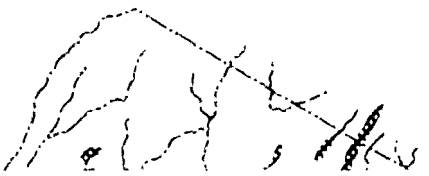
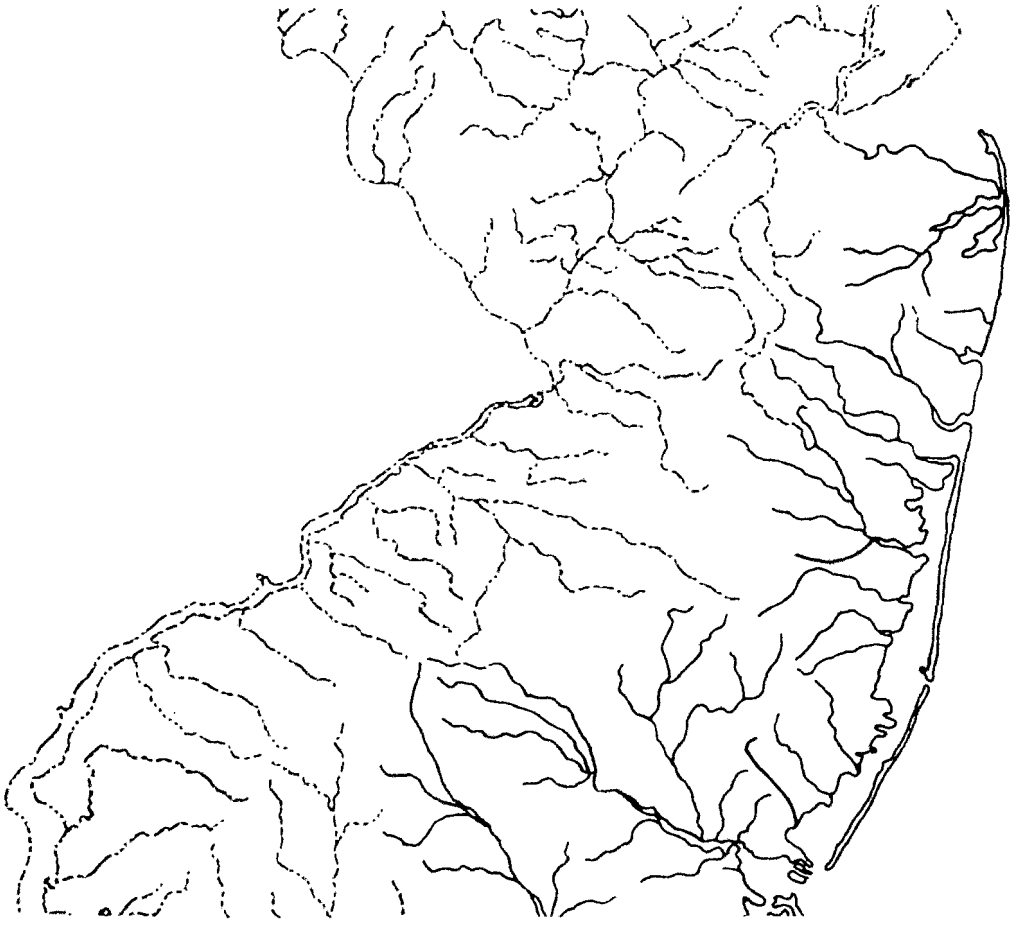


PRE-CONFERENCE REPORT
FOR
WATER QUALITY STANDARDS SETTING/REVISION CONFERENCE
NEW JERSEY ATLANTIC COASTAL AREA



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II OFFICE

NEW YORK, NEW YORK

MAY 1972

PRE-CONFERENCE REPORT
FOR
WATER QUALITY STANDARDS SETTING/REVISION CONFERENCE

NEW JERSEY ATLANTIC COASTAL AREA

U.S. Environmental Protection Agency
Region II Office
New York, New York

May, 1972

SUMMARY

At the request of Governor Cahill of New Jersey, and pursuant to Section 10c (2) Federal Water Pollution Control Act, as amended, a Water Quality Standards Setting/Revision Conference will be held for the New Jersey Atlantic Coastal Area. The conference will provide an opportunity to review, and if necessary and appropriate, revise portions of the presently applicable Water Quality Standards Implementation Plan. Specific implementation plans will be developed for all point source waste dischargers in the designated conference area.

The conference area extends along the Atlantic coast of New Jersey from Sandy Hook to Cape May and includes all the wastes presently discharged into the Atlantic ocean or those that, consistent with approved regional treatment plans, will discharge at some future date in the Atlantic ocean-Bayshore Area of Monmouth County.

This pre-conference report contains a description of the conference area, water uses, existing water quality standards, existing water quality, sources of pollution, and recommended remedial action for all point source discharges.

Conference consideration encompasses 154 point sources of domestic sewage and discharges from 18 industrial facilities. Major items proposed for inclusion in the revised Water Quality Standards Implementation Plan are plans for abatement of domestic sewage pollution via the development of 18 major and

five smaller regional treatment systems, and point source pollution control requirements for industrial wastes.

This report was prepared under a joint task group consisting of professionals from the U. S. Environmental Protection Agency (Region II) and the New Jersey Department of Environmental Protection.

The proposed Implementation Plans contained in this report represent a concurrence and joint proposal of State and Federal pollution control experts.

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SECTION I

INTRODUCTION

A. Background and Authorization for Conference

The Federal Water Quality Act of 1965 authorized the establishment of Water Quality Standards for interstate waters. The law directed that Water Quality Standards for the nations interstate and coastal waters be such as to protect the public health or welfare, and enhance the quality of water. A State Water Quality Standard is comprised of water use classifications, water quality criteria applicable to each use classification and an implementation plan to achieve the desired water quality objectives. The criteria - scientific requirements on which judgements may be based as to the suitability of water quality to support the designated use - and the implementation plans, taken together, essentially comprise the Water Quality Standard (1).

The law makes subject to abatement the discharge of matter into interstate waters that reduce their quality below the water quality levels established pursuant to the Water Quality Act. Compliance with water quality standards can be achieved through State and Federal administrative or court action.

The State of New Jersey has Federally approved Water Quality Standards.

In early December, Governor William T. Cahill requested a Water Quality Standards Revision Conference for the Atlantic Coastal Basin of the State of New Jersey. In his request, Governor Cahill indicated that the purpose of the conference would be "for us (EPA and the State of New Jersey) to examine the recent progress made by many shore communities and the lack of progress by a few toward the design and construction of regional sewerage treatment systems needed to conform with State-Federal Water Quality Standards." Pursuant to this request, a joint federal conference to establish and/or up-date Water Quality Standards has been scheduled for late June. This conference,as described by Administrator Ruckelshaus of the Environmental Protection Agency, comprises a "cooperative effort between the Environmental Protection Agency and the State of New Jersey and . . . a joint review that will assure a strong, realistic implementation plan for the interstate waters for the Atlantic Coastal Basin in New Jersey."

B. Existing Water Quality Standards and Enforcement Conference (1967) Recommendations - Status of Implementation of Federal Directives

The conference will provide a forum to review and/or comment on State/Federal intentions to revise portions of the presently applicable Water Quality Standards Implementation Plan. It will also provide the opportunity of establishing implementation requirements for sources not presently included in the federally approved implementation plan.

Current federally approved New Jersey Water Quality Standards require that all waste discharged to the Atlantic Ocean receive, as a minimum, treatment that will provide,at all times, 85 percent removal of BOD, and that all waste discharged to the estuaries and tributary streams receive a minimum treatment, at all times,of 95% removal of BOD, with adequate disinfection. Abatement orders issued under these standards further require construction of requisite facilities to be completed on or before November 30, 1970. A large number of municipal and industrial point sources do not have federally approved implementation schedules to abate pollution, as only a portion of the point source waste discharges were specified in the Federally approved Water Quality Standards. New Jersey has statutory authority to require water pollution control facilities to conform to state approved regional plans.

On November 1, 1967, a Federal Enforcement Conference was convened concerning pollution of a portion of the Atlantic Coastal Area of the State of New Jersey (from Shark River to Cape May). The impetus for this conference was the deterioration and closing of numerous shellfishing areas. Recommendations from the enforcement conference also called for completion of construction of requisite pollution abatement facilities by November 30, 1970.

Due to time required to develop economically realistic regional plans and systems that would assure meeting water quality criteria and promote restoration and protection of the shellfish areas in the Atlantic Coastal Area, and also due to lack of funding, recalcitrance by some, time expended in litigation, and other conditions, the Water Quality Standards implementation dates for this area have, in general, not been met.

C. Conference Objectives and Procedures for Establishing and/or Updating Water Quality Standards

The purpose of this conference will be development of strong, specific, and realistic implementation plans for all of point source waste dischargers in the designated area. The intent is to establish, with the guidance of the numerous engineering studies and environmental evaluations that have been conducted in the past few years, an implementation plan that will result in a restoration of the water to its designated usage and attendant quality at the earliest feasible time.

After the conference, the newly established implementation plan will be submitted to Administrator Ruckelshaus for inclusion in the Federal Register, and subsequently, after approval, become federal law. Those now violating Water Quality Standards, and who refuse to accept post-conference recommendations as to new or revised implementation plans will be subject to immediate

enforcement action, either Federal or State. Following that, discharges who fail to conform with the new implementation plans will be subject to immediate enforcement action, either via Federal, State, or coordinated State-Federal effort.

D. Pre-Conference Report

Pursuant to the Federal Water Pollution Control Act, as amended, and its appropriate administrative regulations, a pre-conference report is not a pre-requisite for a standards revision conference. The statutory requirement is that, 30 days prior to the conference, notice be given to all interested parties concerning the subject items for revision at the conference.

In order to promote and permit a strong public scrutiny of the proposed standards revisions (implementation plans), this pre-conference report contains relevant elements concerning existing Water Quality Standards, existing water quality, and specific proposals for achieving point source pollution control. Each point source discharger, as well as the public, are invited to attend the conference and offer comments, criticisms, proposals, suggestions, etc. relating to the necessity and feasibility of achieving implementation plans, as proposed in this report.

This report was prepared under the direction of a joint task group consisting of Region II EPA and the New Jersey Department of Environmental Protection. The proposed Imple-

mentation Plans, as contained in this report, represent a concurrence and joint proposal of State and Federal pollution control experts.

SECTION II

CONFERENCE AREA

A. Geographical Limits

The Jersey Coastal Conference Area will cover interstate waters extending from the Sandy Hook to Cape May. This coastal portion of the State of New Jersey covers about 120 miles. Included for conference consideration are all sources of waste located in the Atlantic Coastal Basin, that is, naturally draining into these coastal waters. Also included are waste which are currently sewered to the Atlantic Coastal Area, or will be, as per proposed regional treatment systems.

The Atlantic Coastal Basin includes all of the Atlantic County and those portions of Cape May, Monmouth and Ocean Counties which discharge to the Atlantic Coast. It also includes portions of Burlington County and minimal portions of Gloucester and Camden Counties. Although not presently draining to the Atlantic Coastal Area, we have included those waste discharges, primarily located along the northern coastline of Monmouth County, which will be subsequently sewered to the Atlantic Ocean after installation and completion of regional treatment facilities.

An outline of the conference area is presented on Figure I.

CONFERENCE AREA

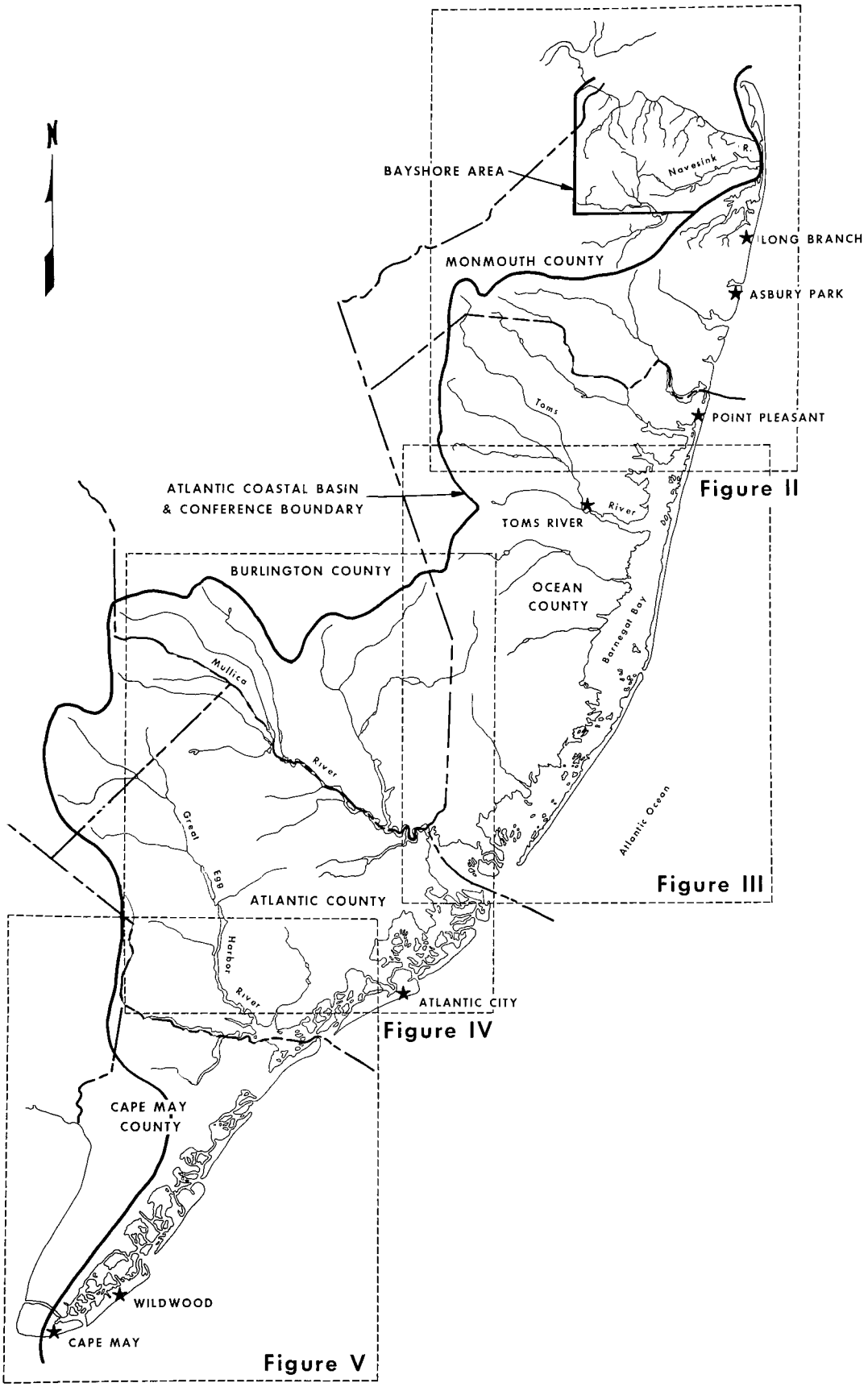


Figure I

B. General Description

The designated conference area generally lies within the Atlantic Coast Plain, which consists of a south eastward - thickening wedge principally composed of unconsolidated sands, gravels, clays, silts and marls of Cretacoeus and Tertiary Ages. The wedge climbs southeastwardly at about 50 feet a mile. The coarser beds of these deposits contain considerable volumes of groundwater.

