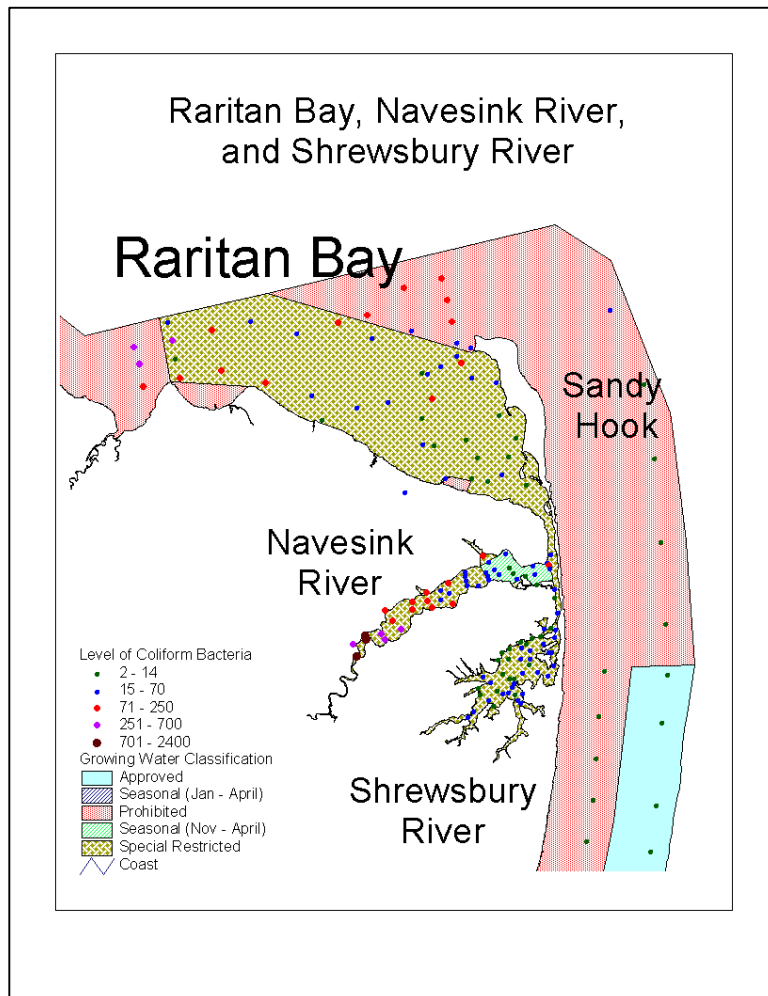


Figure 21:
Bacteriological Water Quality in the Raritan Bay, Navesink River, Shrewsbury River, and Ocean areas.

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and purple dots indicate sampling

stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

The Department is currently engaged in a special water study to evaluate the water quality in the *Prohibited* areas in the Raritan Bay near Sandy Hook and adjacent offshore areas. Completion of this study is anticipated in 1997. At that time data collected from the Prohibited Areas will be analyzed and decisions concerning potential upgrading of shellfish classification will be made.

Nutrients and Dissolved Oxygen

Elevated nutrient levels and low dissolved oxygen levels are found in the Bay as well as in the Navesink River. Potential sources include nonpoint contributions from agricultural activities, storm water input, and spills of domestic waste. While control of these sources

has improved over the last decade, additional control through implementing various best management practices is likely to result in improved water quality.

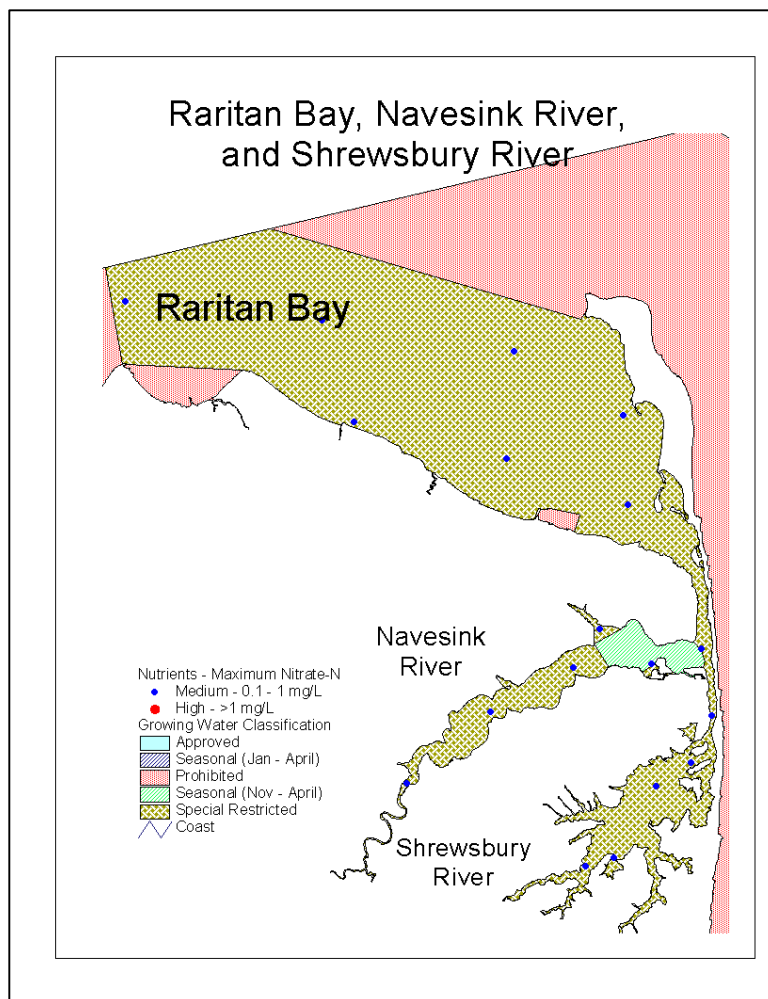


Figure 22: Nitrate-N levels in the Raritan Bay, Navesink River, and Shrewsbury River.

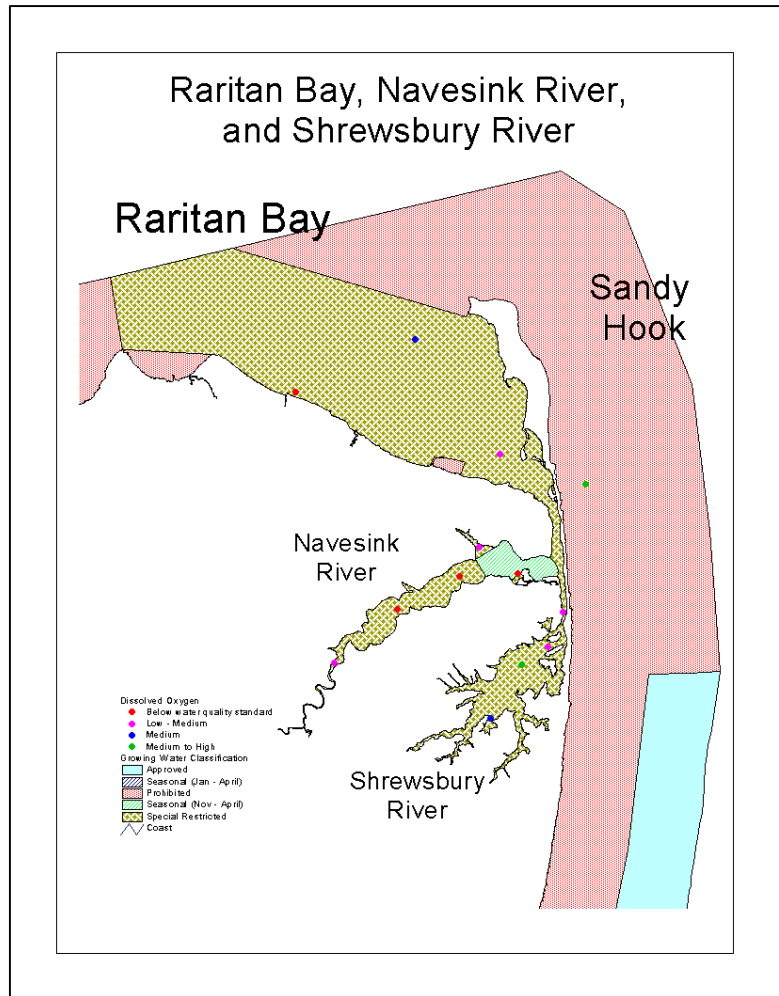
Medium levels of nitrate-nitrogen are found throughout the Raritan Bay, Sandy Hook Bay, Navesink River, and Shrewsbury River. The levels measured are sufficient to stimulate the growth of algae.

The highest levels are found adjacent to the shoreline, where it is more likely that nonpoint

sources of nutrients constitute a major source of the pollution.

Figure 23: Surface Dissolved Oxygen Levels in the Raritan Bay, Navesink River, and Shrewsbury River. Since dissolved oxygen levels tend to be higher at the surface and lower at the bottom, low to medium levels at the surface frequently translate to very low levels at the bottom.

Low levels of dissolved oxygen are found in the same areas as high levels of nutrients. While excess nutrients stimulate algal growth, resulting in a temporary increase in dissolved oxygen due to photosynthetic activity, as the algae die, dissolved oxygen can be reduced to very low levels.



Shark River / Manasquan River

The Shark River and Manasquan River each drain directly to the Atlantic Ocean. The Shark River comprises Shellfish Growing Area N-5; the Manasquan River is Shellfish Growing Area N-6. The offshore area is Growing Area 52/53.

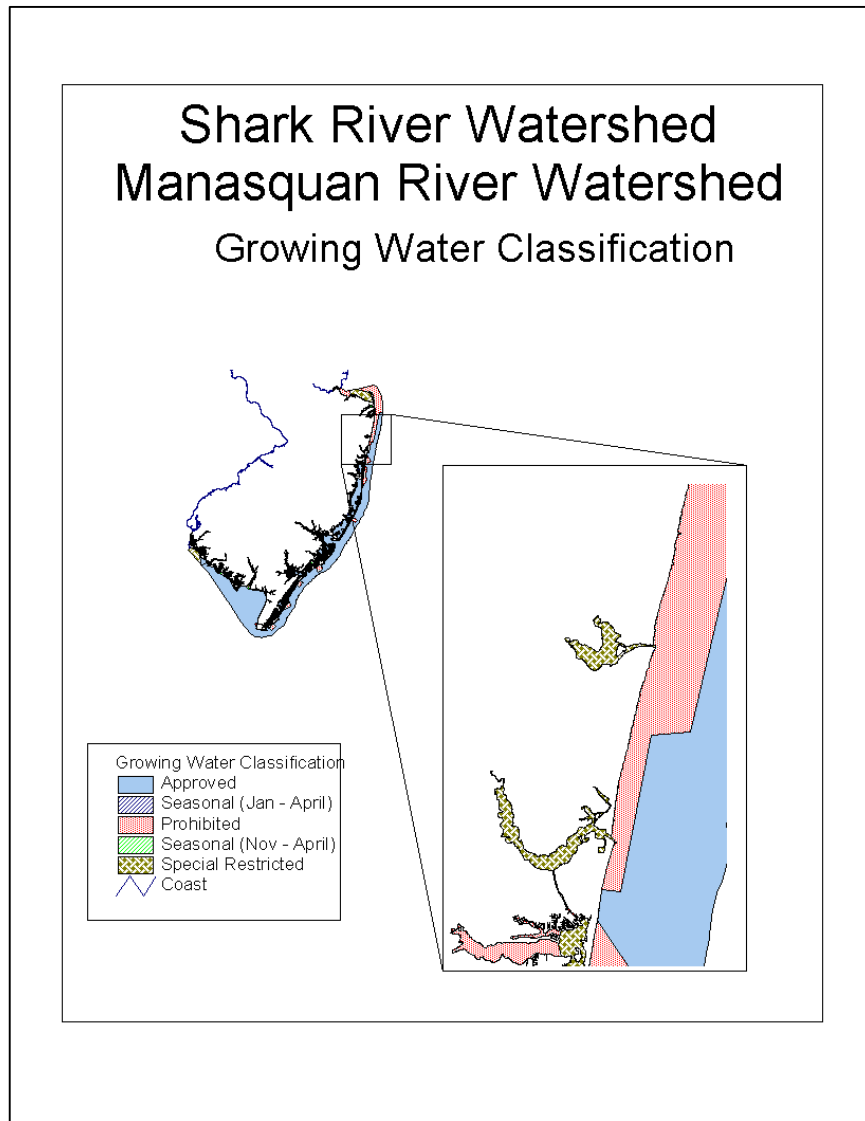


Figure 24: Shark River and Manasquan River Watershed Locations

Bacteriological Water Quality

Although neither river is open for unrestricted shellfish harvesting, water quality has improved over the last few years, especially in the Manasquan River. Water quality tends

to be best in both estuaries near the mouth of the estuary, with more degraded waters in the more upstream areas.

In 1997 the Manasquan River is expected to become New Jersey's first "No Discharge" zone under the Clean Vessels Act, with mandatory requirements prohibiting the discharge of human waste from boats into the estuary. These requirements are expected to facilitate further improvements in water quality in the estuary.

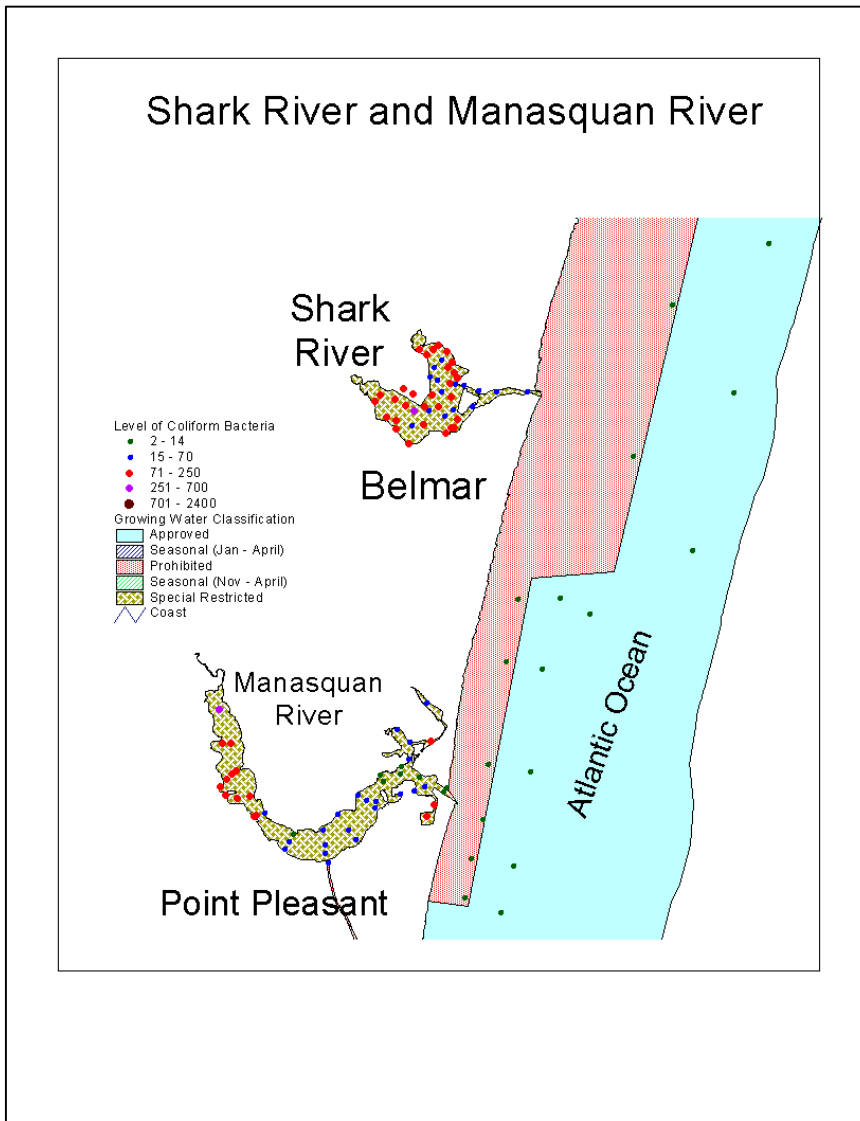


Figure 25:
Bacteriological
Water Quality in
the Shark River and
Manasquan River.