Southern New Jersey has an average precipitation of approximately 45 inches per year. Although precipitation during drought conditions may be only one third or half of the minimum monthly rainfall, the stabilizing effect of groundwater storage in the coastal plain tends to produce sustained river flows during periods of low rainfall.

Four counties, Monmouth, Ocean, Atlantic and Cape May, commonly referred to as the "Jersey Shore", account for more than 90% of the regions total population. Most of the inhabitants in the region live in municipalities or cities fronting the Atlantic Ocean or located along the coastal basin and inlets. The remainder of the inhabitants live in communities on the upper reaches of the coastal streams, in the pinelands, and in other rural areas.

An internationally famous resort area, the "Jersey Shore", attract millions of tourist and vacationers throughout the year.

During the summer season, the overall population of the four counties swells to more than triple its winter size. In many shore communities, seasonal population increases can range up to 20:1. This seasonal variation highlights the importance of the tourist trade to the regions economy.

An analysis of employment patterns in the region also characterizes it as a leading resort area. More than half of the employed persons are engaged in trade and service activities. Summer employment at these facilities rises significantly to accommodate the needs of the thousands of guests visiting the Jersey Shore. Monmouth, Atlantic, and Ocean Counties, together, account for over 1/3 of the employment in hotels and lodging in the state and 10% of employment in amusement. Major recreational activities, as would be expected, include bathing, boating, sport fishing, and waterfowl hunting.

Another major economic activity in the region is commercial finfishing and shellfishing. The New Jersey Shore counties of Cape May, Atlantic, and Ocean account for over 75% of the total employment in the fishery industry in the State of New Jersey. The many inland bays and estuaries located along the Atlantic Coast of New Jersey provide one of the nations foremost areas for shellfish harvesting, and can be considered one of the most important natural resources of the State.

In summary, the recreational and shellfishing activities which support the economic life of the Jersey Atlantic Coastal Area necessitates a high degree of pollution control.

A detailed description of the estuarine character of the New Jersey Atlantic Coastal Area is presented in Appendix D.

SECTION III

WATER USES

A. Water Supply

In general, most of the municipal and institutional water supply systems in the region are small, with the primary source being ground water. Only two systems utilize surface water: the Monmouth Consolidated Water Co. and the Atlantic City Municipal water supply, which uses supplementary surface water during peak summer demands. In addition, there are over 55,000 rural domestic water supply sources (individual wells and other systems) located throughout the region. Ground water is also the primary source for these supplies. For certain shore communities, water consumption can increase more than 1000 percent during peak summer periods.

The seasonal variation in water usage is significant due to the recreational nature of the Jersey coast, with the influx of large numbers of people during summer periods. For example, summer water consumption is approximately three (3) times winter consumption in Ocean County, two (2) times winter consumption in Atlantic County and approximately five (5) times winter consumption in Cape May County.

Industrial water use from municipal systems in the New Jersey coastal region for process and cooling purposes is estimated to

be in the order of 15 MGD. The major self-supplied industry within the region, Toms River Chemical Corp., uses approximately 5 MGD of ground water and 13 MGD of river water. Power plants located along the Jersey coast utilize large volumes of sea water for cooling purposes.

Some water is used for crop irrigation in the region. The major portion of crop irrigation water is taken from streams.

Future water supply needs can be met by the continued preservation and development of surface water sources, and by increased usage of ground water sources, accompanied by an effective program of water resources management. The amount of ground water available in the region has been estimated to exceed 1 billion gallons per day, more than sufficient to meet the regions requirements as well as to supplement the needs of adjacent areas. There are several surface streams in the area that could, if properly developed, serve as primary or supplementary water sources (2). In general, surface water supplies are developed for larger municipal water supply systems.

B. Recreation - Bathing, Boating, Sport Fishing, Waterfowl

The Jersey coastal area is one of the primary summer recreational areas for the northeastern United States. Major water related recreational activities include: bathing, boating, sport fishing and, to a lesser degree, waterfowl hunting.

Recreational bathing can be described as a major water use in much of the New Jersey Atlantic Coast region. Bathing beaches and facilities are located along the ocean front and portions of the intracoastal waterway. As a resort area, much of the regions economy derives from activities associated with forms of recreation, with bathing being perhaps the principal factor.

Recreational boating is widespread throughout the area, particularly in the intracoastal waterway. A major attraction for the boating enthusiast is the intracoastal waterway itself, along which boats with a draft less than four feet can cruise in protected waters from Manasquan Inlet to Cape May Inlet. Many cabin cruisers from the New York-Philadelphia metropolitan areas visit the region during the summer boating season. In addition, the coastal region is utilized significantly by many thousands of out board motor boat enthusiasts.

The Jersey coastal region is one of the principal sport fishing centers in the nation. In this area are some of the largest fleets of charter and party boats leaving eastern ports. The most frequently fished species caught by party boats are porgies and seabass. Charter boats troll the ocean up to 12 miles at sea, or even further in some cases, seeking tuna, blue fish, albacore and striped bass.

The New Jersey coastal region has wetlands of value to waterfowl along the Mullica River in the waterways south of the

Great Egg Harbor River and from Forked River in Barnegat Bay south to Cape May. Particularly large numbers of waterfowl are found in these areas, with black ducks and brant being most common. The birds attract many resident and nonresident hunters in season (2).

C. Commercial Fishing

Commercial finfishing and shellfishing are important industries in the region. The New Jersey shore counties of Cape May, Atlantic and Ocean account for 78.4% of the total employment in the fisheries industry in the state of New Jersey. The New Jersey shellfish industry serves a significant portion of the national market.

Between 1968 and 1970 there was a decline in employment in fisheries of almost 7% in the three counties. This was a modest decline compared to the decline in fisheries employment of 17% in whole State; however, this decline was greater than 17% in Atlantic and Ocean Counties. Only in Cape May County did employment in this industry increase, but only by 5.5%. This trend in Cape May County also incorporates trends in the fisheries industry on the Delaware River. While employment has declined in these counties, the number of establishments classified as fisheries has remained about the same, indicating that whatever factors have been operating to reduce employment in the industry have not been great enough yet to eliminate firms.

The closing of or restriction of additional acres of coastal waters and tidal estuaries for shellfishing since January 1967 as well as the number of acres only open to seasonal shellfishing has occurred. Statewide, approximately 25 percent of designated shellfish areas are restricted, of which 6.5 percent has occurred since 1967.

The shellfishing industry in New Jersey has remained fairly stable since 1967, even with the burden of additional closures. Special projects developed by New Jersey, especially in the coastal area, have helped to sustain the industry. These include relaying, transplanting, etc.

SECTION IV

WATER QUALITY CONSIDERATIONS

A. Effect of Wastes on Water Quality and Use

Dissolved Oxygen

Dissolved oxygen is one of the most significant parameters of water quality. Introduction of dissolved oxygen into the estuarine water body is provided largely by transferrence from the atmosphere and by the photosynthetic activity of aquatic plants. The rate of oxygen introduction and renewal is dependent on the tidal driving force causing new oceanic water to flood into the system, the fresh water inflow, the wind, the surface area, and the amount of turbulence generated by fresh-coastal water mixing. The more turbulent the system, the greater opportunity for atmospheric exchange with the attendant ability to assimilate more waste. However, once imposed upon the system, the decomposable organic matter of a municipal or industrial discharge exerts a demand on the oxygen resources of the receiving water. This demand can result in depletion of dissolved oxygen to the point where desirable biota cannot tolerate the environment; they disappear or are killed. Complete depletion can result in noxious odors with destruction of esthetic values and elimination of both contact and non-contact recreation activities.

Bacteria

The coliform bacteria measurement is an index of the possible presence of pathogens and, therefore, of bacterial pollution from sewage. The basic premise is that if fecal coliforms are present at particular levels, there is a high probability of pathogens being present. Such a condition is a public health hazard for anyone contacting the water or ingesting it or any organisms grown in it. For this reason, coliform levels are used to determine the suitability of waters for bathing, water contact sports, and shellfish harvesting

Nutrients

Aquatic life forms require trace amounts of some mineral salts and vitamins for growth and reproduction. Elimination of such materials from the environment or their reduction below minimum levels can limit these activities in some biota. Conversely, an oversupply can stimulate the propagation of certain species thereby resulting in a drastic shift in the composition of the aquatic community. Wastewaters from municipal sources and some industrial sources contain phosphorus and nitrogen - inorganic salts which serve as nutrients, or fertilizers, for aquatic plant life. Although many other elements are necessary for plant growth, these two nutrients are usually considered the limiting factors in the control or proliferation of aquatic plant growths.

With the adequate supply of nitrogen and phosphorus, the waters can support luxurious growths of suspended algae, attached filamentous algae and rooted aquatic plants. The suspended algae generally reduce aesthetic enjoyment of the waters by reducing their clarity, sometimes to the extent that objects in more than two feet of water are not visible from the surface. With changes in environmental conditions, the sudden depth and subsequent decomposition of a dense algae population can deplete dissolved oxygen to the extent that fish and other aquatic life are not able to survive.

These plants become detached from their moorings, especially during periods of turbulent water, accumulate as slimy masses in the surf and wash up on the shore. It is not uncommon to see masses of detached plants covering long reaches of the shore several inches deep and many feet from the water's edge. They not only present an unsightly appearance but also decay and produce extremely offensive odors. Such shoreline conditions prevent full development of the recreational potential of an area.

Prolific aquatic plant growth is evidenced in the northern half of Barnegat Bay.

Suspended Solids

Suspended solids in sewage include large proportions of decomposable organic solids. Within this area, the major

source of such suspended solids is the discharge of inadequately treated municipal waste. Adequate treatment facilities are capable of removing 90 to 95 percent of such material from municipal wastewaters. Upon discharge to the receiving waters, the suspended solids immediately impart a grey turbidity to the waters and diminish their esthetic appeal. The heavier solids settle to the stream bottom in the vicinity of the points of discharge and form objectionable and harmful sludge deposits. These sludge blankets cover and destroy the bottom aquatic life that serve as food for fish. Suspended solids from industrial wastes can have similar detrimental effects.

The organic material in the sludge deposits undergoes a decomposition process which lowers the dissolved oxygen level in the overlying waters, at times to below that needed for fish and other aquatic life to survive. When complete depletion of oxygen occurs, the further decomposition of organic matter produces obnoxious hydrogen sulfide gas which appears as bubbles on the surface. This gas breaks loose masses of the deposited sludge and lifts them to the surface where they appear as unsightly grey or black odorous clumps and rafts.

The lighter suspended solids are carried downstream by the velocity of the following water to settle and form similar sludge banks in eddy areas distant from the points of discharge.

In coastal streams, the salt content of the sea water precipitates the fine colloidal portions of the suspended solids to form additional sludge deposits where fresh and salt waters meet.

Thus, these suspended solids may produce harmful effects throughout the entire length of the receiving streams from the points of discharge to their months.

Thermal Discharges

The impact of these sources on the marine environment may appear in several different ways:

a. Heat affects the physical properties of water such as density, viscosity and reduces the solubility of dissolved oxygen in water.

b. Heat generally speeds up the rate at which chemical reactions progress thereby resulting in a more rapid formation of undesirable compounds and/or a more rapid depletion of oxygen resources during the decomposition process.

c. The physiological processes of many marine species are temperature dependent. An artificial heat source can accelerate growth and metabolic rates and respiration of most estuarine biota, if introduced within specific limits. Artificially elevated temperatures may also result in longer growing seasons for many organisms.

d. Increased temperatures may reduce the numbers of species in the community and stimulate excessive populations of individual species. Perhaps thermal additions will cause

the development of a fauna more typical of warmer latitudes or will alter the migration patterns of fish affected by the thermal source. In such a case, removal or deactivation of the thermal source may have a harmful effect on the species or fish in the area influenced by source.

e. An increase above natural background temperatures can in many cases result in synergistic actions; i.e., the simultaneous effects of separate agents is greater than the sum total of individual effects. Prime examples are the increased toxicity of some materials, e.g., heavy metals and the increased virulence of fish pathogens.

f. Sudden temperature changes or fluctuations can also have a harmful effect on fish and biota.

In summary, the introduction of artificial thermal sources may place significant stress upon the entire estuarine ecosystem to the extent that fish kills may be caused directly or indirectly (synergistically). Conversely, the effects of a rise in temperature may be somewhat beneficial depending on whether this change brings the natural biota closer to or further from the midrange of temperature to which it is evolutionary adapted or presently acclimated. However, as discussed, any artificially induced temperature changes on the estuarine system may also lower the diversity of flora and fauna -- a condition which often indicates a less stable environment which is more susceptible to species fluctuations and thus to serious environmental upsets.

B. Water Quality Standards

The concept of water resources management is vital to effective environmental control. The basis for such management includes a system of defining the best present and possible future uses for all surface waters and subsequently establishing a rational set of water quality criteria for each best usage classification. These criteria, which set limits on specific water quality parameters, can then be utilized in the formulation of viable regional water quality control plans and compliance dates to implement such plans. It is within this framework that the ultimate utilization of a particular basin may be planned and directed.

The predominant uses of any particular estuarine or coastal area depends on historical and economic development, population pressures, and the natural resources available. In the New Jersey Coastal Basin, the tidal and non-tidal waters have been used intensively for such recreational activities as bathing, boating and sportfishing. The State of New Jersey was required, under the Water Quality Act of 1965, to establish standards for their interstate waters subject to the review and approval of the Secretary of the Interior. This responsibility has subsequently been transferred to the Administrator of the U. S. Environmental Protection Agency.

The Water Quality Standards actually consist of the following four components:

a. A statement of policy on the protection and enhancement of water resources often referred to as an "anti-degradation statement."

b. A classification of surface waters designating specific best uses for individual basins and/or sub-basins.

c. Numerical values (limits) and narrative descriptions of certain water quality parameters assigned for specific water use classifications.

d. A plan of implementation and enforcement, including treatment and control requirements, for all wastewaters discharged into or affecting interstate surface waters.

Generally, an implementation plan consists of a stated course of action (treatment requirements and dates) which is required to achieve the desired water quality classification for a particular basin. This abatement plan is usually based upon past feasibility studies and engineer's reports written for portions of the basin for which the implementation plan is written. Upon establishing a general abatement plan, strategy dates are assigned to wastes dischargers for the completion of the following items concerning the construction of the required treatment and/or transmission facilities:

1. Report on design
2. Submission of preliminary plans
3. Submission of final plans
4. Award construction contracts
5. Complete construction

In 1967, formal orders of this type were established for a total of 71 municipal waste sources in the Atlantic Coastal Basin. The listing of these municipalities and a copy of one such order (City of Pleasantville) have been appended. Similar orders were issued for other point sources in the coastal region and all included identical timetables for the completion of the indicated construction.

The specific dates under the 1967 implementation plan were as follows:

Completion of design - April 30, 1968

Completion of preliminary plans - October 30, 1968

Completion of final plans - June 1, 1969

Award construction contracts - October 1, 1969

Complete construction - November 30, 1970

The major treatment requirements in the implementation plan are:

a. 95 percent BOD removal for waste discharging to coastal estuaries or tributary streams; for Sewage Treatment Plants the effluent is limited to 15 mg/l BOD.

b. 85 percent BOD removal for wastes discharged to the ocean.