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may

not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

While water quality in the Manasquan River and Shark Rivers has been improving, bacteria levels during some periods are still too high to allow shellfish harvesting.

Barnegat Bay / Toms River

There have been no significant water quality improvements in this area in the last year. Water quality is good throughout much of the area.

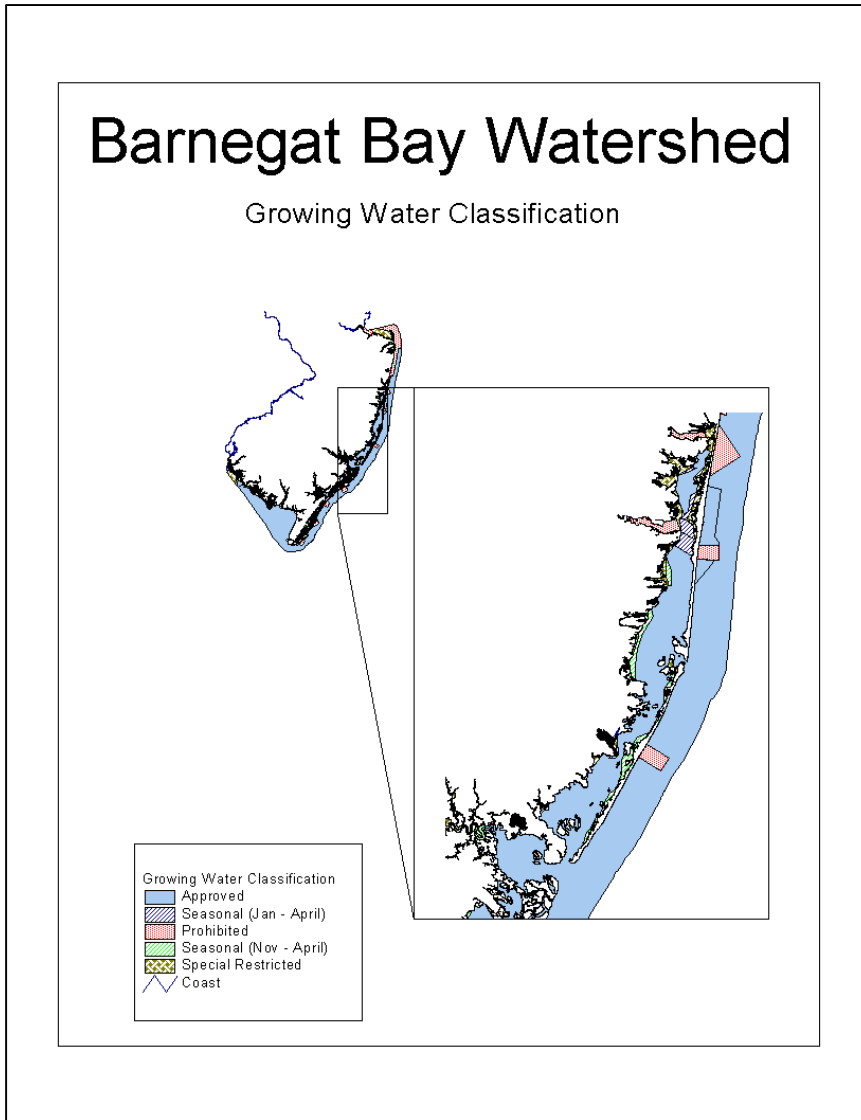


Figure 26:
Barnegat Bay
stretches from the
Metedeconk River
in the north to
Great Bay in the
south.

The northern part of the Bay has minimal shellfish resources, while the southern portion is relatively productive.

Bacteriological Water Quality

Impacted areas include the immediate shoreline, where stormwater outfalls discharge pollutants after precipitation events, and poorly flushed areas in the tidal creeks. The areas immediately adjacent to the shoreline, particularly along the bay side of the barrier islands, are closed to harvesting during the summer, while the poorly flushed areas are generally classified as either *Special Restricted* or *Prohibited*. The areas south of Toms River generally are more productive than the area between Toms River and the Metedeconk River.

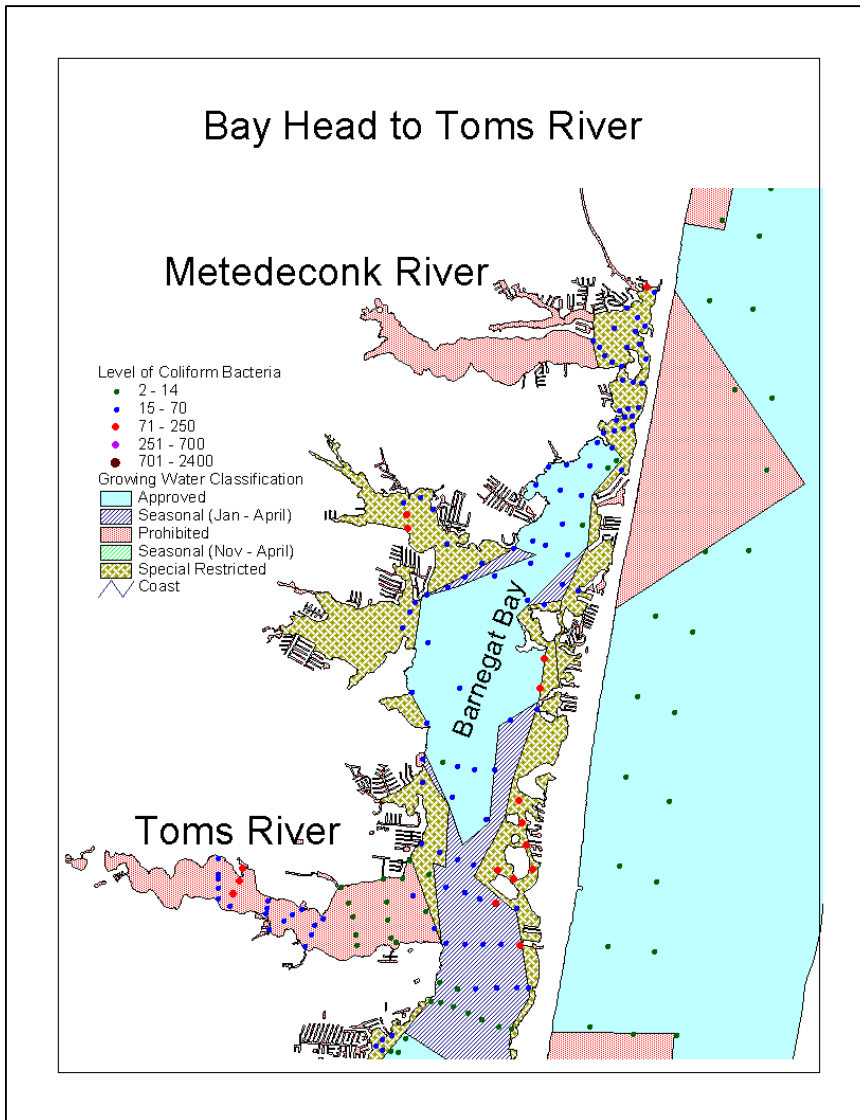


Figure 27:
Bacteriological
Water Quality in
Northern Barnegat
Bay. (Bayhead to
Toms River -
Shellfish Growing
Areas 7/8 and 9/10
in Barnegat Bay
and 50/51 in the
Atlantic Ocean).

The Metedeconk River and Toms River are classified as *Prohibited* due to poor water quality. Water quality is also compromised close to the shoreline. High bacteria levels in these areas is probably due primarily to non-point sources of pollutants and to

stormwater. The *Prohibited* areas in the Atlantic Ocean are buffer zones surrounding domestic treatment facility outfalls.

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

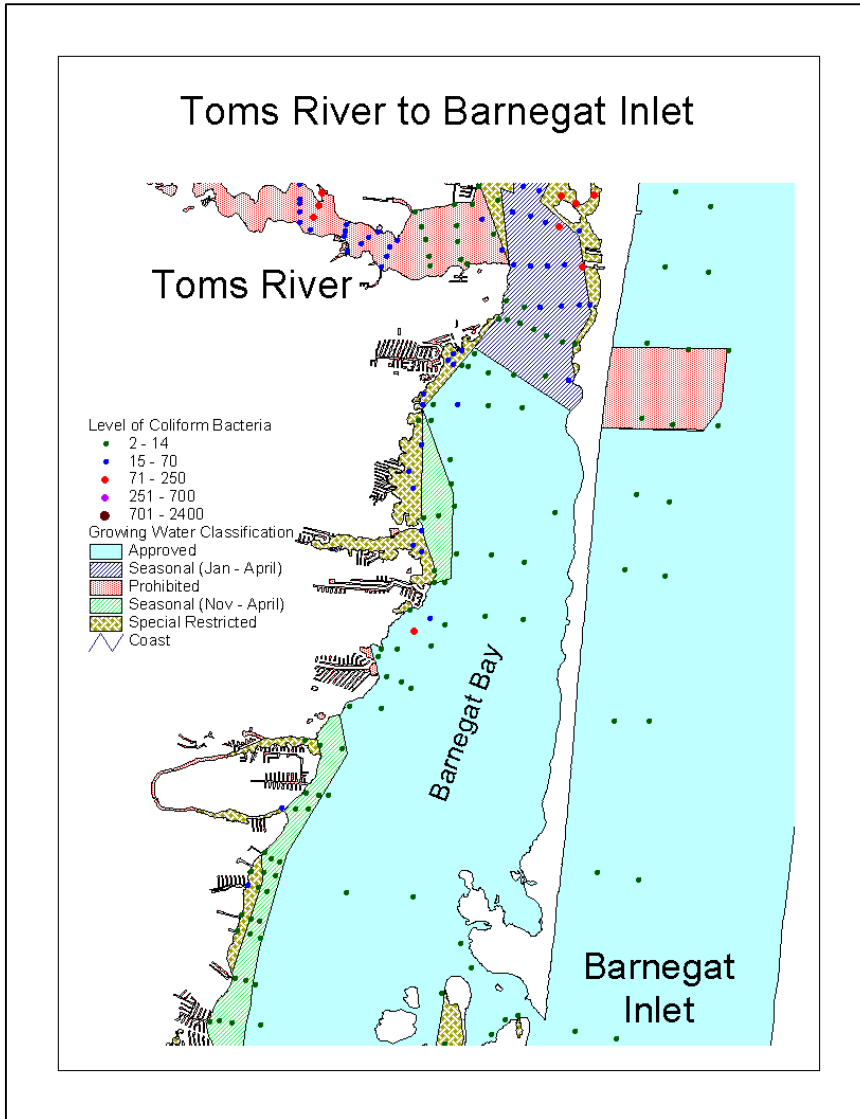


Figure 28:
Bacteriological
Water Quality in
Northern Barnegat
Bay. (Toms River
to Barnegat Inlet -
Shellfish Growing
Area 11/12 in
Barnegat Bay and
49 in the Atlantic
Ocean).

Approximately 3755 acres were upgraded from *Prohibited* to *Approved* in the Atlantic Ocean between Ocean Beach and Seaside Park.

Water quality in the Bay is better in this portion than north of Toms River. Areas along the mainland are classified as *Seasonal* due to

poorer water quality during summer than during winter.

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and

purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

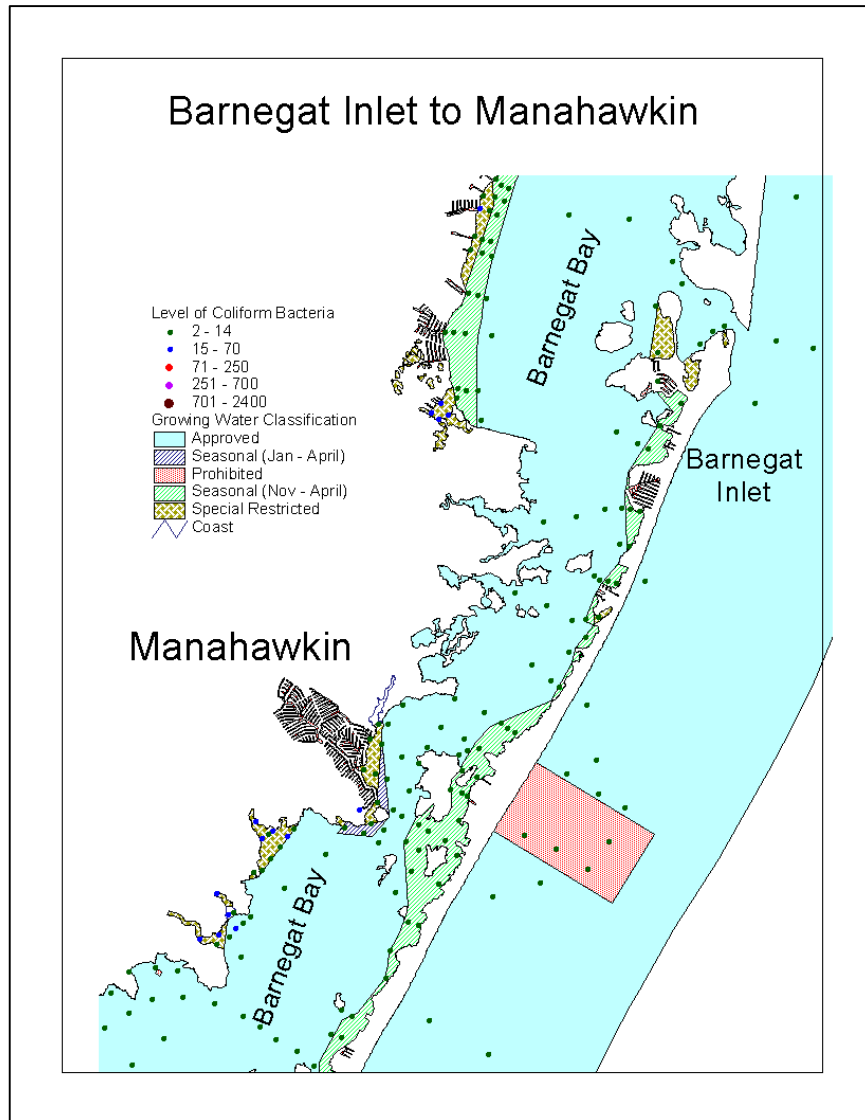


Figure 29:
Bacteriological Water Quality in Southern Barnegat Bay. (Barnegat Inlet to Manahawkin - Shellfish Growing Area 13 in Barnegat Bay and 48 in the Atlantic Ocean).

Water quality is generally excellent. Waters classified as *Seasonal* along the barrier island are affected by increased human activity during the summer. The *Prohibited* area in the Atlantic Ocean surrounds a domestic treatment facility outfall.