The tidal and non-tidal waters of the New Jersey Coastal Area have been designated by a total of six water use classifications:

a. Freshwater non-tidal waterways throughout the Area have been assigned the following three classifications:

FW-1 - waters set aside to be maintained in their natural state and which shall not be subjected to any man-made wastewater discharges.

FW-2 - waters which shall be suitable for potable water supply.

FW-3 - waters which shall be suitable for the maintenance, migration and propagation of the natural established biota and for primary contact recreation.

b. Tidal waters within the Area have been designated as TW-1 waters by which classification they shall be suitable for the following major usages: as a potable water supply, for shellfish harvesting, where permitted, and for primary contact recreation.

c. The coastal waters of the Basin have been assigned the following two classifications:

CW-1 - waters which shall be suitable for primary contact recreation (bathing, water contact sports, etc.)

CW-2 - waters which shall be suitable for secondary contact recreation.

The interstate waters of the New Jersey Coastal Area (Sandy Hook to Cape May) include the following major use classifications:

CW-1 Waters - The waters of the Atlantic Ocean extending from mean low tide line to 1500 feet offshore to a depth of 15 feet, whichever is more distant.

CW-2 Waters - The waters of the Atlantic Ocean extending from the limit of CW-1 to the state boundary of three miles offshore.

TW-1 - Inland tidal waters.

The existing Water Quality Standards have been appended for reference.

C. Water Quality Data

Water quality data for the New Jersey Coastal Area are available from two primary sources: detailed water quality surveys by the Environmental Protection Agency (EPA) and the routine water quality surveillance program maintained by the New Jersey Department of Environmental Protection (NJDEP).

The Environmental Protection Agency has conducted two surveys, one during the summer of 1966, and another during the summer of 1967 to determine water quality. Both surveys extended from Sandy Hook to Cape May. The 1966 survey

included approximately 40 stations on the major tidal inlets and streams tributary to the coastal area. During 1967, coverage was expanded to include additional stations in the Intercoastal Waterway, tidal waters behind barrier islands, and tributary rivers and streams. A combined total of 237 stations was sampled during 1966-67, 12 of which were coincident with those sampled by the NJDEP.

The New Jersey Department of Environmental Protection collects quarterly water quality data at 33 stations from the Navesink River south to the Tuckahoe River. Eight of these stations are located in areas not sampled by EPA. The remaining stations were either at the same location or provided more complete coverage within the same geographical area as previous EPA stations.

The total number of stations sampled was 258. Sampling results are presented in Table No. 1 and discussed in the following paragraphs.

Sandy Hook to Manasquan Inlet

From Sandy Hook to Manasquan Inlet water quality is good. In this stretch, the sampling stations are primarily located in coastal waters. Levels of fecal coliform exceeding criteria occur in waters of the upper Navesink River and the upper Manasquan River. Data collected by both EPA and the NJDEP show that the pattern of bacterial contamination extends into the tidal portions of these waters as well.

Table No. 1
Water Quality Data

Station	Location	Water Quality Classification	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
SANDY HOOK TO MANASQUAN INLET						
S35	Yellow Brook	FW-2	1	0	1	1
S34	Swimming River	FW-2	1	1	1	1
S33	Navesink River	TW-1	2	0	2	2
AC1	Navesink River	TW-1	23	3	6	2
S31	Shrewsbury River	TW-1	2	0	2	0
AC2	Shrewsbury River	TW-1	23	0	6	0
S32	Shrewsbury River	TW-1	2	0	2	0
S30	Shark River	FW-2	1	0	1	1
S29	Shark River	TW-1	3	0	3	1
AC33	Manasquan River	FW-2	18	4	6	6
S67	Manasquan River	FW-2	2	0	2	2
S66	Mingamahone Brook	FW-2	no data		no data	
S26	Manasquan River	FW-2	3	0	3	3
AC3	Manasquan River	FW-2	23	0	6	3
S68	Manasquan River	TW-1	2	0	2	2
A55	Manasquan River	TW-1	2	0	2	0
S27	Manasquan River	TW-1	4	0	4	0
I01	Atlantic Ocean at Highlands	CW-1	2	0	2	0
A91	Atlantic Ocean at Long Branch	CW-1	1	0	1	0
I02	Atlantic Ocean at Long Branch	CW-1	1	0	1	0
A85	Atlantic Ocean at Deal	CW-1	1	0	1	0

Station	Location	Water Quality Classification	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
I03	Atlantic Ocean at Allenhurst	CW-1	1	0	1	0
I04	Atlantic Ocean at Allenhurst	CW-1	1	0	1	0
A86	Atlantic Ocean at Deal Lake	CW-1	1	0	1	0
A92	Atlantic Ocean at Deal Lake	CW-1	1	0	1	0
A87	Atlantic Ocean at Asbury Park	CW-1	1	0	1	0
I05	Atlantic Ocean at Asbury Park	CW-1	1	0	1	0
A93	Atlantic Ocean at Asbury Park	CW-1	3	0	3	0
A88	Atlantic Ocean at Bradley Beach	CW-1	1	0	1	0
A94	Atlantic Ocean at Avon	CW-1	1	0	1	0
I06	Atlantic Ocean at Shark River Inlet	CW-1	1	0	1	0
A95	Atlantic Ocean at Belmar	CW-1	1	0	1	0
A90	Atlantic Ocean at Belmar	CW-1	1	0	1	0
I07	Atlantic Ocean at Sea Girt	CW-1	1	0	1	0
I08	Atlantic Ocean at Manasquan	CW-1	1	0	1	0

Station	Location	Water Quality Classification	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
A63	Atlantic Ocean at Manasquan Inlet	CW-1	1	0	1	0
MANASQUAN INLET TO BARNEGAT INLET						
I09	Atlantic Ocean at Pt. Pleasant Beach	CW-1	1	0	1	0
I10	Bay Head - Manasquan Canal	TW-1	3	0	3	0
S28	Bay Head - Manasquan Canal	TW-1	1	0	1	0
S41	Bay Head - Manasquan Canal	TW-1	1	0	1	0
I11	Bay Head - Manasquan Canal	TW-1	3	0	3	0
A56	Beaverdam Creek	TW-1	2	0	2	0
S71	South Branch Metedeconk River	FW-3	2	0	2	1
S70	South Branch Metedeconk River	FW-3	2	0	2	0
AC5	South Branch Metedeconk River	FW-2	23	2	6	1
S69	North Branch Metedeconk River	FW-3	2	0	2	1
S25	North Branch Metedeconk River	FW-3	3	0	3	3
AC4	North Branch Metedeconk River	FW-2	23	0	6	0

Station	Location	Water Quality Classification	Dissolved Oxygen		Fecal Coliform	
			#Samples	#Samples below Criteria	#Samples	#Samples above Criteria
S24	Metedeconk River	TW-1	3	1	3	3
I15	Metedeconk River	TW-1	3	1	3	0
I14	Metedeconk River	TW-1	3	0	3	0
A54	Metedeconk River	TW-1	2	0	2	0
I13	Metedeconk River	TW-1	3	0	3	0
I12	Metedeconk River	TW-1	1	0	1	0
S42	Barnegat Bay	TW-1	7	0	4	0
I16	Barnegat Bay	TW-1	5	0	2	0
AC32	Kettle Creek	TW-1	17	0	5	1
A53	Kettle Creek	TW-1	2	0	2	0
I18	Kettle Creek	TW-1	4	0	1	0
I17	Barnegat Bay	TW-1	7	0	4	0
I19	Barnegat Bay	TW-1	5	0	2	0
I20	Barnegat Bay	TW-1	5	0	3	0
A52	Barnegat Bay	TW-1	2	0	2	0
I21	Barnegat Bay	TW-1	2	0	2	0
A51	Barnegat Bay	TW-1	2	0	2	0
I22	Barnegat Bay	TW-1	6	0	4	0
I23	Barnegat Bay	TW-1	7	2	4	0
A59	Barnegat Bay	TW-1	2	0	2	0
S20	Barnegat Bay	TW-1	8	0	5	0
S43	Barnegat Bay	TW-1	3	0	1	0
A48	Barnegat Bay	TW-1	2	0	2	1
S74	Toms River	FW-2	2	0	2	2
AC31	Toms River	FW-2	18	1	6	2
S73	Toms River	FW-2	2	1	2	0
S72	Manapagua Brook	FW-2	2	1	2	0

Station	Location	Water Quality Classification	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
S22	Union Brook	FW-2	3	0	3	1
S23	Toms River	FW-2	3	0	3	1
AC7	Ridgeway Branch, Toms River	FW-2	24	0	6	1
AC6	Toms River	TW-1	24	2	6	3
S21	Toms River	TW-1	3	2	4	1
AC30	Toms River	TW-1	18	0	6	2
AC29	Toms River, Jakes Branch	TW-1	18	0	5	1
I24	Toms River	TW-1	7	4	4	2
A49	Toms River	TW-1	3	1	2	0
I25	Toms River	TW-1	7	1	4	0
A50	Toms River	TW-1	3	0	2	1
I26	Barnegat Bay	TW-1	7	0	4	0
I29	Barnegat Bay	TW-1	5	0	2	0
I28	Barnegat Bay	TW-1	5	0	2	0
I29	Barnegat Bay	TW-1	4	0	1	0
S19	Cedar Creek	TW-1	1	0	1	1
AC28	Cedar Creek	TW-1	18	0	5	1
I30	Barnegat Bay	TW-1	3	0	1	0
I31	Barnegat Bay	TW-1	5	0	3	0
I32	Barnegat Bay	TW-1	4	0	2	0
S18	Forked River	TW-1	1	0	1	1
AC27	Forked River	TW-1	18	0	6	2
A08	Forked River	TW-1	1	0	Not analyzed	
A07	Forked River	TW-1	1	0	Not analyzed	
I33	Barnegat Bay	TW-1	6	0	4	0

Station	Location	Water Quality Classification	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
AC26	Oyster Creek	TW-1	17	0	5	0
A06	Barnegat Bay	TW-1	3	0	Not analyzed	
I36	Barnegat Bay	TW-1	6	1	2	0
A05	Oyster Creek	TW-1	3	0	Not analyzed	
I35	Barnegat Bay	TW-1	4	0	2	0
A04	Barnegat Bay	TW-1	2	0	Not analyzed	
A03	Barnegat Bay	TW-1	3	0	Not analyzed	
A02	Barnegat Bay	TW-1	2	0	Not analyzed	
A01	Barnegat Bay	TW-1	2	0	Not analyzed	
I34	Barnegat Bay	TW-1	5	0	3	0
I99	Barnegat Bay	TW-1	2	0	Not analyzed	
I37	Barnegat Bay	TW-1	5	0	4	0
I38	Barnegat Bay	TW-1	5	0	4	0
I39	Barnegat Bay	TW-1	4	0	1	0
BARNEGAT INLET TO LITTLE EGG INLET						
I40	Barnegat Bay	TW-1	5	1	3	0
I41	Barnegat Bay	TW-1	4	0	1	0
I42	Barnegat Bay	TW-1	6	1	3	0
I43	Barnegat Bay	TW-1	7	0	4	0
A60	Log Creek	TW-1	2	1	2	0
I44	Barnegat Bay	TW-1	4	0	1	0
I45	Barnegat Bay	TW-1	4	0	1	0
S17	Manahawkin Bay	TW-1	10	0	5	0
S45	Manahawkin Bay	TW-1	3	0	3	0
AC24	Manahąwkin Creek	FW-2	18	0	6	1

Station	Location	Water Quality Classif-ication	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
A47	Manahawkin Bay	TW-1	1	0	2	0
A46	Mill Creek	TW-1	2	0	2	0
I46	Little Egg Harbor	TW-1	1	0	1	0
AC25	Cedar Run	FW-2	18	0	6	1
I47	Little Egg Harbor	TW-1	3	0	3	0
AC23	Westecunk Creek	TW-1	19	0	7	2
A61	Westecunk Creek	TW-1	2	0	2	0
I49	Little Egg Harbor	TW-1	3	0	3	0
I48	Little Egg Harbor	TW-1	1	0	1	0
I50	Little Egg Harbor	TW-1	2	0	3	0
AC22	Tuckerton Creek	TW-1	18	0	6	1
I51	Little Egg Harbor	TW-1	3	0	3	0
A57	Tuckerton Creek Channel	TW-1	1	0	1	0
A58	Tuckerton Creek Channel	TW-1	1	0	1	0
I52	Little Egg Harbor	TW-1	1	0	1	0
I53	Little Egg Harbor	TW-1	1	0	1	0
I54	Little Egg Harbor	TW-1	3	1	3	0
LITTLE EGG INLET TO ABSECON INLET						
S76	Wading River	FW-2	2	2	2	0
S75	Oswego River	FW-2	2	0	1	0
AC8	Wading River	FW-2	25	0	6	0
S16	Wading River	FW-2	3	1	3	1
AC9	Oswego River	FW-2	26	0	6	0
S15	Oswego River	FW-2	3	0	3	0
S77	Wading River	TW-1	2	2	2	0
S79	Mullica River	FW-2	2	1	2	0

Station	Location	Water Quality Classification	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
S78	Mullica River, Great Swamp Branch	FW-2	2	0	2	0
AC17	Hammonton Creek	FW-2	16	0	6	0
AC11	Mullica River	FW-2	25	0	6	0
S14	Mullica River					
S80	Batsto River	FW-2	2	0	2	0
AC10	Batsto River	FW-2	24	0	6	0
AC18	Mullica River	TW-1	16	1	6	1
S13	Mullica River	TW-1	3	2	3	1
S12	Mullica River	TW-1	4	1	6	0
AC21	Bass River	TW-1	18	1	6	1
I59	Mullica River	TW-1	3	1	3	0
I58	Mullica River	TW-1	2	0	3	0
I57	Great Bay	TW-1	3	0	3	0
I60	Great Bay	TW-1	3	0	3	0
A45	Great Bay	TW-1	2	0	2	0
I56	Great Bay	TW-1	3	0	3	0
I55	Great Bay	TW-1	3	0	3	0
A44	Great Bay	TW-1	2	0	2	0
A41		No data				
A42	Little Bay	TW-1	2	0	2	0
A40	Brigantine Channel	TW-1	1	0	1	0
I61	Brigantine Channel	TW-1	3	1	3	0
A43	Little Bay	TW-1	2	0	2	0
I62	Reeds Bay	TW-1	1	0	1	0
I64	Bonita Tideway	TW-1	3	0	3	0
A38	Reeds Bay	TW-1	2	1	2	0

Station	Location	Water Quality Classif-ication	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
A39	Golden Hammock Thoro-fare	TW-1	2	1	2	0
I63	Broad Creek	TW-1	3	0	2	0
ABSECON INLET TO GREAT EGG HARBOR INLET						
A97	Absecon Inlet	TW-1	1	0	1	0
I67	Absecon Channel	TW-1	3	0	3	0
I68	Clam Creek	TW-1	3	0	3	0
S48	Absecon Inlet	TW-1	1	0	1	0
I98	Absecon Channel	TW-1	3	0	3	0
I65	Absecon Channel	TW-1	3	0	2	0
A37	Absecon Channel	TW-1	2	0	2	0
I66	Absecon Creek	TW-1	1	0	1	0
AC20	Absecon Creek	TW-1	16	1	6	4
I69	Beach Thorofare	TW-1	3	0	2	0
S09	Beach Thorofare	TW-1	4	2	4	2
I70	Beach Thorofare	TW-1	3	2	3	1
A36	Great Thorofare	TW-1	1	1	1	0
A35	Beach Thorofare	TW-1	2	1	2	0
I71	West Canal	TW-1	3	1	3	0
I73	Lakes Bay	TW-1	3	1	3	0
A34	Lakes Bay	TW-1	2	2	2	0
I72	Beach Thorofare	TW-1	3	0	3	1
A96	Dock Thorofare	TW-1	1	0	1	0
A33	Shelter Island Waters	TW-1	2	0	2	0
I74	Beach Thorofare	TW-1	3	0	3	0

Station	Location	Water Quality Classification	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
I75	Risley Channel	TW-1	3	1	3	0
A32	Scull Bay	TW-1	2	1	2	0
GREAT EGG HARBOR INLET TO HEREFORD INLET						
S06	Great Egg Harbor Inlet	TW-1	4	0	4	0
S05	Great Egg Harbor Inlet	TW-1	4	0	4	0
I76	Ship Channel	TW-1	3	0	3	0
A29	Rainbow Channel	TW-1	2	0	2	0
A30	Rainbow Channel	TW-1	2	0	2	0
S11	Great Egg Harbor River	FW-3	1	0	1	0
AC12	Great Egg Harbor River	FW-3	25	1	6	0
S81	Great Egg Harbor River	FW-3	1	0	2	1
AC14	Great Egg Harbor River	FW-3	16	1	6	3
AC15	Babcock Creek	FW-3	16	2	6	2
AC13	Great Egg Harbor River	TW-1	25	0	6	1
S10	Great Egg Harbor River	TW-1	3	0	3	0
AC16	South River	FW-3	16	0	6	4
I80	Great Egg Harbor River	TW-1	2	0	2	0
A28	Great Egg Harbor River	TW-1	2	2	2	0
I79	Great Egg Harbor River	TW-1	3	1	3	0
S82	Tuckahoe River	FW-3	2	1	2	0
AC19	Tuckahoe River	FW-3	15	2	5	4
S08	Tuckahoe River	TW-1	3	3	3	0
I81	Tuckahoe River	TW-1	3	0	3	0
S07	Great Egg Harbor Bay	TW-1	1	0	1	1
I78	Great Egg Harbor Bay	TW-1	3	0	3	0
I77	Beach Thorofare	TW-1	3	0	2	0

Station	Location	Water Quality Classification	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
S53	Crook Horn Creek	TW-1	3	0	3	0
A23	Crook Horn Creek	TW-1	1	1	1	1
I82	Crook Horn Creek	TW-1	2	0	2	0
A22	Corson Sound	TW-1	1	1	1	0
S04	Corson Inlet	TW-1	3	0	3	0
I83	Ludlam Bay	TW-1	3	0	3	0
A21	Whale Creek	TW-1	2	0	2	0
I84	Ludlam Thorofare	TW-1	3	1	3	0
I85	Ludlam Thorofare	TW-1	1	0	1	0
A20	Townsend Channel	TW-1	2	0	2	0
I86	Ludlam Thorofare	TW-1	3	0	3	0
A24	South Channel	TW-1	2	1	2	0
S03	Townsend Inlet	TW-1	3	0	3	0
S56	Ingram Thorofare	TW-1	3	0	3	0
A19	Princeton Harbor	TW-1	2	1	2	0
I87	Paddy Thorofare	TW-1	3	0	3	0
A18	Great Sound	TW-1	2	0	2	0
A27	Long Reach	TW-1	2	2	2	0
A17	Creese Thorofare	TW-1	2	1	1	0
I88	Island Thorofare	TW-1	3	1	3	0
A15	Nichols Channel	TW-1	2	0	2	0
S57	Great Channel	TW-1	3	0	3	0
A13	Jenkins Channel	TW-1	2	0	2	0
I89	Dung Thorofare	TW-1	3	0	3	0
HEREFORE INLET TO CAPE MAY INLET						
S02	Hereford Inlet	TW-1	4	0	4	0

Station	Location	Water Quality Classif-ication	Dissolved Oxygen #Samples	Dissolved Oxygen #Samples below Criteria	Fecal Coliform #Samples	Fecal Coliform #Samples above Criteria
I90	Herefore Inlet	TW-1	3	0	3	0
S59	Beach Creek	TW-1	3	0	3	1
I91	Grassy Sound Channel	TW-1	3	1	3	0
A12	Old Turtle Thorofare	TW-1	2	0	2	0
A14	Beach Creek	TW-1	2	0	2	0
A26	Grassy Sound	TW-1	2	0	2	0
S60	Grassy Sound Channel	TW-1	3	0	3	0
A11		no data			no data	
A25	Post Creek Basin	TW-1	2	1	2	1
A10	Richardson Channel	TW-1	2	2	2	1
I93	Richardson Channel	TW-1	3	2	3	0
I92	Grassy Sound Channel	TW-1	3	2	3	0
I94	Sunset Lake	TW-1	3	2	3	0
A16	Sunset Lake	TW-1	2	1	2	0
A09	Upper Thorofare	TW-1	1	0	1	0
S01	Cape May Harbor	TW-1	4	0	3	0
I97	Cape May Harbor	TW-1	1	0	1	0
I95	Cape May Harbor	TW-1	2	0	2	0
A98		no data			no data	
S62	Cape May Canal	TW-1	3	0	3	0
I96	Cape May Harbor	TW-1	3	0	3	0

Manasquan Inlet to Barnegat Inlet

This area includes most of Barnegat Bay and the Metedeconk and Toms Rivers. Water quality meets criteria in the open waters of Barnegat Bay. In the Metedeconk River, water quality levels not meeting criteria were evidenced in the upper portion and extend into tidal waters of the estuary. Toms River is the most severely degraded estuary north of Atlantic City. During the 1966-67 EPA surveys, dissolved oxygen levels in the upper estuary were less than the criteria (4 milligrams per liter) specified by the approved standards on 4 of 7 sampling tours. Levels of dissolved oxygen and/or bacteria not meeting criteria extend throughout the estuary and into fresh waters. Dissolved oxygen levels below criteria also occurred in Goose Creek, Oyster Creek, and the north branch of the Forked River.

Barnegat Inlet to Little Egg Inlet

From Little Egg Inlet to Absecon Inlet, water quality is good. The natural conditions in the Mullica River cause dissolved oxygen levels below the absolute minimum set by the approved state and/or interstate standards. There is little industrial or residential development within the basin. A natural condition caused by organic enrichment from the marsh and bogs which prevail in the area is probably responsible for oxygen depletion. In the upper tidal (and freshwater) portions

of the Mullica Basin, pH values are frequently below the minimum value of 6.5 established by the approved standards. This low pH is probably caused by organic acids released during natural decomposition of organic matter.

Absecon Inlet to Great Egg Harbor Inlet

The confined tidal waters from Absecon Inlet to Great Egg Harbor Inlet exhibit water quality levels not conforming with accepted criteria. Levels not meeting criteria were evidenced upon one or more occasions at 11 of 22 stations sampled within this area. The major water quality consideration was oxygen depletion, although elevated bacterial densities also occurred. Water quality conditions in this area clearly demonstrate the effect of tidal exchange. Acceptable levels were observed at stations located within one tidal excursion from an ocean inlet (near Absecon and Great Egg Harbor Inlets); water quality levels not meeting criteria were observed at stations in the confined bay and channels greater than one tidal excursion from the inlets (Lakes Bay, Beach Thorofare, etc.). This phenomena accounts for the pattern of water quality observed from Absecon Inlet to Cape May.

Great Egg Harbor Inlet to Herefore Inlet

Water quality from Great Egg Harbor Inlet to Hereford Inlet is marginal. Water quality levels not meeting criteria were observed on one or more occasions at 12 of 41 stations in this area. Dissolved oxygen was below approved levels at 10

stations. The combined State and Federal data reveal a pattern of oxygen depletion and bacterial contamination in the tidal and fresh waters of the Tuckahoe River and the lower Great Egg Harbor River. Levels of dissolved oxygen not meeting criteria are also scattered in confined tidal waters behind the barrier Islands.

Herefore Inlet to Cape May

Tidal waters from Hereford Inlet to Cape May exhibit oxygen depression, principally in areas where wastes are discharged to confined bays. Water quality levels not meeting criteria were evidenced at eight (8) locations, seven (7) of which involved low dissolved oxygen concentrations. Stations where water quality criteria were not met are concentrated in confined tidal waters west of Wildwood and Wildwood Crest.

Water quality in the Atlantic Coastal Area exhibits a two phase pattern. North of Little Egg Inlet - where most coastal sewage treatment plants discharge to the Atlantic Ocean - water quality levels not meeting criteria occur at stations primarily in tidal estuaries of tributary rivers and streams. South of Little Egg Inlet -- where sewage treatment plants discharge to confined tidal waters which receive little exchange and circulation -- water quality conditions not meeting criteria are more concentrated and frequent.

The Atlantic Coastal waters and waters of open bays are of good quality. In general, water quality conditions not meeting criteria occur in areas where tidal exchange is limited, that is, confined waters.

The major water quality problems of the New Jersey Atlantic Coastal Area are depressed dissolved oxygen levels, bacterial contamination, and the presence of sewage discharge in inland bays and estuaries, which restricts their usage for shellfishing. Oxygen depression can limit reproduction, migration, and survival of many forms of marine life, including finfish which contribute to the economic vitality of the area. Fecal coliform contamination, if allowed to continue or increase, could endanger the recreational potential of the basin. High coliform bacteria levels, and the presence of sewage discharges in inland bays and estuaries has resulted in economic damage to, and if left unchecked, could further harm the New Jersey shellfish industry.

SECTION V

POINT SOURCES OF POLLUTION

A. Domestic Sewage - Municipal, Institutional and Federal Facilities

Domestic sewage from municipal, institutional and federal facilities comprise the greatest source of pollution within the Jersey Coastal Area. Many of these sewage systems are subjected to large seasonal load variations, which are due to an increase in the resident and transient population during the summer recreational period. At least a dozen resort communities along the Jersey Shore undergo population increases of tenfold or more.

Conference consideration encompasses 154 point sources of domestic sewage. Of this total, 48 point sources are given primary treatment, 94 are given what can be described as secondary treatment, and 12 undergo an additional treatment step (tertiary treatment). Also, sewage from 8 point sources are, after treatment, discharged to the ground via percolation into the subsurface stratum. All point source domestic sewage discharges undergo some form of treatment.

The location of all point sources of domestic sewage in the designated conference area is shown on Figures I through V. Table 2 itemizes all sewage point sources, and gives pertinent information in regard to flow, treatment,and the waterway into which the wastes are discharged.