All sampling stations with more than 5 data points for the period 1994 - 1996 are

shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

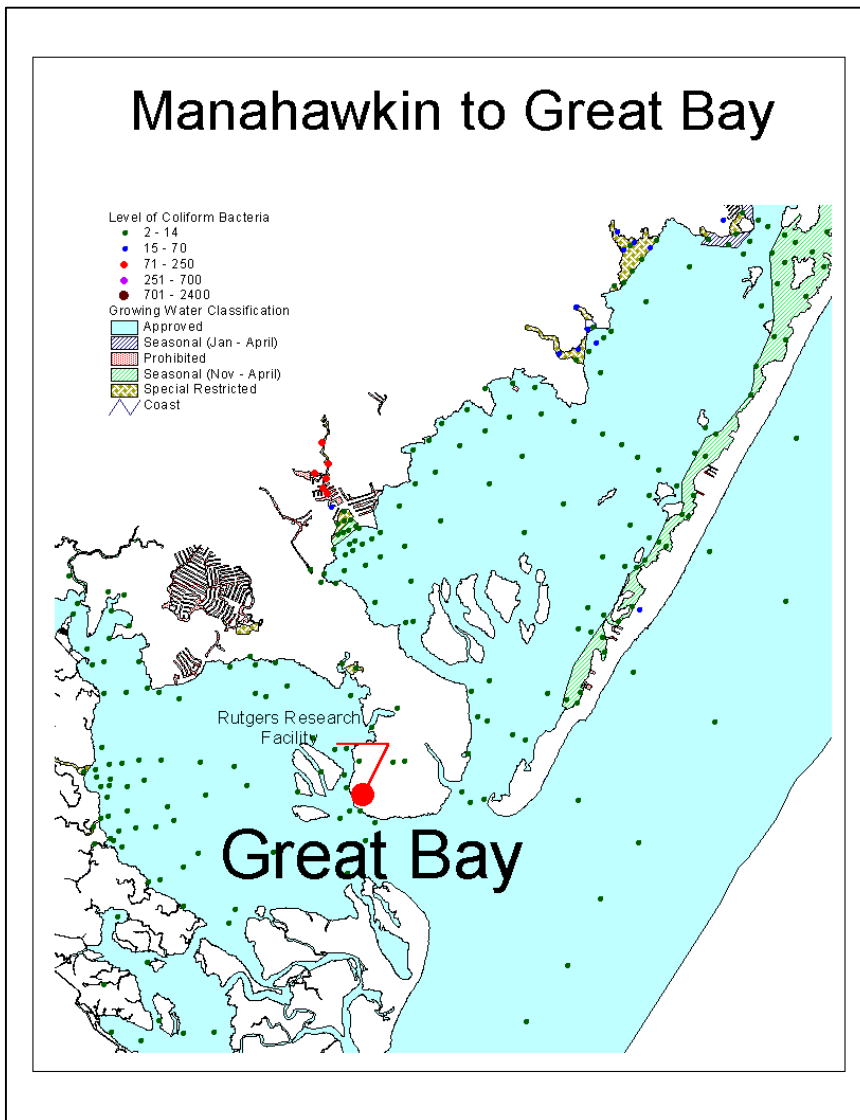


Figure 30:
Bacteriological
Water Quality in
Southern Barnegat
Bay and Great Bay.
(Manahawkin to
Great Bay and the
Mullica River -
Shellfish Growing
Area 14/15 in
Barnegat Bay and
46/47 in the Atlantic
Ocean)

A small area (approximately 6 acres) adjacent to the on-site waste disposal facility at the Rutgers Marine Research Station (shown as a large red dot) was downgraded from *Approved* to *Special Restricted* as a precautionary measure.

All sampling stations with more than 5 data

points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

Water quality in this area generally continues to be excellent. The drainage basin includes much of the central preservation area in the Pinelands Preserve. Waters adjacent to

developed areas and in the upper regions of the waterways follow the general pattern of lower water quality than waters in the bay or in well flushed areas.

Nutrients and Dissolved Oxygen

The nutrient / dissolved oxygen pattern appears to be slightly different from other areas in that the levels of nutrients, while sufficient to stimulate algal growth are not as high as seen in other areas. Dissolved oxygen levels are usually not depressed enough to cause death for other organisms.

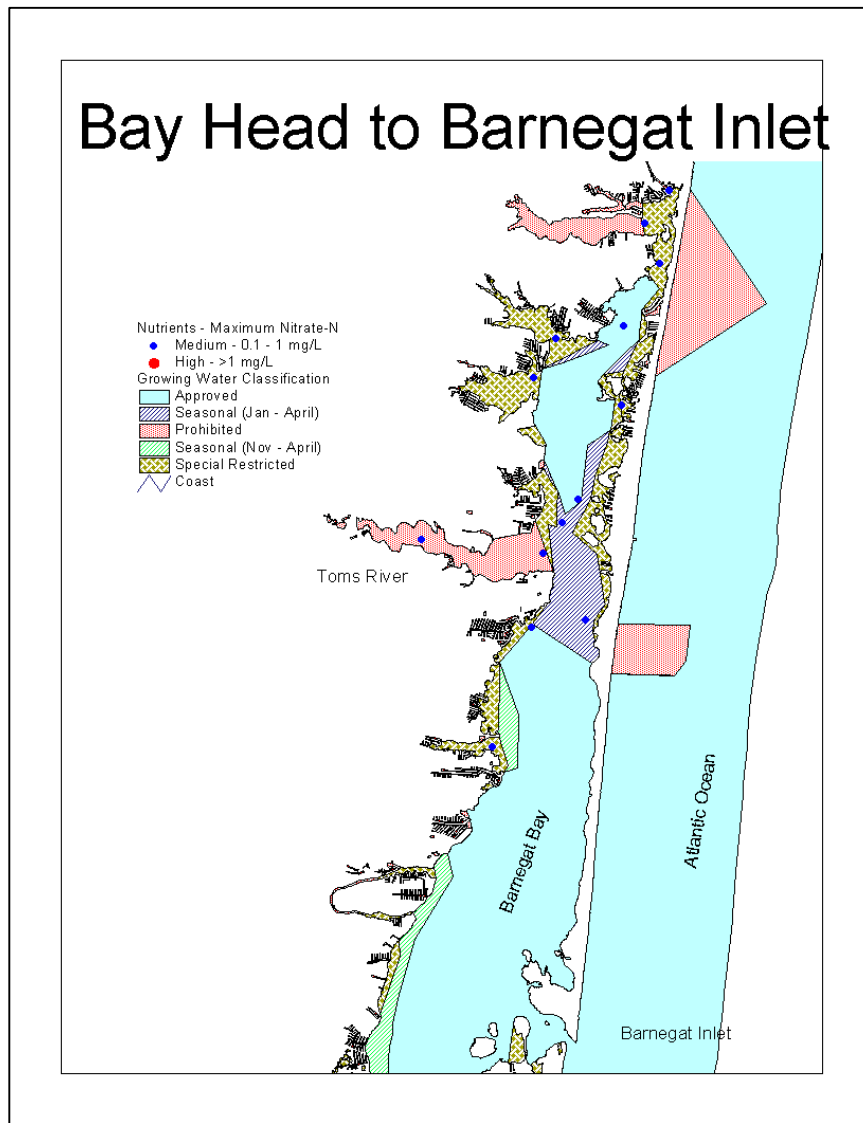


Figure 31:
Nitrate-N Levels
in the northern
portion of
Barnegat Bay.

Leased Lots Used for Purification of Clams Harvested from Special Restricted Waters

Clams harvested from *Special Restricted* waters in Raritan Bay, Sandy Hook Bay, or the Navesink River are purified by holding in clean water in one of two depuration facilities in Monmouth County or on a relay lot in Barnegat Bay until the bacteria have been purged from the clam tissue.

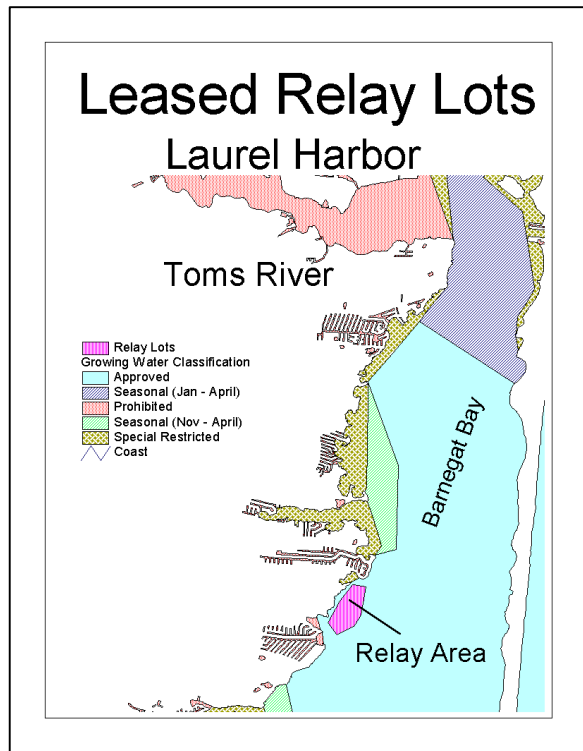
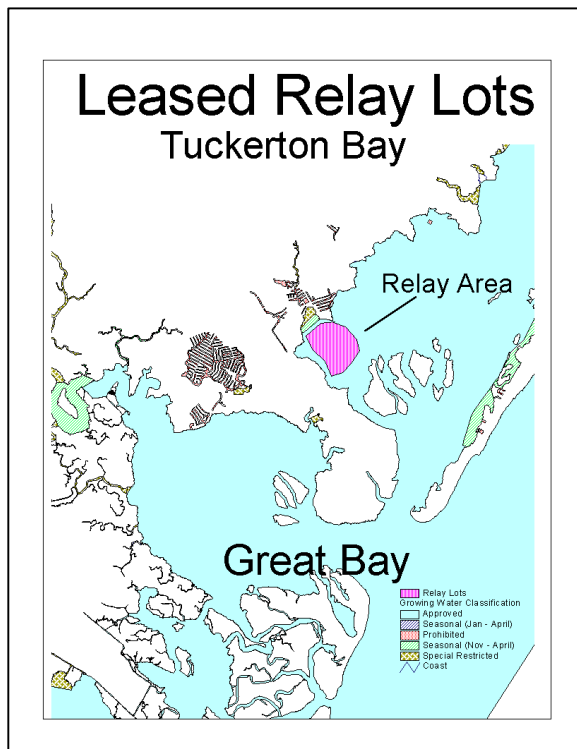


Figure 32: Location of leased relay lots near Laurel Harbor. (left)

Figure 33: Location of leased relay lots in Tuckerton Cove. (below)



Additional leased lots are located in Great Bay. However, these lots were not actively used during 1996.

Non-point Source Study

The Department is currently engaged in a cooperative study (in conjunction with the USGS) of stormwater impacts on water quality in the Toms River watershed. The purpose of the study is to compare the impacts of storm events on water quality in areas of varying land use patterns ranging from residential to industrial areas.

Back Bay Areas from Great Bay to Cape May

Water quality has generally continued to improve since the domestic discharges were eliminated from a back bay areas over ten years ago. Although there are areas which continue to be classified as *Prohibited*, the water quality has shown a consistent trend of overall improvement.

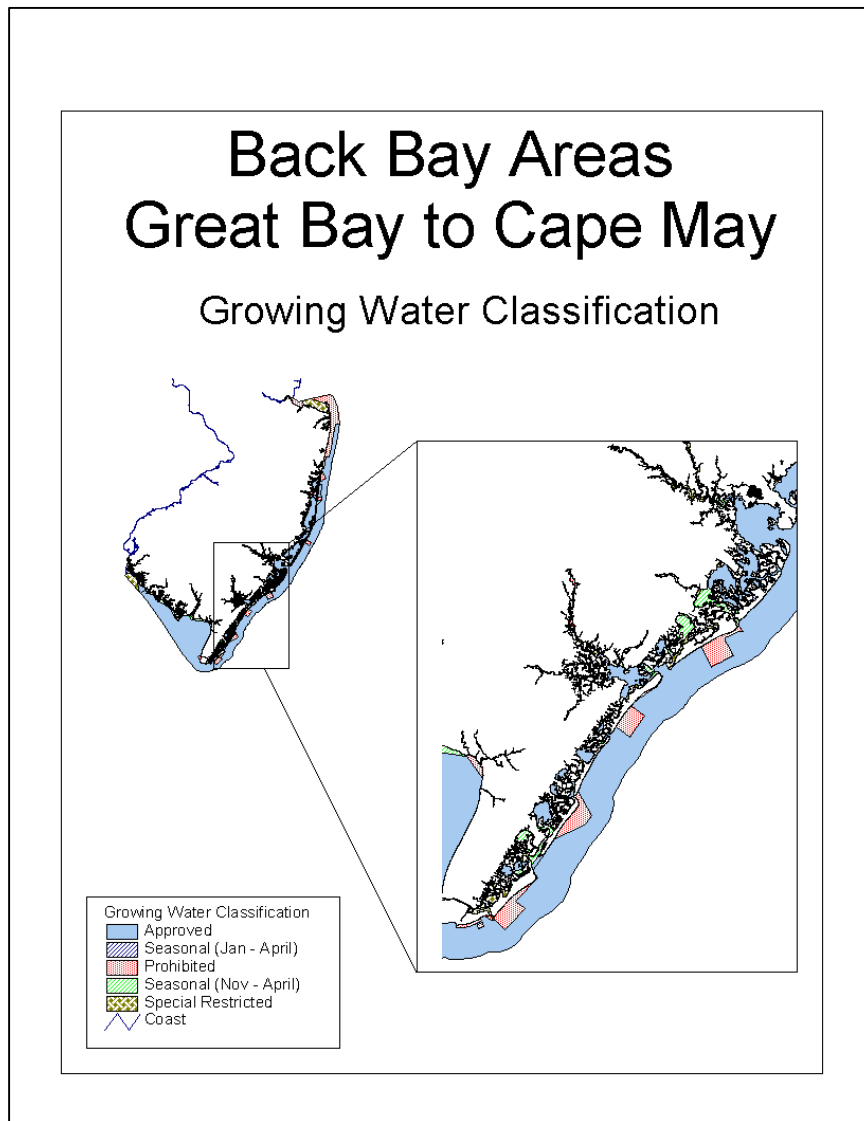


Figure 34:
Location of
Back Bay areas
bounded by
Great Bay on
the north and
Cape May on
the south.

Bacteriological Water Quality

Water quality in the back bays has continued to improve since the construction of upgraded domestic waste facilities and discharge of waste to the ocean rather than to the poorly flushed bays.