DOMESTIC SEWAGE POINT SOURCES-MONMOUTH COUNTY

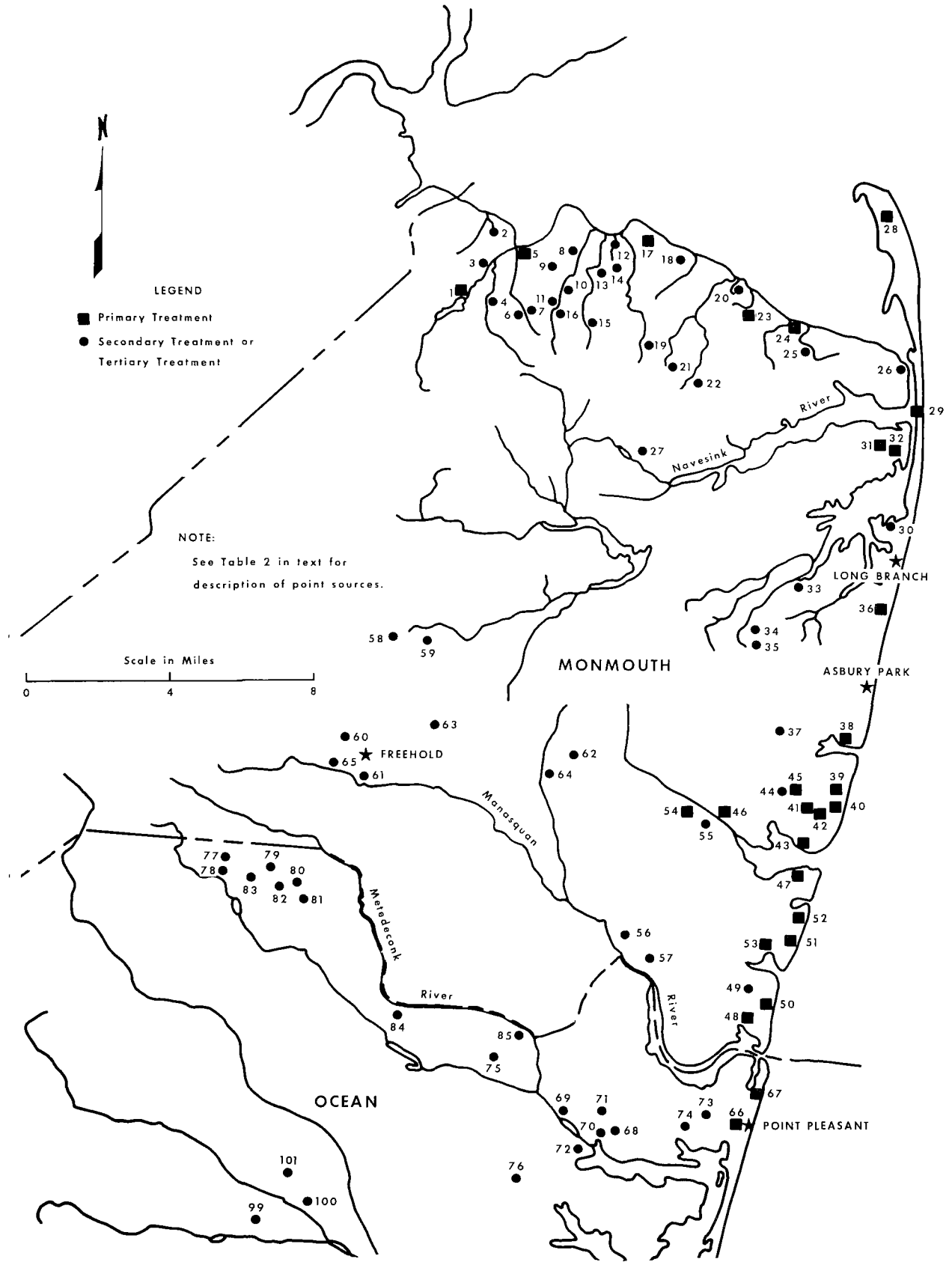


Figure II

DOMESTIC SEWAGE POINT SOURCES-OCEAN COUNTY

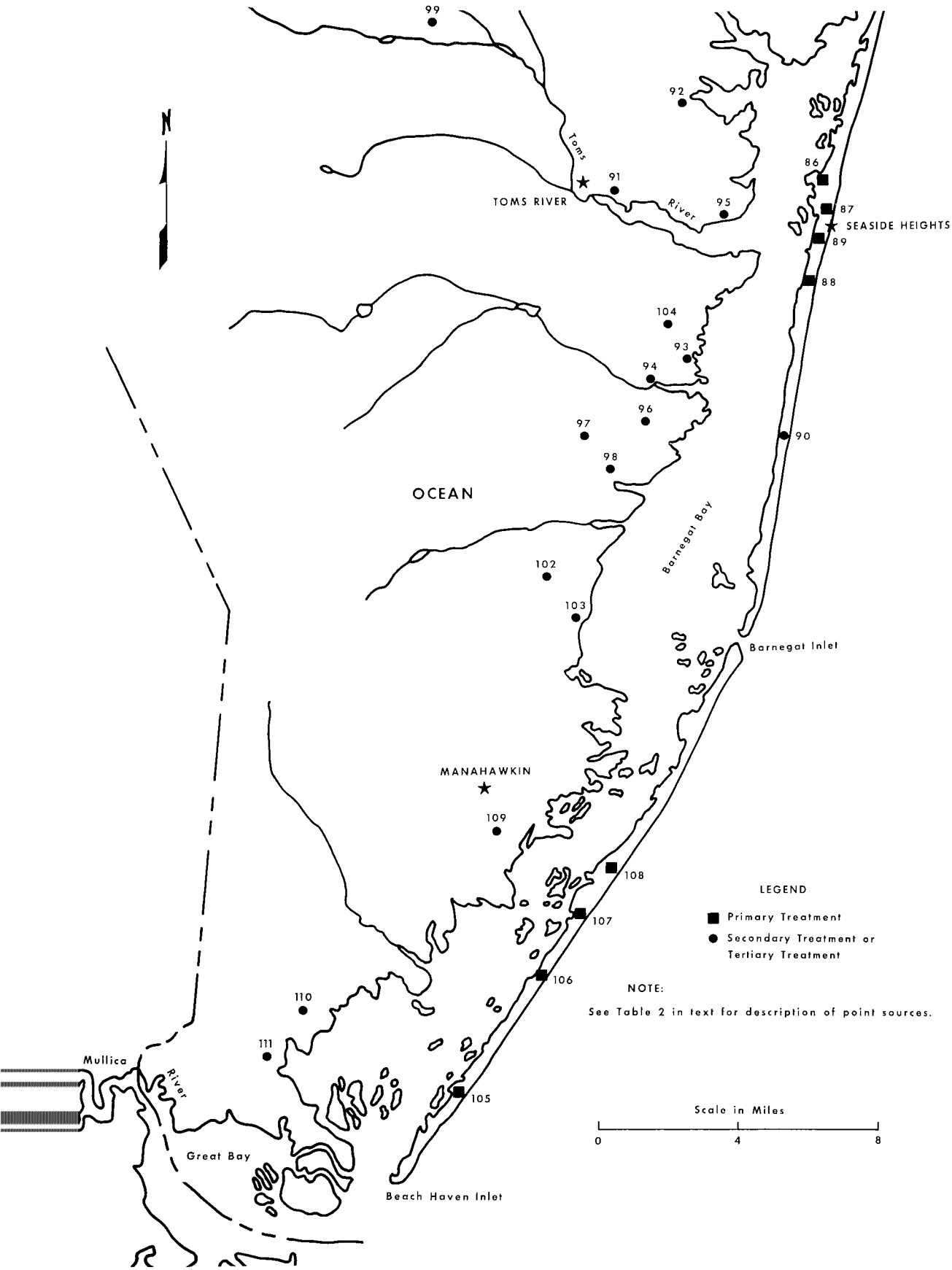


Figure III

DOMESTIC SEWAGE POINT SOURCES-ATLANTIC COUNTY

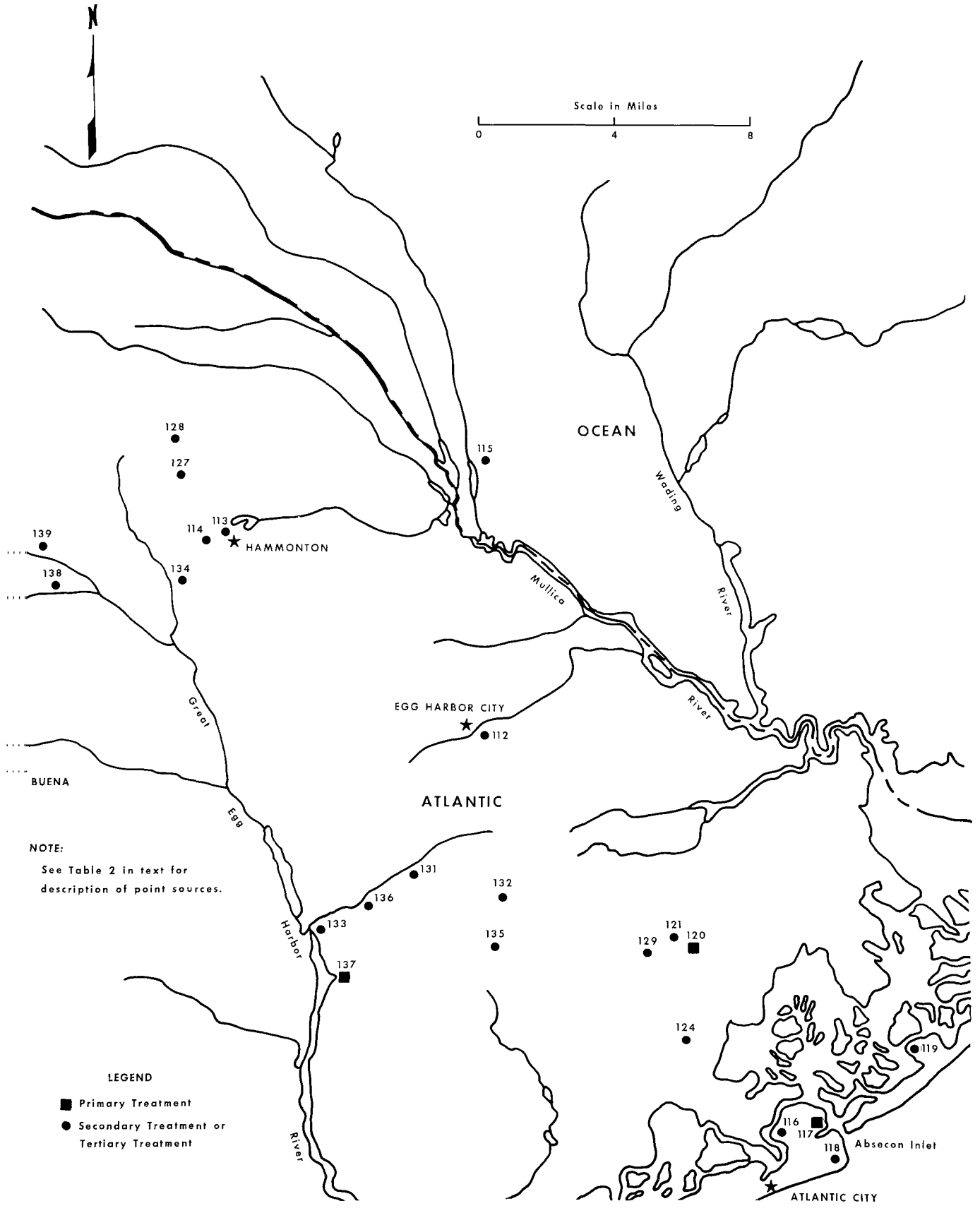


Figure IV

DOMESTIC SEWAGE POINT SOURCES-CAPE MAY COUNTY

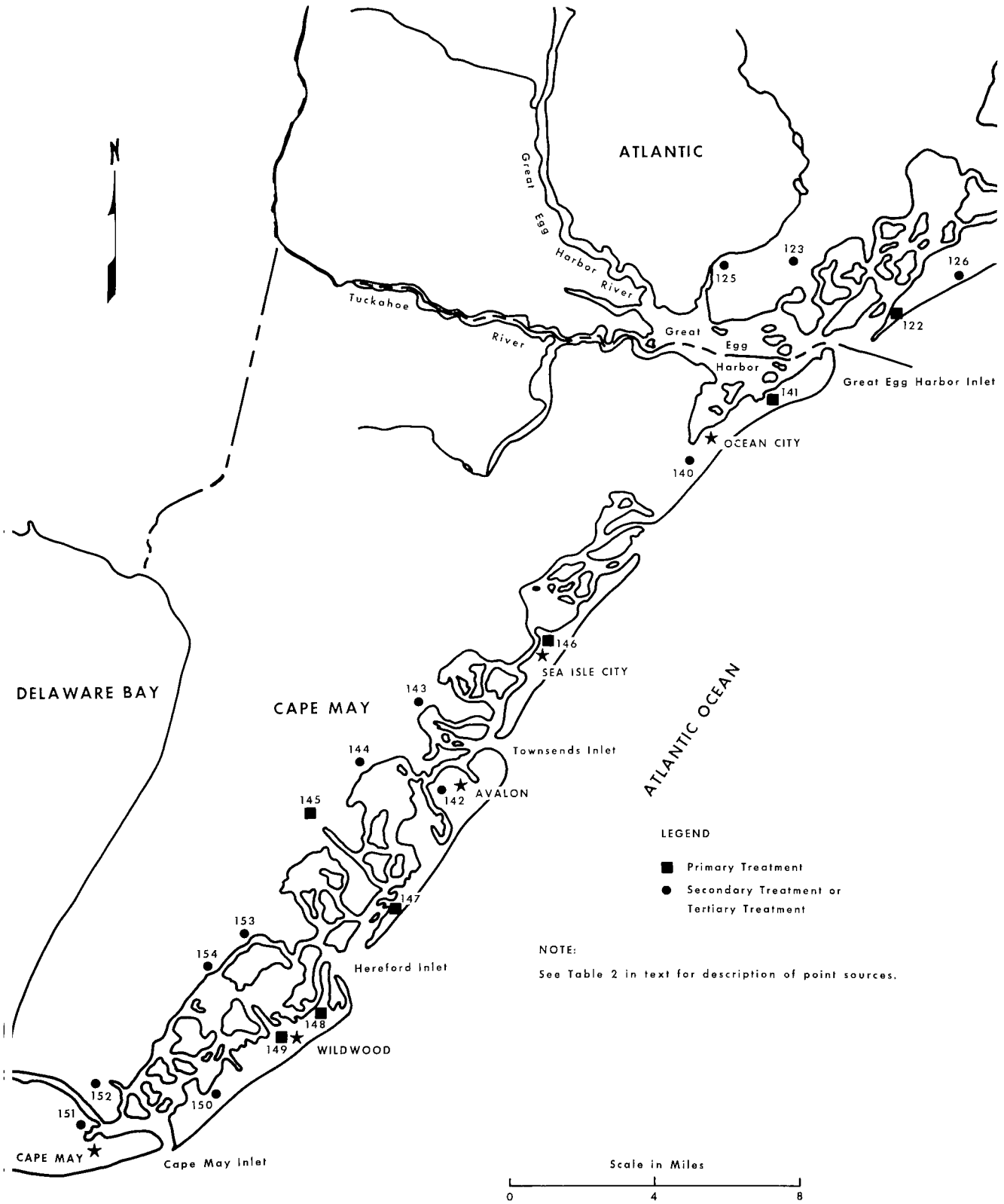


Figure V

TABLE NO. 2
Domestic Sewage Point Sources
(Conference Area)

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classification
1	Matawan Boro	Municipality	0.800	0.800	Primary	Raritan Bay	TW-1
2	Matawan Twp.	Matawan Twp. Mun. Util. Auth. Cliffwood Bench	0.750	0.350	Secondary	Whale Creek to Raritan Bay	FW-3
3	Matawan Twp.	Matawan Twp. Mun. Util. Auth. River Gardens	0.100	0.070	Secondary	Matawan Creek to Raritan Bay	TW-1
4	Matawan Twp.	Matawan Twp. Mun. Util. Auth. Stratmore	0.800	0.850	Secondary	Mohingson Brook to Raritan	FW-3
5	Keyport	Municipal	0.900	0.650	Primary	Raritan Bay	TW-1
6	Hazlet Twp.	Hazlet Twp. San. Auth.	0.196	0.180	Secondary	Luppatacung Creek to Raritan Bay	FW-3
7	Hazlet Twp.	Beer St. School Bd. of Ed.	0.012	0.005	Secondary	Luppatacung Creek to Raritan Bay	FW-3
8	Union Beach	Bd. of Ed. Memorial Park School	0.005	0.009	Secondary	Conascunk Creek to Raritan Bay	TW-1
9	Hazlet Twp.	Family Circle Ass. (Bradlee)	0.0072	0.011	Secondary	Flat Creek to Raritan Bay	FW-3
10	Hazlet Twp.	Bayshore Sewerage Co.	0.55	1.20	Secondary	Flat Creek to Raritan Bay	FW-3
11	Hazlet Twp.	J.M. Fields Dept. Stores	0.010	0.008	Secondary	Monascunk Creek to Raritan Bay	FW-3
12	Union Beach	International Flavors & Fragrances (Domestic)	0.005	0.003	Secondary	East Creek to Raritan Bay	TW-1
13	Hazlet Twp.	International Flavor & Fragrance In.	0.032	N/A	Secondary	East Creek to Raritan	FW-3
14	Hazlet Twp.	Holly Hill Mobile Home Park	0.010	0.009	Secondary	Thorn Creek to Raritan Bay	FW-3

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classif-ication
15	Holmdel Twp.	Municipal (Lanvin-Charles of the Ritz)	0.180	0.045	Secondary	East Creek to Raritan Bay	FW-3
16	Hazlet Twp.	Harvrich Ass. K-Mart Shopping Center	0.024	Not Available	Secondary	Monascunk Creek to Raritan Bay	FW-3
17	Keansburg	Municipal	2.07	1.80	Primary	Raritan Bay	TW-1
18	Middletown Twp.	St. Catherine's Parish Hall	0.008	0.002	Secondary	Tidal ditch to Raritan Bay	TW-1
19	Middletown Twp.	Middletown Swim & Tennis Club	0.008	0.004	Secondary	Mahores Brook to Raritan	FW-3
20	Middletown Twp.*	Township of Middletown Regional Sew. Auth.	6.5	3.0	Secondary	Raritan Bay	CW-2
21	Middletown Twp.	Food Fair Properties Inc.	0.050	0.020	Secondary	Trib. to Mill Brook to Raritan Bay	FW-3
22	Middletown Twp.	Howard Johnson Motel and Rest	0.015	0.009	Secondary	Twin Brook to Compton Creek	FW-3
23	Middletown Twp.	U.S. Govern. (U.S. Navy) Leonardo Loading Pier	0.080	0.025	Primary	Ware Creek to Raritan Bay	FW-3
24	Atlantic Highlands	Municipal	0.600	0.300	Primary	Sandy Hook Bay	TW-1
25	Middletown Twp.	Atlantic Highlands Nursing	0.013	0.006	Secondary	Many Mind Brook to Raritan Bay	TW01
26	Highlands	Municipal	1.2	0.500	Primary	Atlantic Ocean	CW-1
27	Middletown Twp.	Middletown Sew. Auth. Middletown Green	0.060	0.035	Secondary	Nut Swamp Brook to Navesink River	FW-3
28	Middletown Twp.	Fort Hancock U. S. Army Installation	0.55	N/A	Primary	Atlantic Ocean	CW-1
29	Sea Bright	Municipal	0.250	0.117	Primary	Atlantic Ocean	CW-1
30	Monmouth Beach	Northeast Monmouth Regional Sewerage Authority	10.0	2.5	Secondary	Atlantic Ocean	CW-2