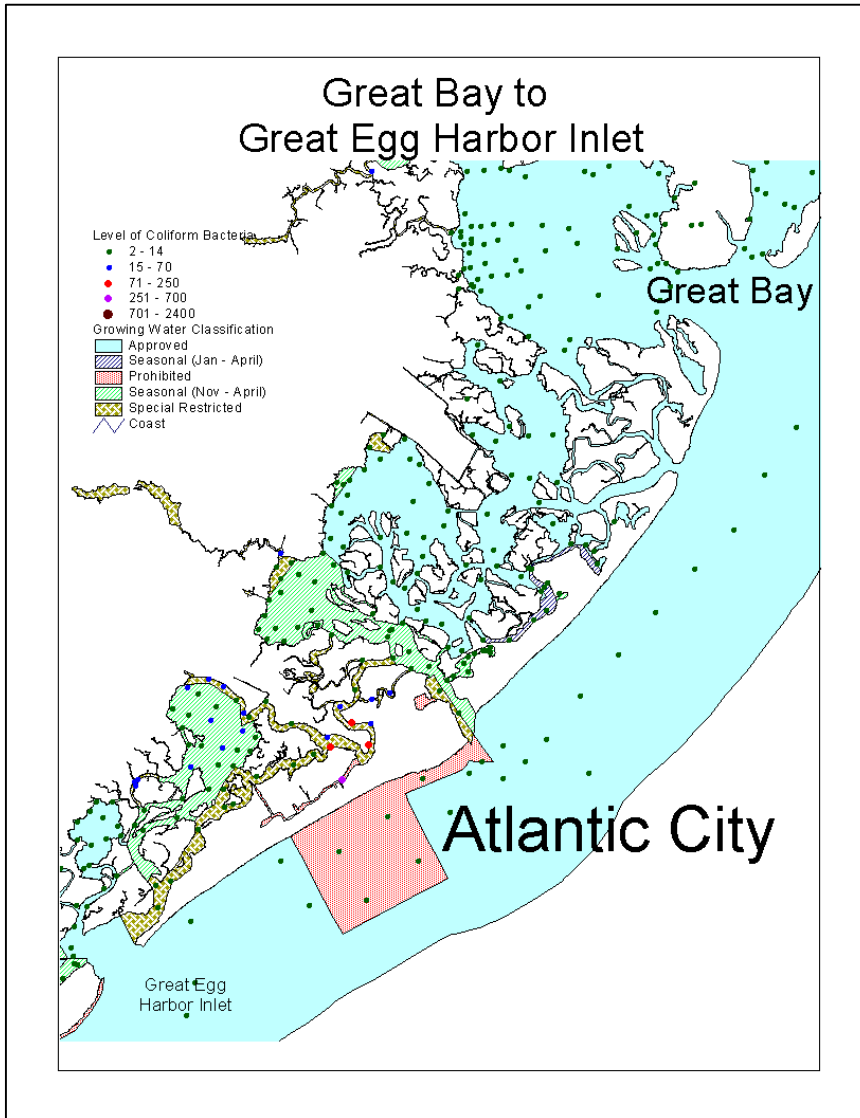


Figure 35:
Bacteriological
Water Quality.
(Great Bay to Great
Egg Harbor Inlet -
Shellfish Growing
Areas SE1 and SE2
in the Back Bays
and Areas 43 and
44/45 in the Atlantic
Ocean)

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted*

waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

Water quality in this area continues to be excellent. The Steelman's Bay area, which exhibited questionable water quality at the time of the last annual report is no longer of

concern. In addition, water quality in the Anchorage Point area has improved so that the Department is evaluating the potential for a classification upgrade. There have been periodic overflows of untreated wastewater in the Atlantic City area. The Department is continuing to evaluate the potential impact of the overflows.

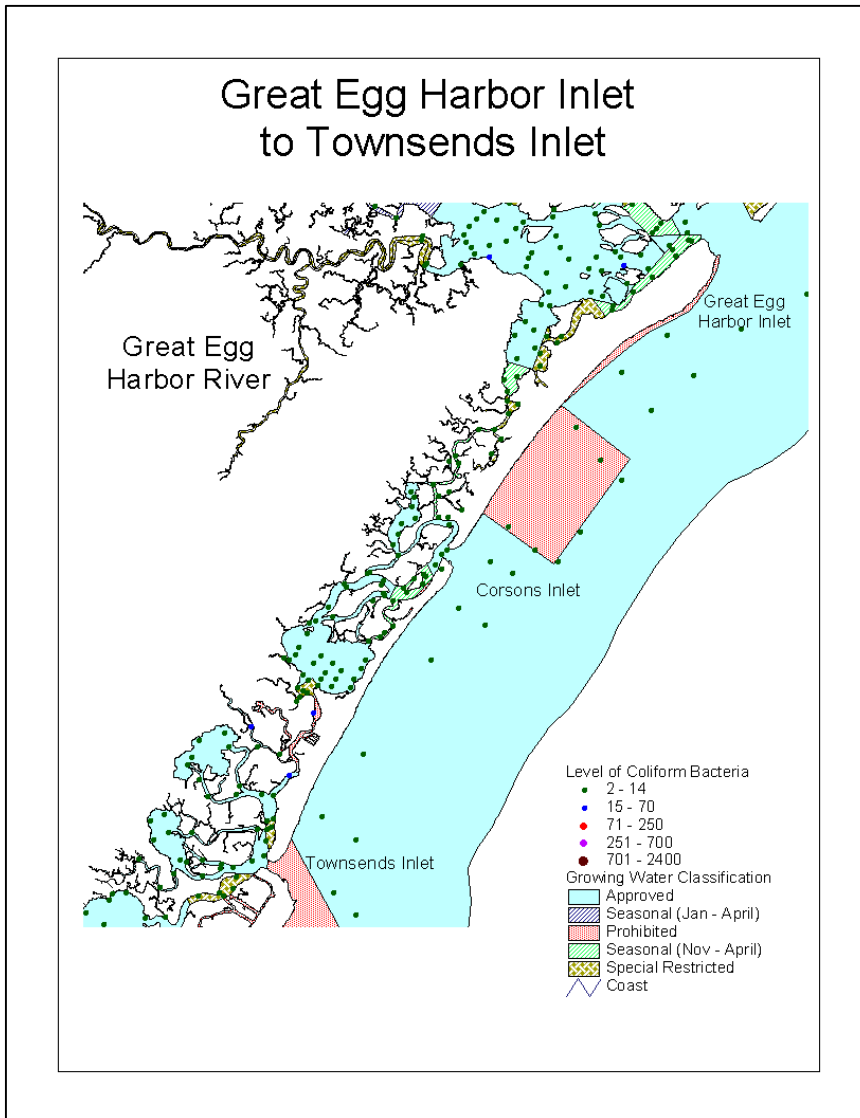


Figure 36:
Bacteriological
Water Quality.
(Great Egg Harbor
to Townsends Inlet -
Shellfish Growing
Areas SE3 and SE4
in the Back Bays
and Areas 42 and
43 in the Atlantic
Ocean)

Approximately 90 acres in Crook Horn Creek (located between Peck Bay and Corsons Inlet) were upgraded from *Special Restricted* to *Seasonal*.

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the

Approved criteria. Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

Ludlams Thorofare has the potential for a classification upgrade. This area will be evaluated in detail as a part of the next triennial growing area report.

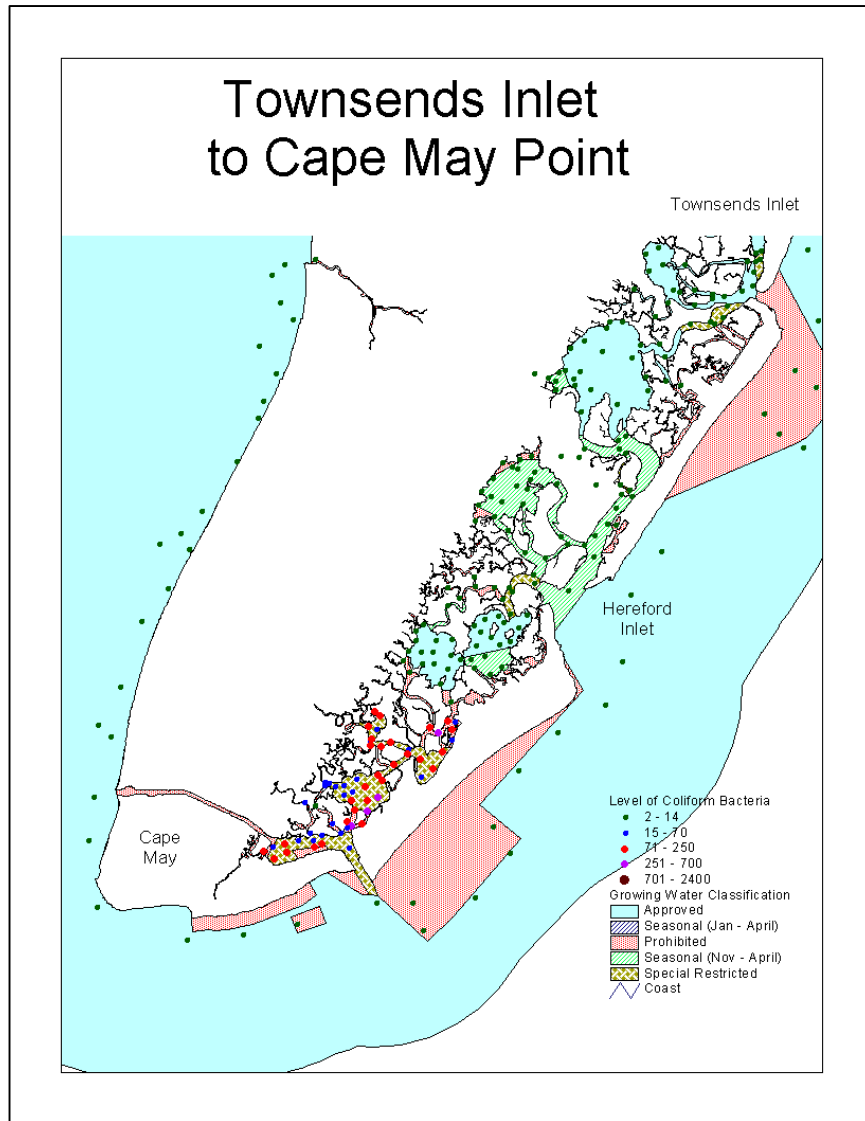


Figure 37:
Bacteriological
Water Quality.
(Townsend's Inlet to
Cape May Point -
Shellfish Growing
Areas SE5 and SE6
in the Back Bays
and 40/41 and 42 in
the Atlantic Ocean)

Approximately 325 acres in Sunset Lake (located west of Wildwood) were upgraded from *Prohibited* to *Special Restricted*.

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria.

Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

Nutrients and Dissolved Oxygen

Medium to high levels of nutrients and low levels of dissolved oxygen are found throughout the back bays south of Great Bay. Potential nutrient sources include storm water runoff, other nonpoint sources, and natural export of nutrients from the tidal wetlands.

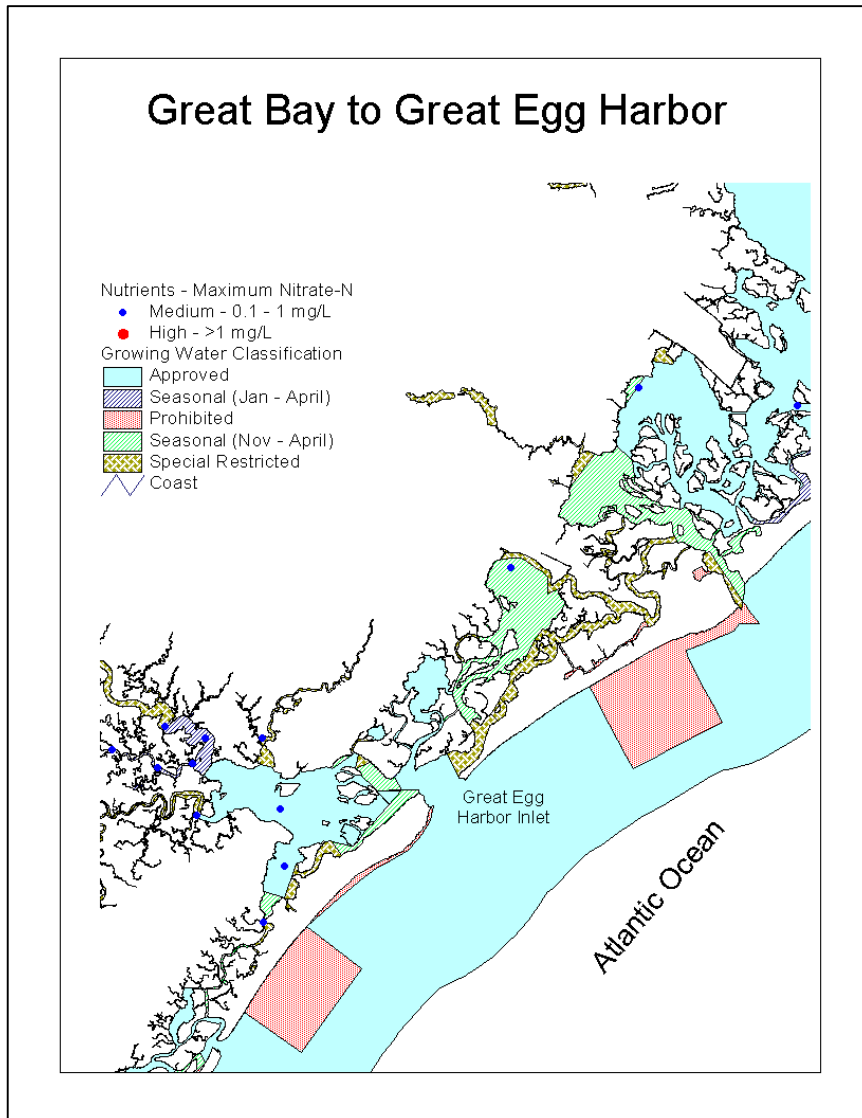
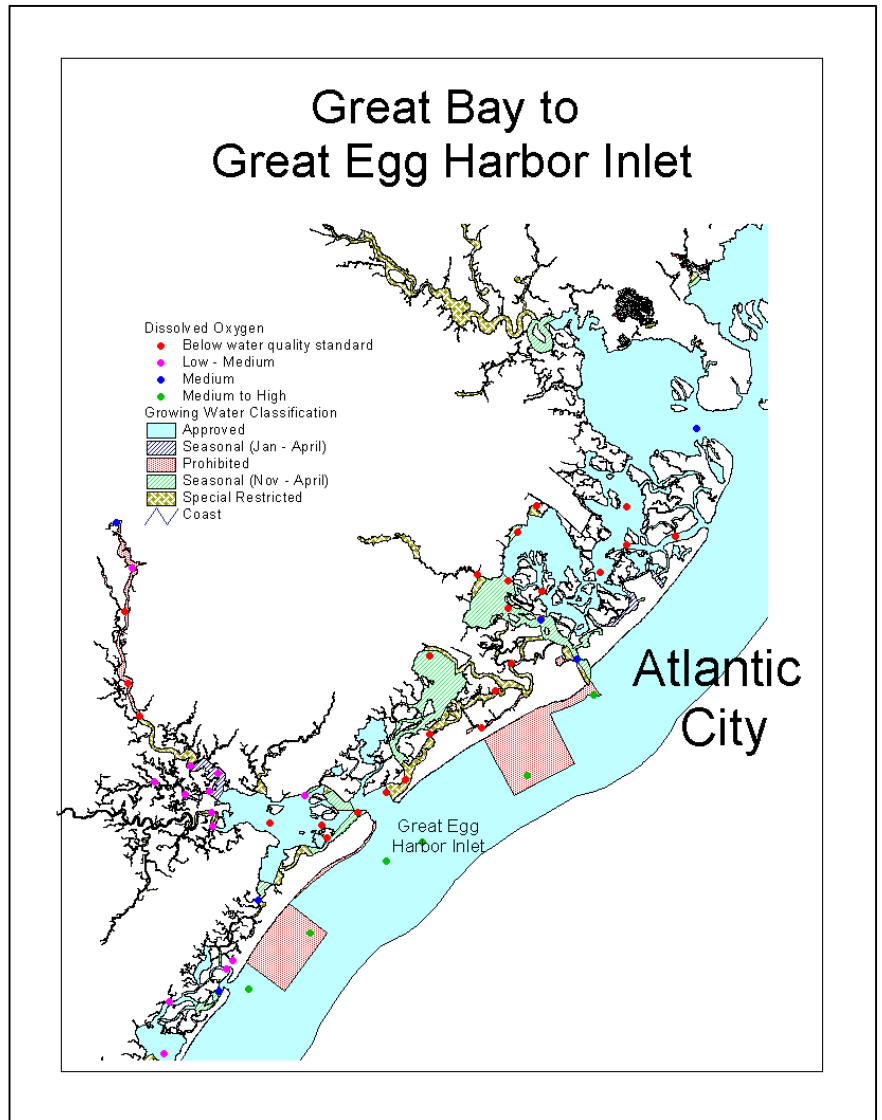


Figure 38: Nitrate-N Levels in the Back Bays south of Great Bay.

While the direct discharge of domestic waste into the back bays was discontinued in the mid to late 1980's, it is likely that nutrients and other pollutants have been stored in the sediments and will be released gradually over many years.

Figure 39: Dissolved Oxygen Levels in Great Egg Harbor River and Back Bays south of Great Bay.

Low levels of dissolved oxygen are found adjacent to developed areas. Additional areas are found adjacent to tidal wetlands, where the water may become oxygen depleted as a result of natural processes and low water velocity as the wetlands are submerged and drained throughout the tidal cycle.



Delaware River Bay / Maurice River / Cohansey River

Water quality in the Delaware Bay continues to be good. However, some poorly flushed estuarine areas, particularly in the Maurice River and Dividing Creek, indicate elevated levels of coliforms. These areas will be further evaluated regarding the potential for classification downgrading.

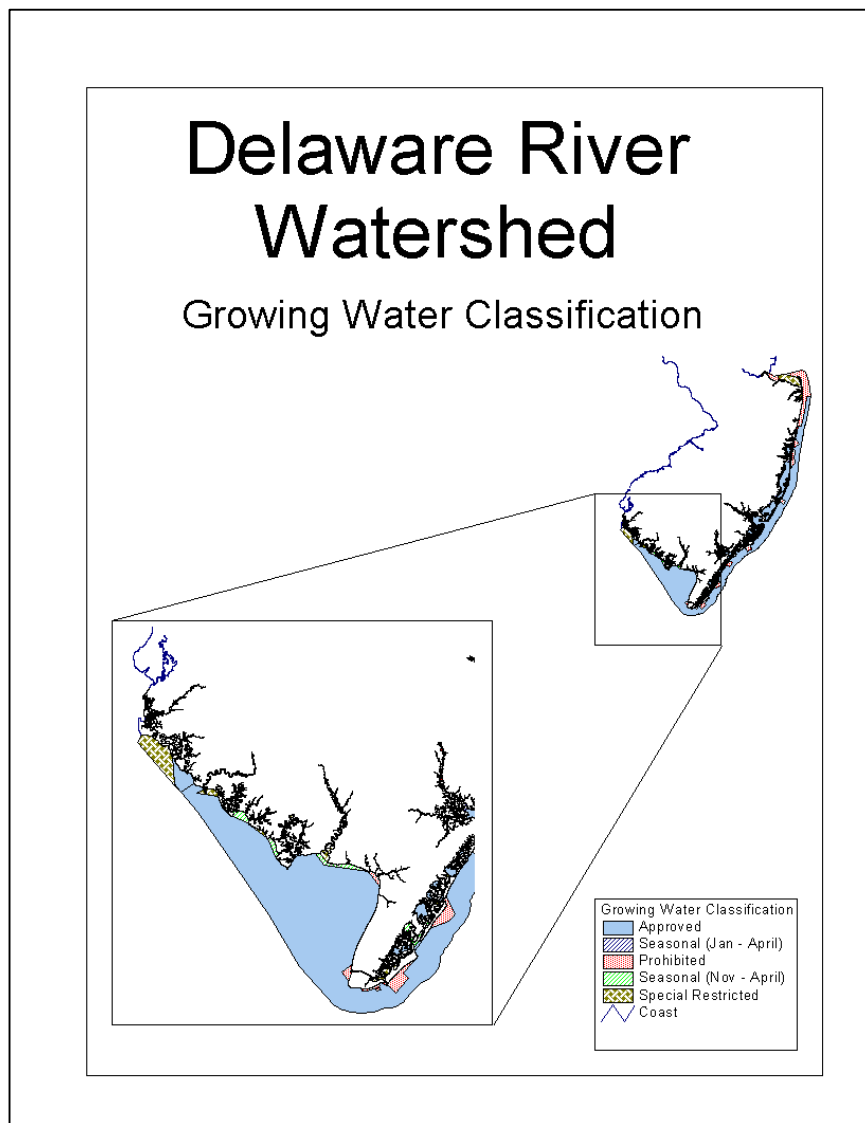


Figure 40: Delaware Bay, including the Cohansey River, Maurice River, Dividing Creek, and smaller tidal creeks.

Bacteriological Water Quality

Water quality in the Bay, except for areas adjacent to the shoreline remains good. Areas at the mouths of the Maurice River and Dividing Creek exhibit degraded water quality.

The Department is conducting a special water quality study to determine the source of the pollutants contributing to the poor water quality.

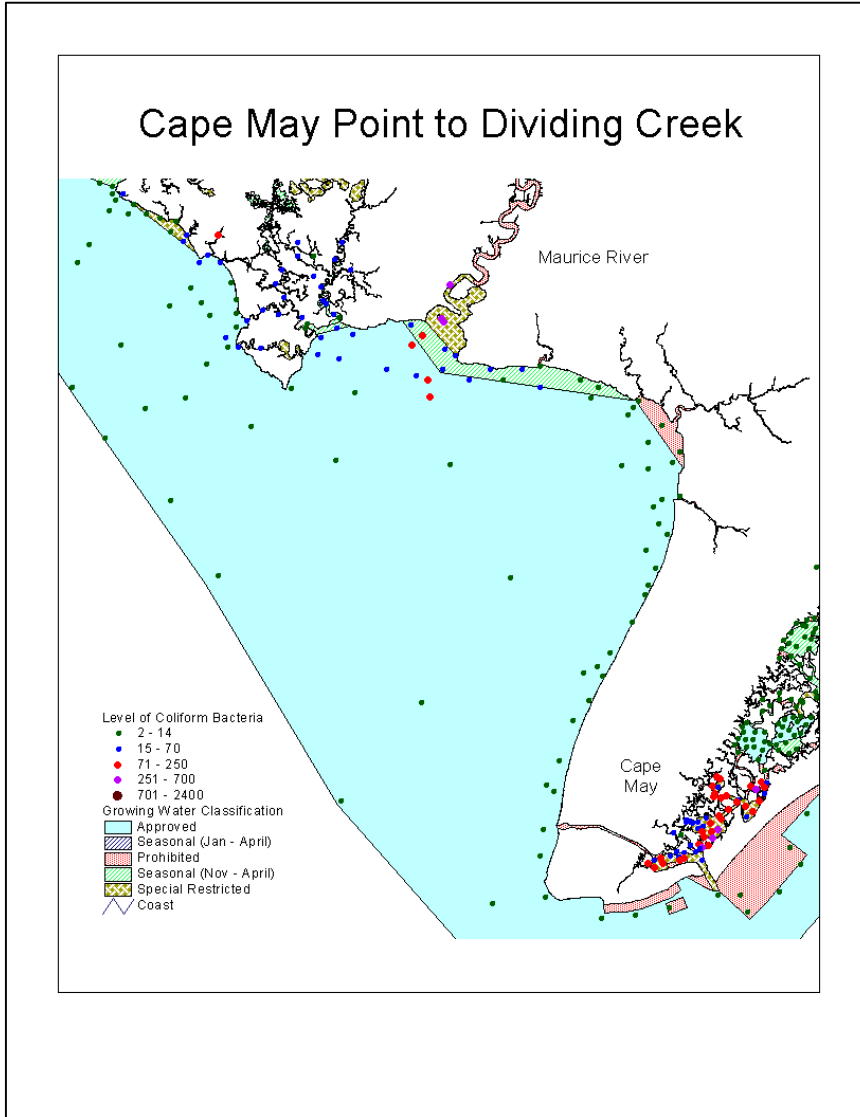


Figure 41:
Bacteriological
Water Quality in
the Delaware Bay.
(Cape May Point to
Dividing Creek -
Shellfish Growing
Area DB-1 and DB-
3)

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for

Special Restricted waters. Shellfish may not be harvested for direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

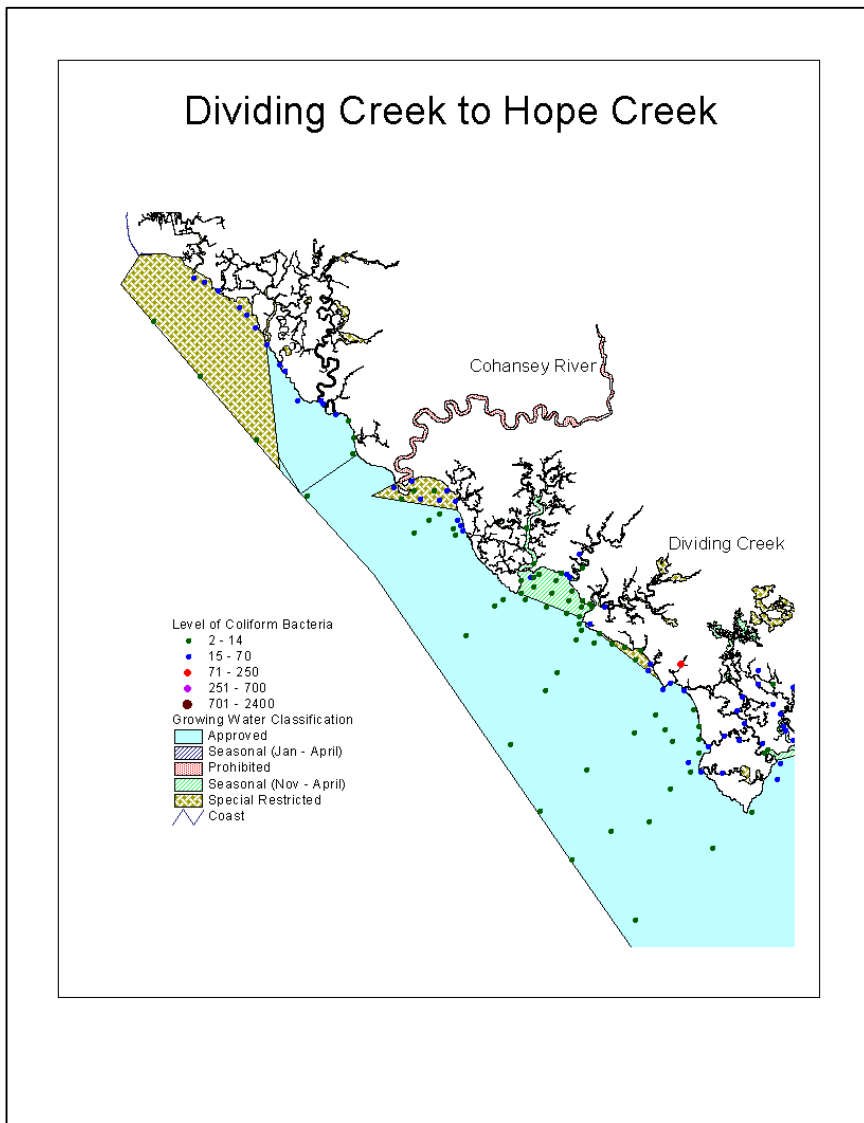


Figure 42:
Bacteriological Water
Quality in the
Delaware Bay.
(Dividing Creek to
Hope Creek - Shellfish
Growing Area DB-2
and DB-3)

All sampling stations with more than 5 data points for the period 1994 - 1996 are shown. Green and blue dots indicate sampling stations which meet the *Approved* criteria. Red and purple dots indicate sampling stations which meet the criteria for *Special Restricted* waters. Brown dots indicate sampling stations with bacteria concentrations exceeding criteria for *Special Restricted* waters. Shellfish may not be harvested for

direct market if the median level of total coliform bacteria in the growing water is greater than 70 or more than 10% of the samples exceed 330.

Water quality remains good in the Bay, except for those areas adjacent to the shoreline where human activities contribute pollutants.

Nutrients and Dissolved Oxygen

Some of the highest concentrations of nutrients and lowest levels of dissolved oxygen in shellfish waters have been measured in the Delaware Bay. The high levels of nutrients appear to be related to the application of agricultural fertilizers in Salem and Cumberland Counties. Application rates of fertilizers in those counties is higher than elsewhere in the region.