Ident. No.	Municipality	Owner	Design Cap.	Ave. Daily Flow	Type of Treat.	Point of Dis.	Water Classif-ication
31	Rumson	Municipal	0.060	0.230	Primary	Navesink River	TW-1
32	Rumson	Bd. of Ed. Dean Porter School	0.0056	0.002	Secondary	Navesink River	TW-1
33	Ocean Port	Fort Monmouth U. S. Govern.	0.750	0.700	Secondary	Parker's Creek to Shrewsbury River	TW-1
34	New Shrewsbury	Mid-Monmouth Industrial Park	0.025	0.020	Secondary	Wampum Brook to Shrewsbury River	FW-3
35	New Shrewsbury	Camp Charles Wood U. S. Govern.	0.500	0.500	Secondary	Wampum Brook to Shrewsbury River	FW-3
36	Long Branch	Long Branch Sewer Authority	5.4	4.5	Primary	Atlantic Ocean	CW-1
37	Ocean Twp.	Ocean Twp. Sewerage Authority	3.0	2.2	Secondary	Atlantic Ocean	CW-2
38	Deal	Municipal	0.3	0.371	Primary	Atlantic Ocean	CW-1
39	Asbury Park	Municipal	5.5	3.6*	Primary	Atlantic Ocean	CW-1
40	Neptune Twp. Ocean Grove	Camp Meeting Association	0.847	1.020	Primary	Atlantic Ocean	CW-1
41	Bradley Beach	Municipal Evergreen Ave. Plant	0.335	0.218	Primary	Atlantic Ocean	CW-1
42	Bradley Beach	Municipal Ocean Park Ave. Plant	0.665	0.640	Primary	Atlantic Ocean	CW-1
43	Avon-by-the-Sea	Municipal	0.400	0.407	Primary	Atlantic Ocean	CW-1
44	Neptune Twp.	Municipal Plant #2 Old Corless Ave. Plant	2.5	0.657	Secondary	Atlantic Ocean	CW-1
45	Neptune Twp.	Municipal Plant #1	1.16	1.7	Primary	Atlantic Ocean	CW-1
46	Neptune City	Municipal	0.310	0.504	Primary	Atlantic Ocean	CW-1
47	Belmar	Municipal	3.0	1.8	Primary	Atlantic Ocean	CW-1
48	Manasquan	Municipal	0.525	0.686	Primary	Atlantic Ocean	CW-1

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classif-ication
49	Sea Girt	N.J. State Dept. of Defense National Guard Training Center	0.2	0.185	Secondary	Atlantic Ocean	CW-1
50	Sea Girt	Municipal	0.4	0.378	Primary	Atlantic Ocean	CW-1
51	Spring Lake	Municipal Pitney Ave.	0.14	0.30	Primary	Atlantic Ocean	CW-1
52	Spring Lake	Municipal Penn. Ave. Plant	1.50	0.786	Primary	Atlantic Ocean	CW-1
53	Spring Lake Heights	Municipal	0.5	0.450	Primary	Atlantic Ocean	CW-1
54	Wall Twp.	U. S. Army Installation Camp Evans	0.8	0.035	Primary	Atlantic Ocean	TW-1
55	Wall Twp.	N.J. Highway Auth. (Asbury Park Service Area)	0.03	0.025	Secondary	Trib. to Shark River	FW-2
56	Wall Twp.	Arthur Brisbane Child Treat. Center	0.016	0.016	Tertiary	Trib. to Manasquan River	FW-2
57	Wall Twp.	Geraldine L. Thompson Medical Home	0.035	0.014	Secondary	Ground Percolation	FW-2
58	Freehold Borough	Municipal	0.800	1.0	Secondary	Pasaquanaqua Branch, Trib. Manasquan R.	FW-2
59	Freehold Twp.	Wynnewood Sewerage Utilities Co.	0.296	0.300	Secondary	Pasaquanaqua Branch, Trib.Manasquan R.	FW-2
60	Freehold Twp.	Freehold Sewer Co.	0.800	0.906	Secondary	Pasaquanaqua Branch, Trib. Manasquan R.	FW-2
61	Freehold Twp.	Silvermeade Mobile Homes Park, Inc.	0.300	0.019	Secondary	Trib. of Manasquan Riv.	FW-2
62	Howell Twp.	Howell High School-Regional Board of Ed. (Freehold Dist.)	0.032	0.015	Secondary	Manasquan Riv.	FW-2
63	Howell Twp.	Adelphia Sewer Company	0.127	0.015	Tertiary	Manasquan River	FW-2
64	Farmingdale Boro	New Construct. Main Street Apartment	0.030	None Avail.	Tertiary	Marsh Bog Brook Trib. Manasquan Riv.	FW-2

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classif-ication
65	Freehold Twp.	New Construct. Levitt & Sons	0.050	None Avail.	Secondary	Trib. Manasquan Riv.	FW-2
66	Bay Head	Municipal	0.5	0.488	Primary	Atlantic Ocean	CW-1
67	Point Pleasant Beach	Municipal	1.5	1.18	Primary	Ocean	CW-1
68	Brick Twp.	Brick Plaza, Inc.	0.030	.030+	Secondary	Cedar Bridge Creek	FW-2
69	Brick Twp.	Brick Twp. Srg. Auth. - Lake Riviera	0.030	0.035	Secondary	Kettle Cr.	FW-2
70	Brick Twp.	Kennedy Mall Shopping Ctr.	0.030	0.045	Tertiary	Cedar Bridge Creek	FW-2
71	Brick Twp.	Brick Twp. Srg. Auth. - Green Briar	0.800	0.042	Tertiary	So. Branch Beaver Dam Creek	FW-2
72	Brick Twp.	Brick Twp. Bd. of Ed. - Middle Elem. School	0.50	New Plant no flow data	Secondary	Ground recharge	
73	Pt. Pleasant Boro	Bd. of Ed. High School	0.022	0.012 (Oct.)	Secondary	Ground recharge	
74	Pt. Pleasant Boro	Bd. of Ed. Nellie Bennett School	0.015	0.006 (Oct.)	Secondary	Pt. Pleasant Canal	TW-1
75	Lakewood Borough	N. J. Water Co. (Lakewood)	1.9	1.60	Secondary	S. Br. Metedeconk Riv.	FW-2
76	Lakewood Twp.	S. Lakewood Sewer Co. (Leisure Village)	0.300	0.249	Secondary	Kettle Cr.	FW-2
77	Jackson Twp.	Oak Tree Mobile Home Inc.	0.045	0.025	Tertiary	Trib. So. Br. Toms Riv.	FW-2
78	Jackson	United Mobile Homes (South Wind Mobile Homes)	0.045	New Plant no flow data	Secondary	Ground Percolation	
79	Jackson Twp.	Harmony Sewer Co.	0.144	0.065	Secondary	So. Br. Metedeconk River	FW-2
80	Jackson Twp.	Jackson Twp. Util. Auth. Brookwood I	0.150	.162	Secondary	No. Br. Metedeconk River	FW-2
81	Jackson Twp.	Jackson Twp. Util. Auth. Brookwood II	0.150	.139	Secondary	So. Br. Metedeconk River	FW-2

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classif-ication
82	Jackson Twp.	Jackson Twp. Util. Auth. Brookwood III	0.300	.167	Secondary	No. Br. Metedeconk River	FW-2
83	Jackson Twp.	Jackson Twp. Bd. of Ed. H. S. Complex	0.100	0.10	Tertiary	No. Br. Toms River	FW-2
84	Howell Twp. (Monmouth Cty)	Maxim Sewer	0.450	0.358		No. Br. Metedeconk River	FW-2
85	Howell Twp. (Monmouth Cty)	Crickett Restaurant	0.006	0.004		No. Br. Metedeconk River	FW-2
86	Lavallette	Municipal	0.868	0.870	Primary	Atlantic Ocean	CW-1
87	Dover Twp.	Dover Sewer Auth. (Ortley Beach)	6.0	3.5	Primary	Atlantic Ocean	CW-1
88	Seaside Park	Municipal	0.96	1.2	Primary	Atlantic Ocean	CW-1
89	Seaside Heights	Municipal	1.7	1.5	Primary	Atlantic Ocean	CW-1
90	Berkeley Twp.	Berkeley Twp. Srg. Auth. (So. Seaside Park)	0.5	0.04	Secondary	Atlantic Ocean	CW-1
91	Dover Twp.	Dover Twp. Srg. Auth. Toms River Boro	0.544	0.990	Secondary	Toms River	TW-1
92	Dover Twp.	Dover Twp. Srg. Auth. Holiday City	0.250	0.173	Secondary	Kettle Creek	TW-1
93	Berkeley Twp.	Berkeley Twp. Srg. Auth. Berkeley Shores	0.500	0.235	Secondary	Lagoon to Barnegat Bay	TW-1
94	Berkeley	Berkeley Twp. Srg. Auth. Clamming Creek Plant	0.250	0.050	Secondary	Clamming Creek	TW-1
95	Island Heights	Municipal	0.400	0.148	Secondary	Dillions Creek	TW-1
96	Lacey Twp.	Jersey Central Power & Light	0.004	0.003	Secondary	Oyster Creek	TW-1
97	Lacey Twp.	N. J. Hwy. Auth. Forked River Service Area	0.040	0.028	Secondary	Cedar Creek	FW-2

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classif-ication
98	Lacey Twp.	N. J. Dept. Env. H-Forked River Marina	0.006	No data Est. flow .003	Secondary	Forked River	TW-1
99	Lakehurst Boro	Municipal	0.300	0.145	Tertiary	Union Branch Pine Lake Toms River	FW-2
100	Manchester Twp.	U. S. Naval Air Station Lakehurst	0.500	.272	Secondary	Ridgeway Br. Toms Riv.	FW-2
101	Manchester	Crestwood Vil. Sewer Co. Inc.	0.100	0.114	Secondary	Ground Recharge	
102	Ocean Twp. Ocean County	Mid-Jersey Sewer Crop. (Waretown)	0.0855	0.400	Secondary	Waretown Creek	TW-1
103	Union Twp.	Pebble Beach Water & Sewer Co.	0.400	0.097	Tertiary	Lochiel Br. Horse Neck Creek	TW-1
104	Berkeley Twp.	Bd. of Ed. Clare B. Worth School	0.010	Not Avail.	Secondary	Discharge into a swale.	
105	Beach Haven Borough	Beach Haven Srg. Akth.	0.6	1.2	Primary	Atlantic Ocean	CW-1
106	Long Beach Twp.	Long Beach Twp. S. A.	2.0	1.5	Primary	Atlantic Ocean	CW-1
107	Ship Bottom Borough	Ship Bottom Srg. Auth.	1.2	0.5	Primary	Atlantic Ocean	CW-1
108	Surf City Borough	Municipal	0.722	0.78	Primary	Atlantic Ocean	CW-1
109	Stafford Twp.	Stafford Twp. M. U. A.	0.577	0.457	Secondary	Mill Creek to Manahawkin Bay	TW-1
110	Tuckerton	Tuckerton M. U. A.	0.5	0.2	Secondary	Tuckerton Creek	TW-1
111	Little Egg Harbor Twp.	Mystic Isles Srg. Co.	0.308	0.31	Secondary	Rose's Cr. to Great Bay	TW-1
112	Egg Harbor City	Municipal	0.340	0.484	Secondary	Landing Cr. to Mullica Riv.	FW-3
113	Hammonton	Municipal	2.0	1.248	Secondary	Hammonton Creek	FW-2

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classif-ication
114	Hammonton	N. J. Expressway Auth.	0.004	0.004	Secondary	Penny Pot Stream	FW-3
115	Washington Twp. (Burlington County)	Pacemaker, Inc.	0.010	0.044	Secondary	Mullica River	TW-1
116	Atlantic City	Atlantic City Sewer Co. City Island Plant	18.1	15.770	Primary	Beach Thorofare	TW-1
117	Atlantic City	Atlantic City Sewer Co. Texas Ave. Plant-operational summer months only	0.500	0.750	Primary	Beach Thorofare	TW-1
118	Atlantic City	Vornado Inc. (Two Guys)	0.01	0.02	Secondary	Beach Thorofare	TW-1
119	Brigantine	Municipal	0.600	1.041	Secondary	St. George Thorofare to Absecon Inlet	TW-1
120	Galloway Twp.	Seaview Country Club	0.03	0.010 (Est.)	Primary	Reeds Bay	TW-1
121	Galloway Twp.	N. J. Highway Auth. - Atlantic City Service Area	0.030	0.027	Secondary	Trib. to Mullica Riv.	FW-2
122	Longport	Municipal	0.500	0.419	Primary	Beach Thoro.	TW-1
123	Linwood	Mainland Regional High School Mainland Bd. of Ed.	0.02	0.010	Secondary	Patcong Cr.	FW-3
124	Pleasantville City	Municipal	2.05	1.52	Secondary	Jonathan Thorofare	TW-1
125	Somers Point	Somers Pt. City Srg. Auth.	1.05	0.868	Secondary	Patcong Creek	TW-1
126	Ventnor	Ventnor-Margate	3.5	4.856	Primary	Beach Thorofare	TW-1
127	Winslow Twp.	Ancora State Hospital	0.400	0.231	Secondary	Blue Anchor Mullica Riv.	FW-2
128	Winslow Twp.	Winslow Sanitary			Tertiary	Recharge Basins	
129	Galloway Twp.	N. J. Dept. of Higher Ed. Stocton State College	0.150	N/A	Secondary	Spray Irrigation	

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classif-ication
130	Buena Borough	Buena Borough Munic. Util. Authority	0.400	0.287	Secondary	Branch of Deep Run to Great Egg Harbor River	TW-1
131	Egg Harbor Twp.	National Aviation Fac. Experimental Sta.	0.210	0.236	Secondary	Gravelly Run Great Egg Harbor Riv.	TW-1
132	Galloway Twp.	Lenox, Inc.	0.020	0.018	Tertiary	Babcock Creek	FW-3
133	Hamilton Twp.	Hamilton Twp. Munic. Util. Authority	0.625	0.355	Secondary	Babcock Creek	TW-1
134	Hamilton Twp.	N. J. Expressway Auth. Elwood Sect.	0.05	0.020	Tertiary	Makepeace stream	FW-3
135	Hamilton Twp.	Zaberer's Restaurant	0.028	0.020	Secondary	Gravelly Run	TW-1
136	Hamilton Twp.	Atlantic City Race Track	0.033	0.60	Secondary	Babcock Run	TW-1
137	Weymouth Twp.	Belcoville		0.30 (Est.)	Primary	South River	TW-1
138	Monroe Twp.	Mun. Utilities Auth.	0.472	0.318	Secondary	Squamkum Be. of Great Eau Hudson River	FW-3
139	Monroe Twp.	American Mobile Homes	0.056	N/A	Secondary	Sub-Surface Disposal	FW-3
140	Ocean City	Municipal 46th St. Plant	1.0	1.16	Secondary	Great Egg Harbor Bay	TW-1
141	Ocean City	Ocean City Sewer Service Co.	2.5	3.7	Primary	Great Egg Harbor Bay	TW-1
142	Avalon	Avalon Sewage Authority	1.0	0.898	Secondary	Great Sound	TW-1
143	Dennis Twp.	N. J. Highway Auth. - Seaville Service Area	0.030	0.021	Secondary	Lundlam Bay	TW-1
144	Middle Twp.	Cape May Bd. Chosen Freeholders-Holmes	0.05	0.010	Secondary	Holmes Creek to Great Sound	TW-1
145	Middle Twp.	Middle Twp. Sewer District #1 Cape May Court House	0.100	0.175	Primary	Crooked Brook to Here-ford Inlet	TW-1

Ident. No.	Municipality	Owner	Design Cap. (MGD)	Ave. Daily Flow (MGD)	Type of Treat.	Point of Dis.	Water Classif-ication
146	Sea Isle City	Municipal	0.340	0.28	Primary	Ludlams Thorofare	TW-1
147	Stone Harbor	Municipal	1.2	0.732	Primary	Great Channel	TW-1
148	North Wildwood	Municipal	2.11	1.022	Primary	Herefore Inlet	TW-1
149	Wildwood	Municipal	3.5	2.85	Primary	Grassy Sound	TW-1
150	Wildwood Crest	Municipal	1.3	1.919	Primary	Richardson Sound	TW-1
151	Lower Twp.	Shaw Crest Mobile Homes Corp.	New Plant No data		Secondary	Richardson Sound	TW-1
152	Lower Twp.	Lower Cape Regional - Bd. of Ed. Lower Twp.	0.016	0.007	Secondary	Mill Creek	TW-1
153	Middle Twp.	Garden Lake Corp.	0.020	0.010	Secondary	Creese Creek to Grassy Sd.	TW-1
154	Middle Twp.	Florida Motor Court	0.060	0.020	Secondary	Richardson Sound	TW-1

There are seven federal sources of municipal waste, with five located in Monmouth County and one each in Ocean County and Atlantic County. Specifics are included in Table 2.