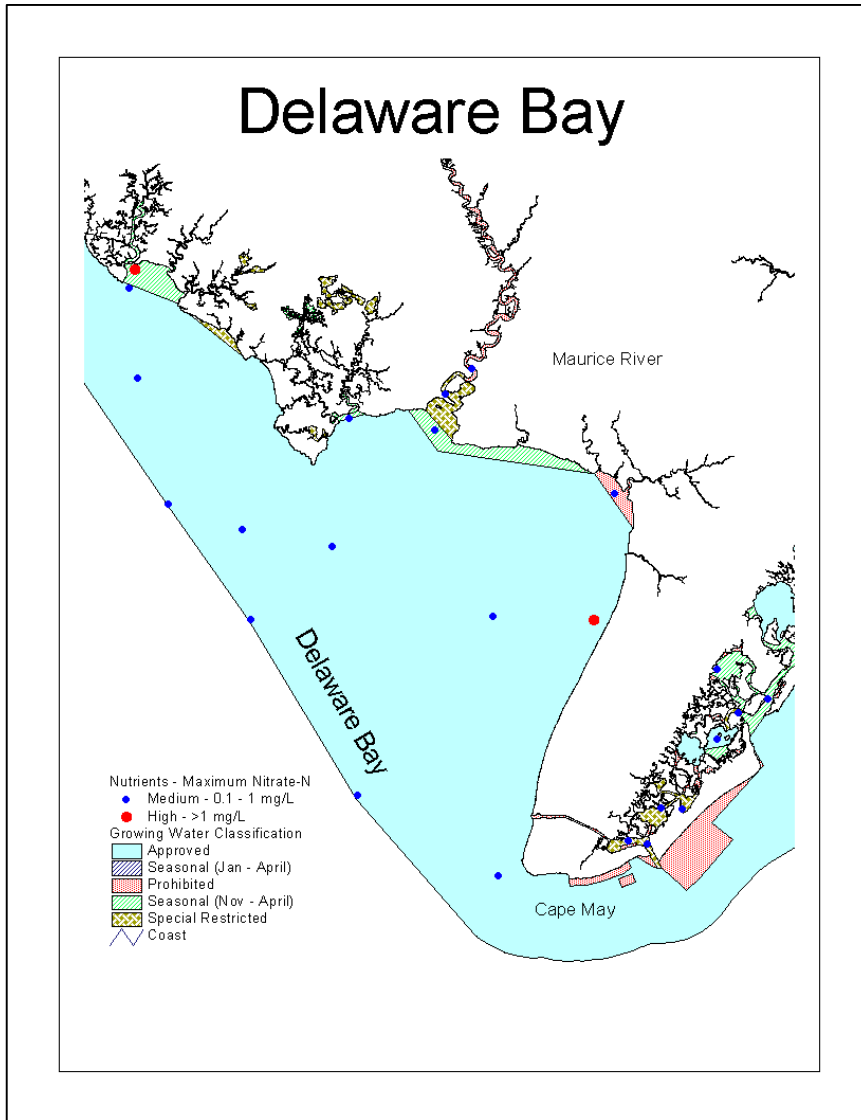
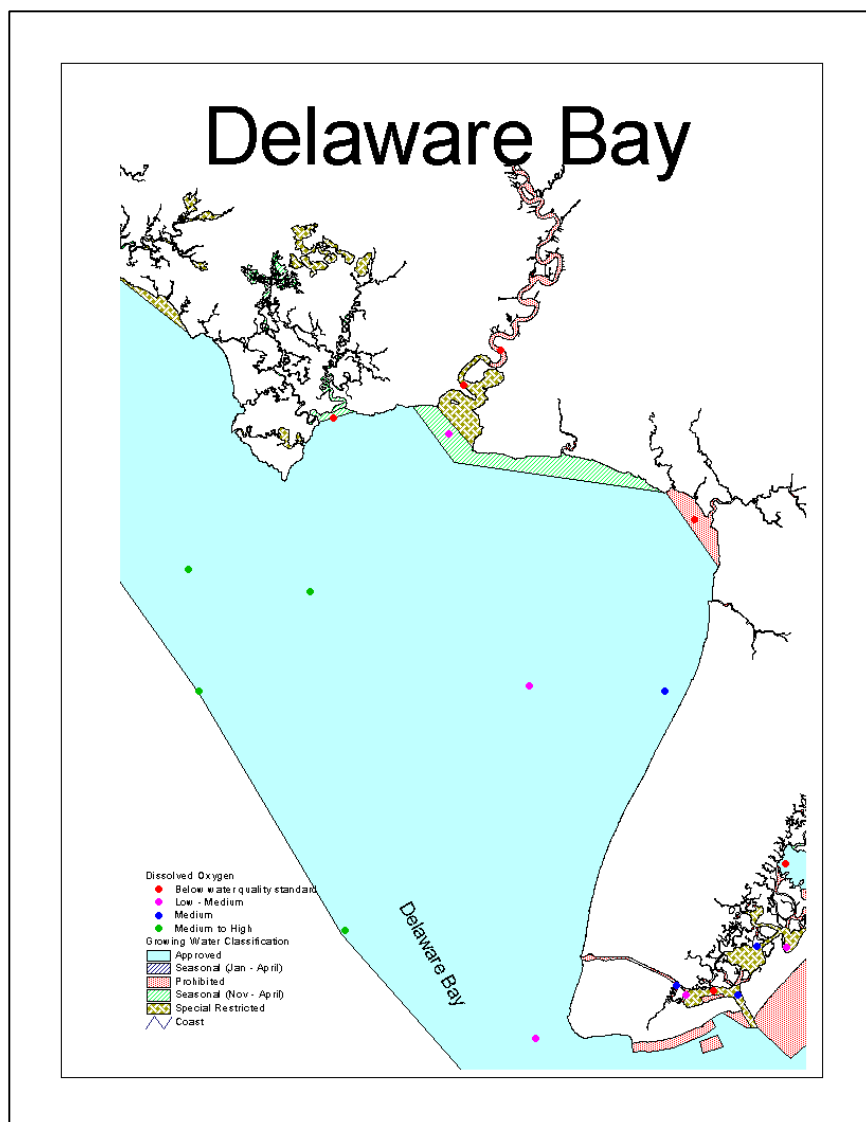


Figure 43: Nitrate-N levels in the Delaware Bay.



**Figure 44:
Dissolved
Oxygen Levels in
the Delaware
Bay.**

The lowest levels of dissolved oxygen are found in the tidal creeks. Although high levels of nutrients have been measured in the Bay, it is not clear that these levels stimulate algal blooms sufficient to severely depress the level of dissolved oxygen.

CONCLUSION:

From these individual annual reports it is concluded that:

1. All areas attain the minimum water quality for the classification.
2. Possible upgrades may occur in portions of SE-2 (Lakes Bay), SE-4 (Ludlam Thorofare), 42 (offshore reduction in prohibited area around outfall), and 43 (offshore reduction in prohibited area around outfall).
3. Water quality shows an improving trend that may result in upgrades in the future in the following areas: N-2 (Sandy Hook Bay), N-4 (Shrewsbury River), N-6 (Manasquan River), SE-6 (Sunset Lake), and 54/55 (offshore reduction in prohibited area around outfall). As water quality improves, changes in the sampling regime may be necessary to provide an adequate amount of data for evaluation.
4. Coliphage sampling is recommended for DB-2 (Dividing Creek and Maurice River Cove) and SE-6 (Jarvis Sound and Cape May Harbor).
5. Shoreline surveys are recommended for Areas N-1/2, N-7/8, N-9/10, N-14/15, DB-1, and DB-2. Classification changes may be proposed after the surveys are completed.
6. A hydrographic survey is recommended for Area N-1/2.
7. Possible downgrades may occur in Areas 40/41 (Stone Harbor) and DB-2 (Maurice River).

Recommended changes in sampling include:

1. Use of systematic random sampling strategy in areas with no domestic wastewater outfall.
2. Continue sampling in area 56/57 (Sandy Hook), with an emphasis on sampling after rainfall on the ebb tide.

ACKNOWLEDGEMENTS

This report was written under the direction of William J. Eisele, Jr., Chief, and James E. Mumman, Administrator. Robert Connell assisted in statistical and GIS data analysis. Special acknowledgment is given to Captains Don Owens, Joe Buzby, Matt Schoen, and Ken Hayek for their perseverance in collecting shellfish water quality samples. This study would not have been completed without the analytical capabilities of our microbiology laboratory staff, including Eric Feerst, Supervisor; Jeanne Campbell, Bruce Hovendon and Bob Seabrook.

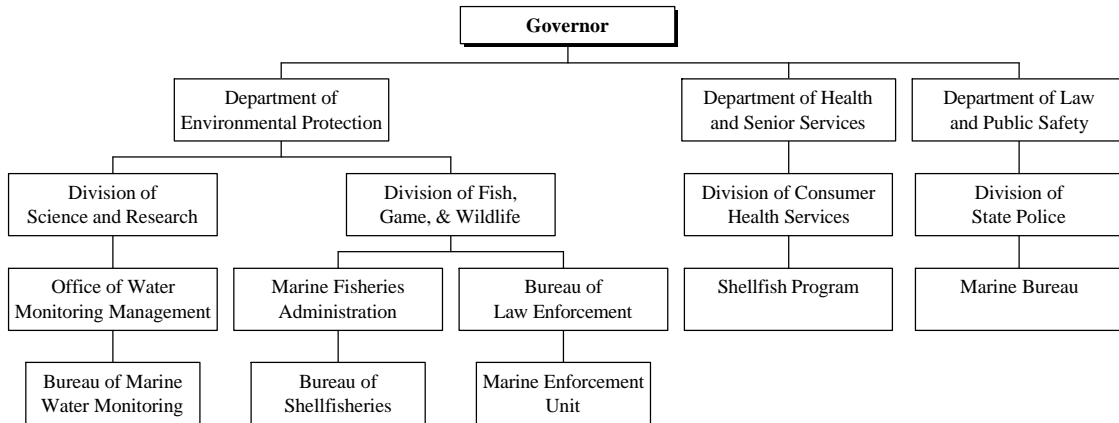
Photo credits:

Figures 1,4, 5, 6, 7, 8, 9, 13, 14, 15: courtesy Sandbox Photography

Figure 12: courtesy Ocean County Utilities Authority

APPENDIX I: ORGANIZATIONAL CHART

STATE OF NEW JERSEY SHELLFISH AGENCIES



LOCATION

Leeds Point

Nacote Creek
Bivalve

Nacote Creek

Trenton

Field Stations

ACTIVITIES

Water
Monitoring

Special
Permits

Licenses,
Leases,
Resource
Management

Enforcement:

Resource
Management,
Special
Permits

Certified
Dealers;
Depuration
Plants

Enforcement:

All New
Jersey
Statutes

APPENDIX II: WATER QUALITY SUMMARY (BY WATERSHED)

SUMMARY OF BACTERIAL WATER QUALITY FOR THE 30 GROWING AREAS

Growing Area	Classification Correct	Potential Changes in Classification	Recommended Changes in Sampling
Raritan Bay, Sandy Hook Bay, Navesink River, Shrewsbury River			
N 1-2	Yes	Possible upgrades in Sandy Hook Bay and western Raritan Bay	Shoreline and hydrographic investigations, inc circulation pattern in Sandy Hook Bay
N 3	Yes	No anticipated changes	No changes
N 4	Yes	Possible eventual upgrade in lower Shrewsbury	No changes
Shark River, Manasquan River			
N 5	Yes	No anticipated changes	No changes
N 6	Yes	Possible eventual upgrade in lower Manasquan	No changes
Barnegat Bay			
N 7-8	Yes	No anticipated changes	Shoreline survey
N 9-10	Yes	No anticipated changes	Shoreline survey
N 11-12	Yes	No anticipated changes	No changes
N 13	Yes	No anticipated changes	No changes
N 14-15	Yes	No anticipated changes at this time; possible change to Remote Area for part of Great Bay	No changes
Back Bays - Great Bay to Cape May			
SE 1	Yes	No anticipated changes	Continued monitoring on overflow discharges in Atlantic City
SE 2	Yes	Possible upgrade in Lakes Bay and Ship Channel	No changes
SE 3	Yes	No anticipated changes	No changes
SE 4	Yes	No anticipated changes	No changes
SE 5	Yes	No anticipated changes	No changes
SE 6	Yes	No anticipated changes	Change to rainfall priority
Delaware Bay			
DB 1	Yes	Possible upgrade near Fortescue	No changes
DB 2	Yes	No anticipated changes	Coliphage sampling in Dividing Creek and Maurice River Cove; needs shoreline survey
DB 3	Yes	No anticipated changes	No changes
Atlantic Ocean - Cape May to Sandy Hook			
40-41	Yes	Downgrade in Stone Harbor area	No changes
42	Yes	Possibility of reducing size of buffer zone around outfall	No changes
43	Yes	Will reduce buffer zone around outfall	No changes
44-45	Yes	No anticipated changes	No changes
46-47	Yes	No anticipated changes	No changes (remote area)
48	Yes	No anticipated changes	No changes
49	Yes	No anticipated changes	No changes
50-51	Yes	No anticipated changes	No changes
52-53	Yes	No anticipated changes	No changes
54-55	Yes	Possible upgrade	Increase sampling frequency. Update files on POTW operations
56-57	Unknown	Entire area is prohibited; EPA collecting samples; potential upgrade pending sampling results	No changes

AREA 1/2: RARITAN RIVER BAY / SANDY HOOK BAY

Next Report Due:

1998

Last Sanitary Survey:

1989

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers **017 - 027** and is sampled under the following strategy:

☒

APC for assignment numbers

017 - 027

☒

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis (017)

Number of stations in area:

24

Number of samples collected per run:

23

Number of runs collected:

11 in 1996

Do the results support the current classification:

YES

Bacteriological Data Analysis (027)

Number of stations in area:

24 (sampled by ISC)

Number of samples collected per run:

15

Number of runs collected:

11 in 1996

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for the Raritan River Bay / Sandy Hook Bay was completed in **1996**. The **15** sets of data evaluated for the current annual report (**1990-1996**) indicate that:

1. Year-round sampling indicates that most sampling stations meet Special Restricted requirements. A few stations meet Approved requirements. Sampling stations in the upper part of Raritan Bay do not meet the requirements for Special Restricted waters.
2. In 1996 an intensive sampling schedule was initiated to determine if two sections now classified as Prohibited could be upgraded to Special Restricted. Although only 11 samples have been collected to date, it appears that these two areas (indicated on the

map) may be eligible for an upgrade pending analysis of a sufficient number of bacteriological samples and a determination that toxicant are not present in the shellfish tissue at a concentration which would be a human health concern.

3. There have been numerous spills from sewage blockages and overflows along the shoreline in the Keyport / Union Beach area (near Station 62). Repair of the problem has been delayed until the winter of 1997-1998.
4. Additional spills have occurred during heavy rains from the pump station in the vicinity of the bridge from Sandy Hook to the Highlands.

Recommendations:

1. No changes in classification are required at this time.
2. A change in classification in the area designated Potential Upgrade #1 (Sandy Hook Bay) should be considered after the bacteriological data are complete and the level of potential toxins in tissue has been evaluated.
3. A change in classification in the area designated Potential Upgrade #2 (western Raritan Bay) should be delayed until the bacteriological data are complete, the potential level of toxins in tissue has been evaluated, and the causes of the sewage spills in the Keyport / Union Beach area have been remedied.
4. Depuration / relay area 12B should remain closed for harvesting until the causes of the sewage spills in the Keyport / Union Beach area have been remedied.

AREA 3: NAVESINK RIVER ESTUARY

Next Report Due:

1999

Last Sanitary Survey:

1992-1995

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 037 and is sampled under the following strategy:

☒

APC for assignment numbers

037

☒

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

45

Number of samples collected per run:

26-45

Number of runs collected:

3 in 1996

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for the Navesink River was completed in **1996**. The **15** sets of data evaluated for the current annual report (**1994-1996**) indicate that:

1. Year-round sampling indicates that the Navesink River attains the required coliform standard for Seasonally Approved waters east of the Oceanic Bridge and the coliform standard for Special Restricted waters west of the Oceanic Bridge and east of the Route 35 bridge. Two stations upstream of the Route 35 Bridge exceeded the standard for Special Restricted waters.
2. Several isolated stations adjacent to the shoreline between the Oceanic Bridge and the Route 35 bridge exhibit significant increases in bacterial loading during dry weather.

Recommendations:

1. No changes in classification are needed.
2. The next shoreline investigation should attempt to locate potential sources of dry weather bacterial loading.

AREA 4: SHREWSBURY RIVER ESTUARY

Next Report Due:

1999

Last Sanitary Survey:

1990

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 047 and is sampled under the following strategy:

☒

APC for assignment numbers

047

☒

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

43

Number of samples collected per run:

43

Number of runs collected:

2 in 1996

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for the Shrewsbury River was completed in **1995**. The **15** sets of data evaluated for the current annual report (**1993-1996**) indicate that:

1. All sampling stations meet the requirements for Special Restricted waters. Most stations come close to meeting the requirements for Approved waters or Seasonally Approved waters.
2. The fecal coliform results do not correlate well with the total coliform results.

Recommendations:

1. No changes are needed in classification at this time.
2. Make up runs missed in 1996.

AREA 5: SHARK RIVER ESTUARY

Next Report Due:

1997

Last Sanitary Survey:

1989

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 057 and is sampled under the following strategy:

☒

APC for assignment numbers

057

☒

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

45

Number of samples collected per run:

45

Number of runs collected:

1

Do the results support the current classification:

YES

Conclusion:

1. Due to personnel illness in 1996 a decision was made to reduce the number of samples collected from Area 5. The decision was based on Area 5 being classified as Special Restricted and only harvested under the Special Permit Program.
2. The 15 sets of data evaluated for the current report indicate that Area 5 is correctly classified. No changes are necessary.
3. Data from the single sampling run in 1996 supports the present classification.
4. Make-up sampling runs for Area 5 should be a priority

Recommendations:

1. Area 5 should remain under the Special Restricted classification.
2. Additional catch-up sampling runs should be scheduled for Area 5.
3. A total of ten sampling runs under Adverse Pollution Condition of rainfall with an ebb tide preference should be scheduled for 1997.