In the designated conference area, Monmouth County contains the largest number of point source sewage discharges, and also the largest flow volume. An itemization of point source discharges by County follows:

County	No. of Point Sources
Monmouth	64
Ocean	47
Atlantic	23
Cape May	15
Burlington	1
Gloucester	2
Camden	2
	154

As indicated previously, all point sources undergo some form of treatment, with the majority of point sources of sewage given secondary treatment. Sewage discharges cause unacceptable water quality levels and have resulted in the closing of many acres to shellfishing. Standard health practice dictates restricting shellfishing areas proximate to sewage discharges. The limited assimilative capacity of the coastal estuaries and tributary streams, and the designated water uses for the area require additional abatement measures.

B. Industrial Wastes (Direct Discharges)

Industrial water pollution in the New Jersey Coastal area is a relatively minor problem in comparison to municipal point sources of pollution, since most of the industry in the State is located in areas north and west of the Conference area.

Those companies that are direct dischargers into navigable waters were required to file applications for a permit with the Army Corps of Engineers to discharge in accordance with the Refuse Act Permit Program. This program is jointly administered by the Corps of Engineers and EPA. Sources of information for industrial waste characteristics and existing treatment facilities were permit applications and state files.

In the New Jersey Coastal area, eighteen direct dischargers have filed applications for permits (see Table 3). These companies are predominantly in the food processing, chemical, paper and power generation industries.

About two-thirds of the process water discharged in the region from these eighteen direct dischargers comes from the Tom's River Chemical Company and practically all of the cooling water discharged is from three power generating companies, the largest being the Jersey Central Power and Light Company in Lacey Township.

The largest contributors of biological oxygen demand are

TABLE NO. 3
Industrial Direct Dischargers - N. J. Atlantic Coastal Area

Name of Firm	Plant Location	Receiving Water & Classification	Type of Products	Description of Present Discharge
MONMOUTH COUNTY				
Brockway Glass	Freehold	DeBois Creek FW-2	Glass Containers	Flow -.435 MGD Phenol - 20 ppb Oil & Grease - 58 lbs/day
Nestle	Freehold	Tributary to DeBois Creek FW-2	Instant Coffee	Flow - .89 MGD BOD_5 - 434 lbs/day Oil & Grease - 97 lbs/day Phenol - .87 lbs/day Temp. - 98°F max.
3M Minnesota, Mining & Manufacturing Co.	Freehold	Passaquanaqua Creek FW-2	Magnetic Tape, Coatings	Flow - .33 MGD cooling water BOD - 45 lbs/day
OCEAN COUNTY				
Borden, Inc.	Pt. Pleasant Beach	Wills Hole Thorofare TW-1	Clams	Flow - .0868 MGD BOD_5 - 248 lbs/day TSS - 145 lbs/day Oil & Grease - 7 lbs/day F. Coli. - not available
Fish Products	Tuckerton	Newman's Thorofare TW-1	Animal Feed	Flow - 1.326 MGD Oil & Grease - not available
Jersey Central Power and Light	Lacey Township	Oyster Creek TW-1	Power Generation	information not available Flow - 529 MGD
CAMDEN COUNTY				
Mrs. Paul's Kitchen (Braddock Frosted Foods, Inc.)	Braddock Winslow Twp.	Tributary to Mullica River FW-2	Frozen Fish & Vegetables	Flow - .2 MGD Cooling Water Temp. - 67°F pH - 5.6* - 8.5 TS - 90 lbs/day BOD_5 - 8.4 lbs/day Copper - .25 lbs/day Iron - .25 lbs/day *Intake water is naturally acidic

Name of Firm	Plant Location	Receiving Water & Classification	Type of Products	Description of Present Discharge
Tom's River Chemical	Tom's River Dover Twp.	Atlantic Ocean CW-2 Tom's River FW-2	Dyes, Resins, Pesticides, Cooling Water	Discharge 3 (2) TSS - 3900 lbs/day BOD_5 - 13,200 lbs/day COD - 31,300 lbs/day Ammonia (N) - 825 lbs/day Cadmium - 1.1 lbs/day Chromium - 26.2 lbs/day Copper - 36.7 lbs/day Lead - 14.7 lbs/day Mercury - 0.15 lbs/day Zinc - 26.3 lbs/day Chlorinated Hydrocarbons - 6,150 lbs/day (3) Nitrobenzene - 132 lbs/day Nickel - 10.8 lbs/day Phenol - 3.0 lbs/day
BURLINGTON COUNTY				
Pacemaker	Lower Bank, Washington Twp.	Mullica River TW-1	Boats	Flow - .0005 MGD Cooling Water - .0001 MGD Process Water Temp. - #1: 60°F Ave., 72°F max. - #2: 75°F Ave., 85°F max. pH - 6.5 - 8.5
ATLANTIC COUNTY				
Atlantic City Electric Humble Oil (Oil Terminal)	Atlantic City Atlantic City	Beach Thorofare TW-1 Clam Creek TW-1	Power Generation Oil Terminal	66 MGD Stormwater Oil & Grease - 9 mg/l in treated stormwater
Lenox China	Pomona, Galloway Twp.	Jack Pudding Branch of Babcock Creek FW-3	Fine China	Flow - .15 MGD (includes sanitary)
L. N. Renault & Sons (Universal Foods Corp.)	Galloway Twp.	Elliot's Creek FW-2	Wine	Maximum (4) Flow - .007 MGD BOD_5 - 770 lbs/day TSS - 512 lbs/day Color - 175 PT-CO Units

Name of Firm	Plant Location	Receiving Water & Classification	Type of Products	Description of Present Discharge
Scott Paper	Landisville	Tributary of Deep Run FW-3	Paper Products	Flow - .01 Cooling Water pH - 6.5 - 7.5 Temp. - 80°F max.
CAPE MAY COUNTY				
Atlantic City Electric Co.	Beesley's Point	Egg Harbor Bay TW-1	Power Generation	Flow - 189 MGD (units 1 & 2) Proposed: 298 MGD Description of current discharge not available
Borden, Inc.	Cape May	Upper Thorofare TW-1	Clams	Average: Flow - 0.257 MGD TSS - 696 lbs/day BOD_5- 161 lbs/day Oil & Grease - 10.8 lbs/day Fecal Coli - N/A
Haynie Products	Middle Twp.	Jude's Creek to Richardson Channel TW-1	Refined Fish Oil	Flow - .0018 MGD BOD_5 - 69 lbs/day TSS - 1 lb/day Oil & Grease - 6 lbs/day Phenol - no data Chlorinated Hydrocarbons - no data Ph - 7.9
Wildwood Clam Co.	Wildwood	Otten's Harbor TW-1	Clam Packaging	Flow - .005 MGD

Notes

(1) Average daily loadings given unless specified otherwise.

(2) For the Tom's River Chemical Company, values are only given for discharge #3, the process water discharge to the Ocean. The other four discharges are to Tom's River (Cooling Water).

(3) Recent information from company indicates lower value - company continuing to evaluate.

(4) Source of information - Refuse Act Permit Program Applications.

(5) Discharge Loadings are net values, i.e. substances added to the receiving waterway.

the Tom's River Chemical Company and Nestle Company. The only known direct discharger of metal wastes is the Tom's River Chemical Company.

Table 3 gives major features and effluent characteristics for each of the industries.

C. Industrial Waste in Municipal Systems

As indicated previously, industrial waste do not comprise the major pollutional factor in the Jersey Coastal Area and designated study region. Thirteen industrial plants are reported to discharge waste to municipal sewage treatment facilities (3). Considering the number of point sources of domestic sewage and the extent of the conference area, this seems to be a relatively small industrial waste contribution.

To further verify and assess the extent of industrial waste in municipal systems, with primary analysis given to material (heavy metals) which might upset the municipal sewage system or would not be removed via bio-oxidation, 24 hr. composite samples of selected sewage treatment facilities were collected and analyzed for heavy metals. The samples were collected on December 16 - 17, 1972 by the Surveillance and Analysis Division of Region II EPA. The following plants are sampled:

Name	Treatment	Flow on Sampling Date
Atlantic City	Primary Treatment	11.25 MGD
Pleasantville	Secondary Treatment - High Rate Trickling Filtration	1.0 MGD
Lakewood	Secondary Treatment - High Rate Trickling Filtration	1.8 MGD
Belmar	Primary Treatment	1.7 MGD

Belmar would be a representative community with very little industrial waste; Atlantic City, Lakewood and Pleasantville are stable communities with a higher probability of containing industries or establishments that could produce liquid wastes. Plant operators for all of these communities informed EPA that they knew of no significant industry served by their sewer collection system.

On the whole, heavy metal concentrations in the effluents from these sample communities does not appear to be of great significance. Concentrations of zinc were high at Pleasantville and copper concentrations were somewhat high in Pleasantville and Lakewood. Data on the sampling results are appended for reference.

Reviewing the problem of industrial waste in municipal systems, it appears that although the problem is not one of major importance or of a pivotal nature to the Jersey Coastal Area, consideration and precautions should be taken in terms of

dischargers to municipal sewage systems. The sewage plant should not become overloaded by industrial waste,nor should it be upset by toxic heavy metals. In addition, precautions and ordinances should insure that appreciable amounts of toxic heavy metals are not discharged to the sewage plant for two reasons: first they may pass through the plant without treatment and thus have a deleterious effect on the receiving waters and its assigned usage; and secondly, if toxic heavy metals are removed at the treatment plant, they could cause problems either via leaching into the ground at digested sludge landfill sites or by gaining access to the air via sludge incineration.

Guidelines for industrial wastes (pre-treatment) in sewage treatment systems are presented in Section VII.

D. Ocean Dumping

Ocean dumping of sewage sludge, harbor dredging and certain chemicals is practiced in the vicinity of the Jersey Caostal area. This dumping takes place approximately 12 miles from Sandy Hook beach in the Atlantic Ocean. Ocean dumping is administered by the Corps of Engineers via a permit system. A study of the impact of this dumping by the Sandy Hook Marine Laboratory on behalf of the U. S. Army Corps of Engineers is underway.

There is some evidence, based on these studies, that material dumped at sea disposal sites are finding their way to the Jersey coastline. Although, evidence has not yet

conclusively indicated that sludge and other materials dumped off Sandy Hook reach Jersey Coastal surf waters.

Evidence which indicates a possible detrimental effect from ocean dumping at the Sandy Hook site focuses attention concerning pollution from dump sites 10 miles from the entrance to Delaware state. This dump site is used by the cities of Camden, Phila., Baltimore, and others. Current EPA policy, and also state of New Jersey policy,as indicated in Governor Cahill's statement of 2/14/70, is in favor of phasing out all the ocean dumping at present sites. EPA interim policy proposes a phasing out of ocean disposal of digested sewage sludges, while state of New Jersey policy, as contained in Governor Cahill's message (see Appendix) also proposes a phasing out of ocean dumping. New Jersey has adopted legislation (Clean Oceans Act) authorizing the New Jersey Department of Environmental Protection to regulate dumping from New Jersey.

Current thought and study is being given by EPA to allowing disposal of sewage sludges, after rendering as innocuous as is feasible, at deep sea sites. The rationale underlying this analysis is that due to limited land disposal sites for solids, and also due to potential air pollution problems from incineration, deep sea ocean disposal of thoroughly digested sewage sludges may be the alternate which, from a total environment viewpoint, is least objectionable, and might be beneficial, under certain circumstances, to marine life.

In discussing ocean dumping as it relates to the Jersey coastal area, it must be remembered that the majority of material disposed of via ocean dumping off the Jersey coast does not originate from the Jersey coastal area. This problem is regional in scope and can be resolved only through federal and inter-state cooperation.

E. Recreational Boating

Recreational boating can represent a significant source of pollution, particularly from the standpoint of pathogenic bacteria. Over 300,000 boats are registered within a few hours drive of the Jersey coast area, indicating the potential impact of pollution from this source (2). The development of marinas and associate facilities, (presently in excess of 100 launch ramp and 18,000 marine berths) to meet present and future recreational boating needs will intensify the pollution problem from recreational boating.

The recommendations of the 1967 enforcement conference included a directive that controls measures aimed at abating pollutants from boats operating in the tidal waters of the Jersey Coastal Area should be adopted by the State of New Jersey. It is the position of New Jersey that, because of the interstate nature of the problem, guidelines should be established by the federal government for adoption by the various states in order to achieve uniform requirements. New Jersey pollution control officials believe that the most

feasible and advantageous method to solve the problem of boat pollution would be to require that boats be equipped with holding tanks, with appropriate land treatment facilities. EPA standards were proposed in May, 1971.

F. Other Pollution Sources

Water quality may be adversely affected by a variety of other land and water uses. Agricultural activities within the area result in chemicals spread over the land surface being washed into surface water or percolated into ground water aquifers. Another source of pollution is dredging, which can result in a re-suspension of accumulated organic sludges and silt. In addition, uncontrolled dredging may result in the formulation of significant holes in the bottom of a bay, thereby increasing detention time and circulation of the water and the subsequent flushing of the system.