AREA 6: MANASQUAN RIVER ESTUARY

Next Report Due:

1999

Last Sanitary Survey:

1992

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 067 and is sampled under the following strategy:

☒

APC for assignment numbers

067

☒

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

44

Number of samples collected per run:

44

Number of runs collected:

1 in 1996

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for the Manasquan River was completed in **1996**. The **15** sets of data evaluated for the current annual report (**1994-1996**) indicate that:

1. Year-round sampling indicates that the Manasquan River attains the required coliform standard for Special Restricted Waters east of the Route 70 Bridge. Many of the stations in this section of the river are close to meeting the Approved standard.
2. Sampling stations upstream of the Route 70 bridge do not consistently meet the standard, although the statistical analysis indicates that overall the standard is attained.

Recommendations:

1. No changes in classification are needed.
2. Missing sampling runs should be made up in 1997.

AREA 7/8: UPPER BARNEGAT BAY

Next Report Due:

1999

Last Sanitary Survey:

1996

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 077, 087 and is sampled under the following strategy:

☒

APC for assignment numbers

077, 087: rainfall priority during winter

☒

rain

☒

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis (077)

Number of stations in area:

38

Number of samples collected per run:

42

Number of runs collected:

4 (2 complete) in 1996

Do the results support the current classification:

YES

Bacteriological Data Analysis (087)

Number of stations in area:

34

Number of samples collected per run:

30

Number of runs collected:

4 in 1996

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for the Upper Barnegat Bay was completed in **1996**. The **15** sets of data evaluated for the current annual report (**1994-1996**) indicate that:

1. All stations for sampling run 077 meet the requirements for Special Restricted waters. Some stations, particularly those located away from the shoreline meet or are close to meeting the requirements for approved waters.
2. All stations for sampling run 087 meet the requirements for Approved or Seasonally Approved waters except for those located near the shoreline in the vicinity of Lavalette, where the requirements for Special Restricted waters are met.
3. For both sampling runs, the fecal coliform results seem to parallel the total coliform

results, indicating that switching to the A-1 analytical procedure may be appropriate.

Recommendations:

1. No changes in classification are needed at this time.
2. Consideration should be given to switching to the A-1 procedure so long as a sufficient number of samples will be available from that procedure prior to the time to re-evaluate the growing area.

AREA 9/10: CENTRAL BARNEGAT BAY TOMS RIVER TO FORKED RIVER

Next Report Due:

2000

Last Sanitary Survey:

1988

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 097, 101, 102, 107 and is sampled under the following strategy:

☒

APC for assignment numbers

097. 101. 102. 107

☒

rain

☒

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis - 097

Number of stations in area: 30
Number of samples collected per run: 30
Number of runs collected: 6
Do the results support the current classification: YES

Bacteriological Data Analysis - 101

Number of stations in area: 111
Number of samples collected per run: 39
Number of runs collected: 7
Do the results support the current classification: YES

Bacteriological Data Analysis - 102

Number of stations in area: 111
Number of samples collected per run: 28
Number of runs collected: 6
Do the results support the current classification: YES

Bacteriological Data Analysis - 107

Number of stations in area:		111
Number of samples collected per run:	22	
Number of runs collected:		5
Do the results support the current classification:		YES

Conclusion:

1. The last data re-evaluation for the Barnegat Bay, Toms River to Forked River was completed in 1996. The 15 sets of data evaluated for the current annual report indicates that all sampling stations meet their respective Approved, Special Restricted, and Seasonal criteria. No changes are necessary. A potential upgrade of the Toms River from Prohibited to Special Restricted classification may be possible based on the collection and analysis of additional samples and a favorable Sanitary Shoreline Survey

Recommendations:

1. Seek recommendations from the Atlantic Coast Shellfish Council on the potential to reclassify the shellfish waters of the Toms River from Prohibited to Special Restricted status.

AREA 11/12: BARNEGAT BAY TO LITTLE EGG HARBOR

Next Report Due:

1999

Last Sanitary Survey:

1988

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 107, 114, 117, 122, 133 and is sampled under the following strategy:

☒

APC for assignment numbers

107, 114, 117, 122, 133

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☒

Systematic Random Sampling for assignment numbers

125

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

158

Number of samples collected per run:

107=22; 114=27; 117=41;
122=36; 125=40; 133=32

Number of runs collected:

107=6; 114=6; 117=9;
122=6; 125=7; 133=6

Do the results support the current classification:

Yes

Conclusion:

The last data re-evaluation for Area 11-12 was completed in Dec. 1996. The 15/30 sets of data evaluated for the current annual report (Oct. 95 through Dec. 1996) indicate that:

1. All stations meet their respective NSSP criteria for classification as Approved, Special Restricted or Seasonal.

Recommendations:

1. No changes are necessary.

AREA 13: LITTLE EGG HARBOR BAY

Next Report Due:

1997

Last Sanitary Survey:

1993

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 131, 132, 133, 134 and is sampled under the following strategy:

☒

APC for assignment numbers

131, 132, 133, 134

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

Bacteriological Data Analysis

Number of stations in area:

131=35; 132=45; 133=32;
134=45

Number of samples collected per run:

131=35; 132=45; 133=32;
134=45

Number of runs collected:

131=7; 132=7; 133=6;
134=6

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for the LITTLE EGG HARBOR BAY was completed in 1993. The 15 sets of data evaluated for the current annual report indicate that:

1. Year-round sampling indicates that all sampling stations meet with their respective criteria for approved, seasonal and special restricted classification. The area is correctly classified. No changes are necessary.

Recommendations:

1. Area 13 is properly classified. No changes are recommended

AREA 14/15: MULLICA RIVER-GREAT BAY

Next Report Due:

2000

Last Sanitary Survey:

1992

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 145, 151, 152 and is sampled under the following strategy:

☐

APC for assignment numbers

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☒

Systematic Random Sampling for assignment numbers

145, 151, 152

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

101

Number of samples collected per run:

145=28; 151=46; 152=27

Number of runs collected:

145=11; 151=5; 152=27

Do the results support the current classification:

Yes

Conclusion:

The last data re-evaluation for Area 14-15 was completed in 1997. The data evaluated for the current annual report indicate that:

1. Year-round sampling indicates that Area 14-15 is correctly classified. No changes are necessary. All stations meet their respective NSSP criteria for their current classification.

Recommendations:

1. No change in classification for Area 14-15 is necessary.

AREA SE-1: REEDS BAY, BRIGANTINE, ABSECON BAY, ABSECON INLET

Next Report Due:

1998

Last Sanitary Survey:

1994

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 167 and 172 and is sampled under the following strategy:

☒

APC for assignment numbers

167 and 172

☐

rain

☒

winter

☐

summer

☒

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis - Assignment # 167

Number of stations in area: 49
Number of samples collected per run: 49
Number of runs collected: 5
Do the results support the current classification: YES

Bacteriological Data Analysis - Assignment # 172

Number of stations in area: 33
Number of samples collected per run: 33
Number of runs collected: 7
(some stations had only 3 samples)
Do the results support the current classification: YES

Conclusion:

The last data re-evaluation was completed in **1994**. The data evaluated for the current annual report (**1993-1996**) indicate that:

1. Year-round sampling indicates that most sampling stations meet Approved criteria. All stations meet the criteria for the current shellfish classification. Several stations are influenced by tide, especially in the western margins of Reeds Bay and Perch Cove and tidal thorofares adjacent to Absecon Inlet.

Recommendations:

1. No changes are needed. The next reappraisal is due in 1998. Some areas currently

classified as Special Restricted are close to meeting Approved criteria and should be carefully evaluated in 1998 for upgrading.

AREA SE-2: GREAT EGG HARBOR AND LAKES BAY

Next Report Due:

1997

Last Sanitary Survey:

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 207, 215, 227 and is sampled under the following strategy:

☒

APC for assignment numbers

207 and 227

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☒

Systematic Random Sampling for assignment numbers

215

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

206

Number of samples collected per run:

Number of runs collected:

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for Great Egg Harbor Bay and Lakes Bay was completed in **1994**. The last annual report covered data collected from 1992 through 1995. The data evaluated for the current annual report (**1992-1996**) indicate that:

1. Steelmans Bay is presently in compliance with criteria. This area was of concern at the time of the last annual report
2. The Anchorage Point area should be considered for an upgrade. The previous problems with failing septs is no longer an issue due to connection to the regional sewerage system. This area is presently classified as ***Special Restricted***.

Recommendations:

1. The Anchorage Point area should be further investigated and a shoreline survey completed to determine if an upgrade is appropriate.

AREA SE-3: CORSONS INLET AND CORSONS SOUND

Next Report Due:

1999

Last Sanitary Survey:

1992

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 235 and is sampled under the following strategy:

☐

APC for assignment numbers

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☒

Systematic Random Sampling for assignment numbers

235

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

48

Number of samples collected per run:

48

Number of runs collected:

11 in DY 1996

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for Corsons Inlet and Corsons Sound was completed in **1996**. The data evaluated for the current annual report (**1990-1996**) indicate that:

1. Year-round sampling indicates that Approved criteria are met for most of the area, except for a portion of Crookhorn Creek. Several sampling sites in the Crookhorn Creek area are affected by seasonal changes in water quality.

Recommendations:

1. No changes in classification are needed at this time.

AREA SE-4: LUDLAM BAY TO GREAT SOUND

Next Report Due:

1998

Last Sanitary Survey:

Feb. 1996

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 247 and is sampled under the following strategy:

☒

APC for assignment numbers

247

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

73

Number of samples collected per run:

48

Number of runs collected:

6

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for the Growing Area SE-4 was completed in Feb. 1996. The sets of data (15) evaluated for the current annual report (07/31/93 to 10/31/96) indicate that:

1. Year-round sampling indicates that the stations located in the southeast corner of Ludlam Bay continue to exceed the criteria for approved classification but are within the criteria for Special Restricted. All other stations meet the criteria for approved classification.
2. Five stations had a seasonal effect - 3213, 3218, 3219C, 3220B, 3303B
3. Six stations had a rainfall correlation - 3211, 3212A, 3215A, 3219A, 3220A, 3224
4. There was a tidal effect at two stations - 3127D and 3219C

Recommendations:

1. All the stations located in Growing Area SE-4 except those located in the southeast

corner of Ludlam Bay meet the criteria for approved classification. The stations located in the southeast corner of Ludlam Bay meet the criteria for Special Restricted therefore this area should remain classified as Special Restricted. The other two areas that are classified as Special Restricted should also remain as Special Restricted since there is a large amount of boat activity. However, Ludlam Thorofare which is classified as Prohibited could possibly be upgraded to approved.

AREA SE-5: BACK BAY AREAS - HEREFORD INLET, JENKINS SOUND, GRASSY SOUND, RICHARDSON SOUND

Next Report Due:

Last Sanitary Survey:

Shoreline Survey:

- ☐ Changes requiring additional field follow-up
☒ No changes were noted which required additional field follow-up

Hydrographic Survey:

- ☐ Changes requiring additional field follow-up
☒ No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 252 and 267 and is sampled under the following strategy:

- ☒ APC for assignment numbers
☐ rain ☒ winter ☐ summer ☒ tide ☐ WWTP
☐ Systematic Random Sampling for assignment numbers
☐ Remote Area

Bacteriological Data Analysis - Assignment 252

Number of stations in area: 50
Number of samples collected per run: 50
Number of runs collected: 7 in DY 1996
Do the results support the current classification: YES

Bacteriological Data Analysis - Assignment 267

Number of stations in area: 44
Number of samples collected per run: 44
Number of runs collected: 9 in DY 1996
Do the results support the current classification: YES

Conclusion:

The last data re-evaluation for the back bay areas including Hereford Inlet, Jenkins Sound, Grassy Sound, and Richardson Sound was completed in **1996**. The data evaluated for the current annual report (**1990-1996**) indicate that:

1. Most data stations conform to Approved criteria. All sampling stations conform to their current classification. Data from numerous stations indicate that there is a seasonal and/or tidal effect.

Recommendations:

1. No classification changes are needed at this time.

AREA SE-6: JARVIS SOUND TO CAPE MAY HARBOR

Next Report Due: **1999**

Last Sanitary Survey: **1994**

Shoreline Survey:

- ☐ Changes requiring additional field follow-up
- ☒ No changes were noted which required additional field follow-up

Hydrographic Survey:

- ☐ Changes requiring additional field follow-up
- ☒ No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 277 and is sampled under the following strategy:

- ☒ APC for assignment numbers **277**
- ☐ rain ☐ winter ☐ summer ☐ tide ☐ WWTP
- ☐ Systematic Random Sampling for assignment numbers
- ☐ Remote Area

Bacteriological Data Analysis

Number of stations in area: 62

Number of samples collected per run: 46

Number of runs collected: 5

Do the results support the current classification: YES

Conclusion:

The last data re-evaluation for the Growing Area SE-6 was completed in Nov. 1996. The sets of data (15) evaluated for the current annual report (10/31/92 to 10/31/96) indicate that:

1. Year-round sampling indicates that all the stations meet the criteria for Special Restricted classification. In January 1997 Sunset Lake was reclassified from Prohibited to Special Restricted. Although most of the stations met the criteria for approved classification there were some that did not, therefore the area could not be reclassified to approved. The new annual data however indicates that all the stations in Sunset Lake meet the approved classification .
2. No stations had a seasonal effect or a tidal effect.
3. Rainfall was a factor at thirty six stations. (Rainfall was not a factor in the three year report that was completed on February 1996).

Recommendations:

1. Since this area is effected by rainfall then the sampling protocol should be changed to adverse pollution control - rainfall priority. As a result of this sampling, it is possible that Sunset lake may be upgraded to Approved classification.

2. Areas that are classified Prohibited will remain the same.

AREA DB-1: EGG ISLAND POINT TO ARTIFICIAL ISLAND

Next Report Due:

1998

Last Sanitary Survey:

1994

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 315, 327, 357, and 362 and is sampled under the following strategy:

☒

APC for assignment numbers

327, 357, 362

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☒

Systematic Random Sampling for assignment numbers

315

☐

Remote Area

Bacteriological Data Analysis 327

Number of stations in area: 43
Number of samples collected per run: 43
Number of runs collected: 5
Do the results support the current classification: YES

Bacteriological Data Analysis 357

Number of stations in area: 41
Number of samples collected per run: 20
Number of runs collected: 5
Do the results support the current classification: YES

Bacteriological Data Analysis 362

Number of stations in area: 58
Number of samples collected per run: 22
Number of runs collected: 10
Do the results support the current classification: YES

Bacteriological Data Analysis 315

Number of stations in area: 43
Number of samples collected per run: 33
Number of runs collected: 8

Do the results support the current classification: YES

Conclusion:

The last data re-evaluation for the Growing Area DB-1 was completed in August 1995. The sets of data (15 for APC and 30 for Systematic) evaluated for the current report (01/01/89 to 10/31/96) indicate that:

1. All stations met the criteria for approved classification except 11 stations that still met the criteria for Special Restricted classification.
2. No rainfall effects.
3. No seasonal nor tidal effects.

Recommendations:

1. Continue sampling in the current manner for Assignments 315, 357, and 362 since the results support the current classifications.
2. Investigate as to why station 4100J did not meet the criteria for approved classification yet stations around it did meet the criteria for approved. Only 4 out of 16 times that this station was sampled did it not meet the criteria for approved classification.
3. The area between Money Island and Fortesque (Newport Neck) which is currently classified as Special Restricted could possibly be upgraded in the future since all the stations in this area meet the criteria for approved classification (see the Assignment 327 map). However, since this area contains boating activities, the upgrade would be to a Seasonal classification. Therefore, it is recommended that more runs be assigned to Assignment 327 and/or a separate run be set up for winter, to determine if the results will support the classification

AREA DB-2: DELAWARE BAY - CAPE MAY POINT TO EGG ISLAND POINT

Next Report Due:

1997

Last Sanitary Survey:

1989

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☒

Changes requiring additional field follow-up

☐

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 32, 33, 34 and is sampled under the following strategy:

☒

APC for assignment numbers

32, 33, 34

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

133

Number of samples collected per run:

Number of runs collected:

Do the results support the current classification:

NO FOR SOME AREAS

Conclusion:

The last data re-evaluation for the Delaware Bay was completed in **1995**. The last annual report covered data collected from 1991 through 1995. The data evaluated for the current annual report (**1992-1996**) indicate that:

1. An area of concern is located at the mouth of the Maurice River in the area which was reclassified in the 1995 reappraisal report. This area, along with a small area near the mouth of Dividing Creek had previously been recommended for additional specialized monitoring (i.e. coliphage analysis). However, as a result of budget cutbacks this monitoring was not accomplished. This area is scheduled for an evaluation this year. It may be necessary to downgrade additional waters based on the current water quality data.

Recommendations:

1. Continued sampling. Waters around the mouth of the Maurice River should be downgraded.

AREA DB-3: DELAWARE BAY

Next Report Due:

1998

Last Sanitary Survey:

1992

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers *** and is sampled under the following strategy:

☐

APC for assignment numbers

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☒

Remote Area

Bacteriological Data Analysis

Number of stations in area:

12

Number of samples collected per run:

12

Number of runs collected:

5 in 1996

Do the results support the current classification:

YES

Conclusion:

The last data re-evaluation for the Delaware Bay was completed in **1995** The data evaluated for the current annual report (**1990-1997**) indicate that:

1. Water quality is excellent in this remote area.

Recommendations:

1. No changes needed. Continue established sampling regime.

AREA 40-41: CAPE MAY POINT TO STONE HARBOR

Next Report Due:

1997

Last Sanitary Survey:

40/'89 41/'87

Shoreline Survey:

☒

Changes requiring additional field follow-up

☐

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 401 and is sampled under the following strategy:

☒

APC for assignment numbers

401

☐

rain

☐

winter

☐

summer

☐

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

15 surface and 5 bottom stations

Number of samples collected per run:

20 including 5 bottom samples

Number of runs collected:

3, two short of minimum five sets

Do the results support the current classification:

YES

Conclusion:

These two areas were combined after 1992 into one sampling area covering 15 miles of coastline. The elevated TC/FC levels found at several bottom stations during 1994 were investigated. No operation problems were noted at cape may county MUA's WWTP during this time period to account for these scores which occurred during the closed surf clam season.

Recommendations:

1. Commit additional resources to acquire at least minimum five sample sets per year.
2. A small area adjacent to the beach in Stone Harbor should be closed to provide a buffer zone around storm water outfalls which discharge over the beach.

AREA 42: STONE HARBOR TO SEA ISLE CITY

Next Report Due:

1997

Last Sanitary Survey:

1987

Shoreline Survey:

☒

Changes requiring additional field follow-up

☐

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 421 and is sampled under the following strategy:

☒

APC for assignment numbers

421

☐

rain

☐

winter

☐

summer

☐

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

11 surface and 6 bottom

Number of samples collected per run:

17 including 6 bottom samples

Number of runs collected:

1, 4 short of minimum 5

Do the results support the current classification:

YES

Conclusions:

Cape May County MUA's outfall remains the only significant point source of contamination with the potential to impact this area and is responsible for 3,750 acre closure that surrounds the discharge. The several elevated coliform levels contained in the data occurred during the summer when the surf claming season is closed. The possibility exists to reduce the size of the current safety buffer zone surrounding the outfall.

Recommendations:

1. Commit additional resources to acquire at least minimum 5 sets of samples per year.
2. Visit WWTP to update file on facility's operation.

AREA 43:-CORSON INLET,SEA ISLE CITY TO PECK BEACH

Next Report Due:

1996

Last Sanitary Survey:

1983

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 431 and is sampled under the following strategy:

☒

APC for assignment numbers

431

☐

rain

☐

winter

☐

summer

☐

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

14 surface and 7 bottom

Number of samples collected per run:

21 including 7 bottom samples

Number of runs collected:

3, 2 short of minimum 5 with one set of bottom samples.

Do the results support the current classification:

YES

Conclusion: A new sanitary survey for this area is currently in draft form for the years 1989 through 1995. The survey shows acceptable water quality (based on 30 sets of samples) and Cape May Municipal Utilities Authority's Ocean City WWTP operating in an efficient and reliable manner and recommends that 1,460 acres of the 2,740 acre prohibited area surrounding the facility's outfall be upgraded to approved. The limited data collected in 1996 supports this recommendation.

Recommendation:

1. Commit additional resources to at least obtain minimum five sets of samples.
2. Reduce the size of the buffer zone around the Cape May MUA outfall.

AREA 44/45: PECK BEACH TO BRIGANTINE

Next Report Due:

1997

Last Sanitary Survey:

1987

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 441 and is sampled under the following strategy:

☒

APC for assignment numbers

441

☐

rain

☐

winter

☐

summer

☐

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

20 surface and 4 bottom

Number of samples collected per run:

24 including 4 bottom

Number of runs collected:

3, 2 short of minimum 5

Do the results support the current classification:

YES

Conclusions:

This ten miles of shoreline contains a 140 acre and a 250 acre Prohibited area adjacent to the storm drains located in Ocean City and Atlantic City, respectively. Also, a 3,600 acre safety zone/Prohibited area surrounds Atlantic County Utilities Authority's discharge. Although limited in the number and scope of samples collected, the data show Atlantic County Utilities Authority's effluent to be adequately disinfected as witnessed by the low F.C. counts surrounding the outfall. The facility appears to be in compliance in using the "HOT LINE" in reporting problems. This is also true of the operators of Ocean City and Atlantic City collection systems.

Recommendations:

1. No change in classification is warranted at this time.
2. Additional resources be allocated to acquired at least minimum number of sample sets.
3. Visit WWTP to update file on operation status.

AREA 46/47: BRIGANTINE TO SPRAY BEACH

Next Report Due:

5/98 S.S.

Last Sanitary Survey:

1986

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment number 471 and is sampled under the following strategy:

☐

APC for assignment numbers

☐

rain

☐

winter

☐

summer

☐

tide

☐

WWTP

☐

Systematic Random Sampling for assignment numbers

☒

Remote Area

Bacteriological Data Analysis

Number of stations in area:

16 surface stations (no bottoms)

Number of samples collected per run:

16

Number of runs collected:

4, 2 runs extra

Do the results support the current classification:

YES, highest TC level 9.1

Conclusions:

The last data re-evaluation for the 471 was completed in 1993. The 15 sets of data evaluated for the current annual report 4/13/93 to 8/30/96 indicate that the area is properly classified Approved. No point sources are contained within this region nor large concentrations of human population. Non-point sources associated with the bird population in the Edwin B. Forsythe Wildlife Refuge do not adversely impact these shellfish growing waters. The 1991 to 1993 Re-evaluation recommended this area be designated as a Remote area.

Recommendation:

Continue sampling this 15 miles of coastline under the Remote sampling schedule (two sets per year).

AREA 48: PEAHALA PARK TO BARNEGAT INLET

Next Report Due:

8/98 S.S.

Last Sanitary Survey:

1986

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 481 and is sampled under the following strategy:

☒

APC for assignment numbers

481

☐

rain

☐

winter

☐

summer

☐

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

15 surface and 8 bottom stations

Number of samples collected per run:

23 including 8 bottom samples

Number of runs collected:

5

Do the results support the current classification:

YES

Conclusions:

The last data re-evaluation for 481 was completed in 1993. The 15 sets of data evaluated for the current annual report 3/1/94 to 9/9/96 indicate that the region is properly classified. On January 2, 1996, 490 acres of the 1950 acre safety zone/Prohibited area surrounding Ocean County UA's southern outfall was upgraded to the Approved category. Bottom Station A53A2 recorded a T.C. level of greater than 2400 on 8/5/96, that in all probability was associated with the WWTP's discharge. However, the corresponding F.C. count was only less than three, which indicates minimal health risk. Even with this minor exception, the 1996 bacteriological results support the current classifications along this 12 mile section of coastline. Also, the above facility continues to report equipment malfunctions to the state "Hot Line" in a very timely manner.

Recommendations:

1. No shellfish growing water reclassifications are warranted at this time.
2. Continue sampling this area under the current sampling schedule.

AREA 49: BARNEGAT INLET TO SEASIDE PARK

Next Report Due:

1998

Last Sanitary Survey:

1986

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 491 and is sampled under the following strategy:

☒

APC for assignment numbers

491

☐

rain

☐

winter

☐

summer

☐

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

16 surface and 8 bottom stations

Number of samples collected per run:

24 including 8 bottom samples

Number of runs collected:

4, one short of minimum five

Do the results support the current classification:

YES

Conclusions:

The last data re-evaluation for 491 was completed in 1994. The 17 sets of data evaluated for the current annual report 4/25/94 through 9/9/96 indicate that the region is properly classified. No storm water discharges are located along this ten mile section of shoreline. Ocean County Utilities Authority's outfall is the only potential point source of contamination to impact these waters. Except for a 1100 T.C. level found at Bottom Station A37B on 8/19/96, the data show the WWTP is adequately disinfecting its effluent. This 1100 T.C. count, it should be noted, had a matching F.C. level of less than three, which indicates no human health concern.

Recommendations:

1. Current shellfish growing water classifications are not in need of modification.
2. Commit additional resources to obtain at least minimal number of collection sets(5).

AREA 50/51: SEASIDE PARK TO MANTOLOKING

Next Report Due:

1999

Last Sanitary Survey:

1995

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 501 and is sampled under the following strategy:

☒

APC for assignment numbers

501

☐

rain

☐

winter

☐

summer

☐

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

15 surface and 10 bottom stations

Number of samples collected per run:

25 including 10 bottom samples

Number of runs collected:

4, one short of minimum five

Do the results support the current classification:

YES

Conclusions:

The last data re-evaluation for 501 was completed in 1995. The 17 sets of data evaluated for the current annual report 5/11/94 through 8/21/96 indicate that the region is properly classified. In January 1996, approximately 3755 acres of Prohibited waters surrounding Ciba-Geigy's old discharge point were upgraded to Approved. This occurred after methylene chloride found in the area's clam tissue was shown to be at levels that are not hazardous to humans. Although the highest surface water T.C. count was only 7.3, several bottom stations recorded T.C. levels of greater than 2400 which were not related to rainfall runoff. In all cases, however, the corresponding F.C. count was only less than three, which indicates minimal human health risk. Ocean County UA's northern outfall is the only potential point source of pollution contained in the area and may be the responsible party for these elevated bottom scores.

Recommendations:

1. No shellfish growing water reclassifications are warranted at this time.

2. Commit additional resources to at least obtain minimal number of sample sets(5).

AREA 52/53: BAYHEAD TO OCEAN GROVE

Next Report Due:

1999

Last Sanitary Survey:

1987

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment number 521 and is sampled under the following strategy:

☒

APC for assignment numbers

521

☐

rain

☐

winter

☐

summer

☐

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

18 surface and 6 bottom stations

Number of samples collected per run:

24 including 6 bottom samples

Number of runs collected:

6

Do the results support the current classification:

YES

Conclusions:

The last data re-evaluation for 521 was completed in 1995. The 15 sets of data evaluated for the current annual report 12/3/93 through 8/22/96 indicate that the region is properly classified. The last Reevaluation covered the time period 1992 through 1995. South Monmouth Regional S.A. and Neptune S.A. both discharge extended secondarily treated effluent 6,000 offshore into this area. Both WWTP outfalls, Manasquan and Shark River Inlets, and the numerous storm water discharges are the reasons for the Prohibited waters in this region. Historically, the area's surface waters are impacted by prolonged northeast winds (three days plus) in conjunction with heavy rainfall while the bottom shellfish inhabited waters are unaffected.

Recommendation:

No change in classification is warranted at this time.

AREA 54/55: ASBURY PARK TO MONMOUTH BEACH

Next Report Due:

1999

Last Sanitary Survey:

1986

Shoreline Survey:

- ☒ Changes requiring additional field follow-up
☐ No changes were noted which required additional field follow-up

Hydrographic Survey:

- ☐ Changes requiring additional field follow-up
☒ No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 541 and is sampled under the following strategy:

- ☒ APC for assignment numbers 541
☐ rain ☐ winter ☐ summer ☐ tide ☒ WWTP
☐ Systematic Random Sampling for assignment numbers
☐ Remote Area

Bacteriological Data Analysis

Number of stations in area:	14 surface and 6 bottom stations
Number of samples collected per run:	20 including 6 bottom samples
Number of runs collected:	6
Do the results support the current classification:	NO, possibility exists for upgrade

Conclusions:

The Sanitary Survey for this eight miles of coastline was completed in 1986 with the last reevaluation being completed in 1995. Half of the region's waters are classified as Prohibited as a result of the numerous shoreline non-point pollution sources and four WWTP discharges. The 1995 and 1996 sampling collections included stations one mile offshore. With a minimum of 15 data sets meeting Approved water criteria (11 completed) and completion of alarm modifications at two of the WWTPs, the possibility exists to reduce the current closure to one mile.

Recommendations:

1. No shellfish growing water reclassifications are warranted at this time.
2. Continue sampling the area to obtain a minimum number of at least 15 sets of samples at the one mile inshore stations.
3. Review WWTP chlorination alarm system upgrade for possible closure reduction.

AREA 56/57: SEA BRIGHT TO SANDY HOOK

Next Report Due:

Last Sanitary Survey:

1979

Shoreline Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Hydrographic Survey:

☐

Changes requiring additional field follow-up

☒

No changes were noted which required additional field follow-up

Bacteriological Survey: - The area includes assignment numbers 561 and is sampled under the following strategy:

☒

APC for assignment numbers

561

☐

rain

☐

winter

☐

summer

☒

tide

☒

WWTP

☐

Systematic Random Sampling for assignment numbers

☐

Remote Area

Bacteriological Data Analysis

Number of stations in area:

10 surface and 5 bottom

Number of samples collected per run:

15, including 5 bottom

Number of runs collected:

none since 1993 (Prohibited area)

Do the results support the current classification:

N/A

Conclusion:

1. The Sanitary Survey for this nine miles of coastline was completed in 1979. All of the region's waters are classified as Prohibited. These shellfish growing waters are impacted by the ebbing tide from the Raritan Bay and Hudson River complex, and the discharge from the Monmouth County Bayshore Outfall Authority's outfall. Although only 5 sets of water samples have been collected (in 1993) since the Sanitary Survey, the region is currently being sampled by the USEPA.

Recommendations:

1. No shellfish growing water reclassifications are warranted at this time.
2. Continue sampling the area to obtain a minimum of at least 15 sets of samples. These samples should be obtained 3-4 days after rainfall on the late ebbing tide.