And finally, probably most significant source of pollution, not previously discussed in detail, is the discharge of domestic, and, to a much lesser extent, industrial waste to the ground. In excess of 100,000 homes within the Atlantic Coastal Area are served by cesspools or septic tanks. Leaching of contaminants may constitute a significant source of pollution. Also, in addition to the sewage plants that dispose of wastes into the ground, some food processing firms dispose of their waste via spray irrigation. These include: Farmingdale Associates, Howell Townships; Keller Brothers, Farmingdale; and Scott Paper Co. in Landisville.

Recognizing the potential hazard from pollutants leaching into ground and surface waters, the state of New Jersey initiated, on January 15, 1972, new regulations governing the installation of sub-surface disposal systems which would protect the environment from pollution via the sub-surface discharge of pollutants. These regulations require that New Jersey Department of Environmental Protection approval be given prior to installation of septic tanks along low-lying sections of the Jersey shore. In this way, where the location was not appropriate, or where the existing stratum could no longer handle additional septic tank discharges, a permit for construction would not be issued. These rules are intended to protect the environment until the recently enacted "Wetlands Act" regulations take effect. The "Wetlands Act" provides a comprehensive set of guidelines to protect the environment in low-lying areas (marshlands, etc.)

Also, it has been and is the policy of the state of New Jersey to encourage and require the development of sewer systems, either where population densities are sufficient to support the cost of sewers, or where a condition hazardous to public health exists due to sub-surface disposal of sewage.

SECTION VI

RECOMMENDED IMPLEMENTATION PLANS

A. Recommendations of Enforcement Conference (1967), Water Quality Standards and State Policy

From a water pollution control viewpoint, the fresh and estuarine waters of the New Jersey Atlantic Coastal Area do not provide a capacity for assimilating appreciable amounts of treated wastewater. The majority of fresh waters in the conference area are classified as suitable for a source of potable waters. Inland tidal waters have been classified as suitable, where permitted, for shellfish harvesting. Also, an extensive surf zone in the Atlantic Ocean has been classified as primary contact recreation waters. Such uses and the delicate estuarine character of the coastal area require very high receiving water quality.

Recognizing the sensitivity and inabilty of the fresh and tidal waters to accept appreciable waste discharges, water quality standards proposed in 1967, and subsequently federally approved, require a minimum of 95% BOD removal for discharges to coastal estuaries and their tributary streams. One of the recommendations of the Enforcement Conference (1967) was that "it would be necessary for even treated waste to be eliminated, since some danger of contamination (shellfish) exists even when adequate treatment is required. Construction

of required waste treatment systems which provide adequate treatment prior to discharge through a limited number of outfalls into the estuaries or through outfall lines extending into the ocean will permit opening many areas now closed to the harvesting of shellfish." (4)

New Jersey policy, in regard to solving the problem of pollution for this area, has encouraged and required the development of regional sewage systems with final discharge of treated effluent to the Atlantic ocean. It was felt by state officials that the fresh water and inland tidal waters were simply not capable of assimilating any appreciable loads placed upon them (BOD and coliforms) and remain suitable for intended purposes. County master plans and studies, conducted by consulting engineer firms, supported the state position. Accordingly, every regional plan for sewage in the conference area provides for either ocean discharges of secondary treated effluent or, in a few remote inland areas, land recharge, after appropriate treatment. It is felt that construction of a series of regional treatment systems will be the most important step, in an overall plan of water resources management, to restoring the Jersey coastal area waters to their designated quality and usage.

Construction of proposed regional plans would provide additional protection to inland fresh surface waters for future use as sources of potable water supply, enhance water

quality in those fresh water streams presently receiving treated waste, continue to protect ocean bathing waters and maximize the restoration of presently closed shellfish harvesting areas.

The state of New Jersey has statutory authority to require water pollution control facilities to conform to state approved regional plans (regional sewage collection and treatment facilities). In 1968, the states power to enforce a policy of regionalization was upheld in the courts. The state of New Jersey has resorted to court proceedings to insure implementation of recommended regional treatment systems.

U. S. Environmental Protection Agency policy also supports treatment proposals which are in concurrence with approved regional plans, as evidenced in the construction grants guideline which allow a larger percentage of federal assistance for a plant that is in conformance with an approved regional plan.

B. Regional Systems - Domestic Sewage

To accomplish pollution control for domestic sewage from the Atlantic Coastal and designated study area, 18 major regional treatment facilities, with subsequent discharges of treated effluent into the Atlantic Ocean, are proposed. There will be 16 regional outfalls extending into the Atlantic Ocean, into waters classified as CW-2, to accommodate discharges

from the various regional treatment facilities.

In addition, consistent with the policy of eliminating domestic sewage discharges from estuaries and tributary streams, five smaller treatment facilities are proposed to accommodate sewage needs of areas too remote to be included in the 18 major regional treatment systems. At some time in the future, assuming that sufficient development occurs, population densities may justify extending interceptors to include flows from these five treatment plants in regional treatment systems (ocean outfalls). For the foreseeable future, these facilities will discharge treated wastes to the ground, after appropriate treatment, which will insure protection of ground water quality.

Of the 18 major regional treatment facilities (with final discharge to ocean) 10 will serve Monmouth county, 5 will serve Ocean county, one regional system will serve Atlantic county, and three regional systems will serve Cape May county. Of course, in certain instances, one regional system may include discharges from two counties, as in the development of any regional treatment system, drainage basins and land topography are significant factors determining the service area for a regional treatment facility.

The treatment facilities are shown on Figure VI and listed as follows:

REGIONAL TREATMENT FACILITIES LOCATION PLAN

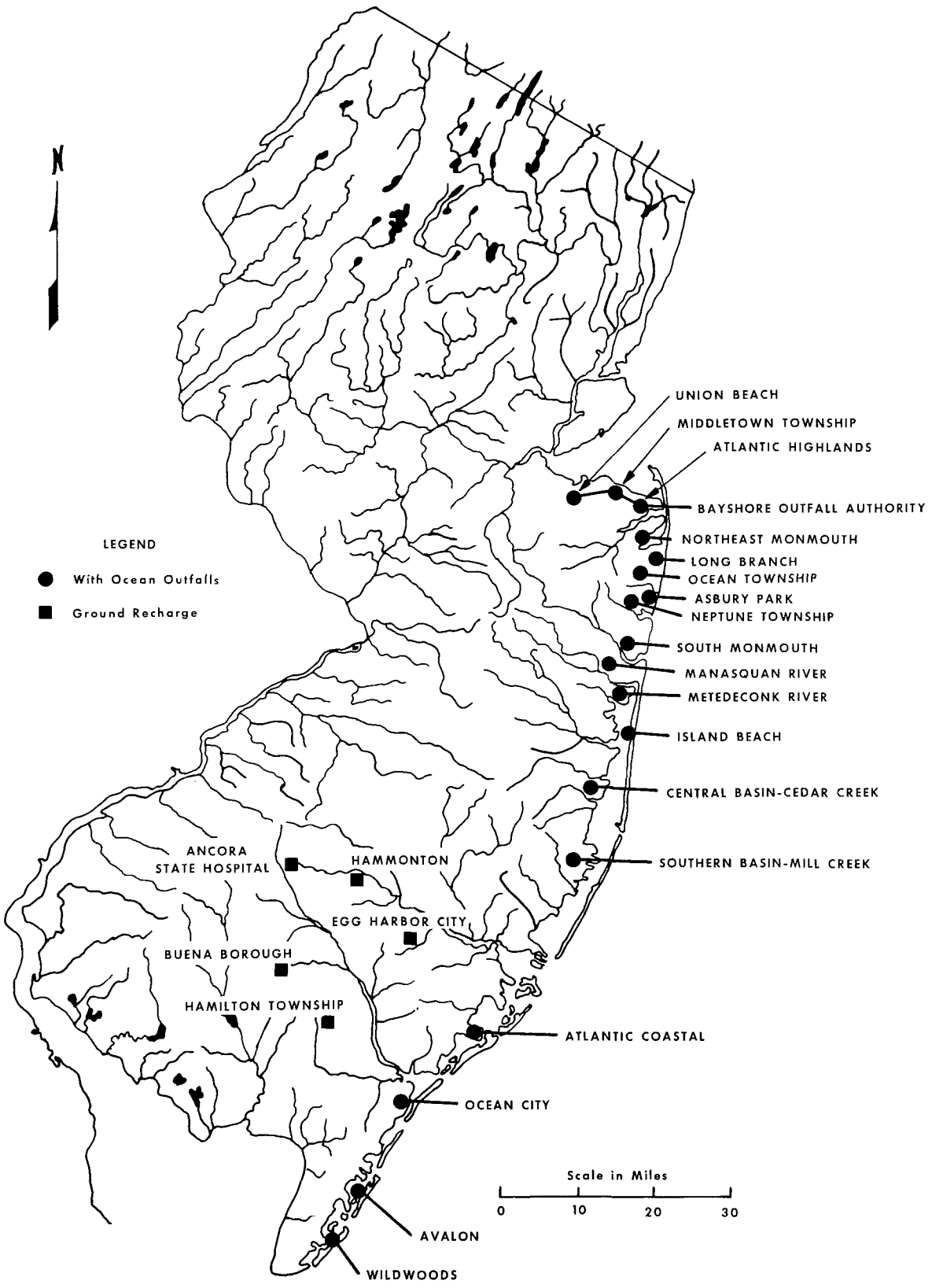


Figure VI

Monmouth County

1. Atlantic Highlands - Highlands Regional Sewerage Authority
2. Middletown Township Regional Sewerage Authority
3. Bayshore Regional Sewerage Authority
4. Northeast Monmouth Regional Sewerage Authority
5. Long Branch Sewerage Authority
6. Ocean Township Sewerage Authority
7. Asbury Park Subregion
8. Neptune Township Subregion
9. South Monmouth Regional Sewerage Authority
10. Manasquan River Subregion

Ocean County

11. Metedeconk River Subregion
12. Island Beach Subregion
13. Central Basin Subregion
14. Southern Subregion

Atlantic County

15. Atlantic Coastal Subregion

Cape May County

16. Ocean City Subregion
17. Stone Harbor - Sea Isle City Subregion
18. Wildwoods Subregion

The five (5) plants that will utilize ground discharge, as shown on Figure VI, are:

1. Egg Harbor City
2. Town of Hammonton
3. Winslow Township (Ancora State Hospital)
4. Hamilton Township (Mays Landing)
5. Buena Borough

Of the above listed regional treatment systems (with final discharges to Atlantic ocean), the Atlantic Highlands, Middletown and Bayshore regional treatment systems all will discharge through a common outfall to the Atlantic ocean (Monmouth County Bayshore Outfall Authority). As indicated previously, wastes from the service areas of these three regional systems, located along the north shore of Monmouth county (Sandy Hook Bay - Raritan Bay), do not currently discharge to the Atlantic Ocean. We have included these three regional systems for conference consideration since their final discharge will eventually be directed into the Atlantic Coastal waters. The remaining 15 regional treatment facilities will each be served by an individual outfall. Development and implementation of proposed regional plans for domestic sewage treatment will be accomplished by diverting present point source discharges into regional interceptors and collectors, subsequently directing the flow to the appropriate regional facilities. In most cases, existing treatment facilities will

be deactivated, and utilized as collection points and pump stations to divert wastes from a locality or area into a regional interceptor or collection sewer.

Table 4 indicates the point source discharges recommended for inclusion in each regional system; also the point sources recommended for inclusion in the five (5) major plants employing ground disposal.

In terms of treatment, the major regional facilities (with ocean discharge of treated effluent) will provide secondary biological treatment (min. 85% BOD removal). The five (5) major treatment plants which will discharge effluents into the ground will provide tertiary treatment, as is necessary for ground discharge. All facilities will provide year-round disinfection (chlorination) of the wastewater.

The discharge from the U. S. Army Installation at Fort Hancock (Sandy Hook Area) will be given secondary treatment, plus adequate disinfection in an individual treatment facility. The effluent will be discharged to the Atlantic Ocean via an ocean outfall.

In terms of the small, remote, inland domestic sewage point source discharges for which ground discharge systems are envisioned, final details of pollution abatement (point sources to be served by various plants, type of treatment, etc.) will be confirmed and/or finalized after detailed engineering studies.

TABLE NO. 4

Sewage Point Sources to be Served by Regional Plants (Near Future)

	Regional Plant (System)	Municipality	Owner
A.	Atlantic Highlands - Highlands Regional Sewerage Authority	Atlantic Highlands	Municipal
		Highlands	Municipal
B.	Middletown Twp. Regional Sewerage Authority	Middletown Twp.	Atlantic Highlands Nursing Home, Inc.
		Middletown Twp.	Food Fair Properties , Inc.
		Middletown Twp.	Howard Johnson Motel and Restaurant
		Middletown Twp.	Middletown Sewage Authority - Middletown Green
		Middletown Twp.	Middletown Swim and Tennis Club
		Middletown Twp.	St. Catherine's Parish Hall
		Middletown Twp.	Middletown Twp. Regional Sewage Auth.
		Middletown Twp.	U. S. Navy - Leonardo Loading Pier
C.	Bayshore Regional Sewerage Authority	Hazlet Twp.	Bayshore Sewerage Company
		Hazlet Twp.	Beer Street School - Board of Education
		Hazlet Twp.	Family Circle Associates
		Hazlet Twp.	Harvich Associates - K-Mart Shopping Center
		Hazlet Twp.	Hazlet Twp. Sewage Authority
		Hazlet Twp.	Holly Hill Mobile Home Park
		Hazlet Twp.	International Flavors & Fragrances Inc.
		Hazlet Twp.	J. M. Fields Department Stores
		Homdel Twp.	Municipal (Lanvin - Charles of the Ritz)
		Keansburg	Municipal
		Union Beach	Board of Education - Memorial Park School
		Union Beach	International Flavors and Fragrances (Domestic)

Regional Plant (System)	Municipality	Owner
	Keyport	Municipal
	Matawan Borough	Municipal
	Matawan Twp.	Matawan Twp. Mun. Utilities Auth. - Cliffwood Beach
	Matawan Twp.	MTMUA - River Gardens
	Matawan Twp.	MTMUA - Stratmore
D. Northeast Monmouth Regional Sewerage Authority	Sea Bright	Municipal
	Monmouth Beach	Northeast Monmouth Regional Sewerage Authority
	Rumson	Municipal Plant
	Rumson	Board of Education - Dean Porter School
	Oceanport	Fort Monmouth (U. S. Government)
	New Shrewsbury	Mid-Monmouth Industrial Park
	New Shrewsbury	Camp Charles Wood (U. S. Government)
E. Long Branch Sewerage Authority	Long Branch	Long Branch Sewer Authority
F. Ocean Twp. Sewerage Authority	Ocean Twp.	Ocean Twp. Sewerage
	Deal	Municipal
G. Asbury Park Subregion	Asbury Park	Municipal
H. Neptune Twp. Subregion	Bradley Beach	Municipal Evergreen Ave. Plant
	Bradley Beach	Municipal Ocean Park Ave. Plant
	Avon-by-the-Sea	Municipal
	Neptune Twp. Ocean Grove	Ocean Grove Camp Meeting Association
	Neptune Twp.	Municipal Plant #2 Old Corless Ave. Plant
	Neptune Twp.	Municipal Plant #1 Penn Ave.
	Neptune City	Municipal

	Regional Plant (System)	Municipality	Owner
I.	South Monmouth Regional Sewerage Authority	Belmar	Municipal
		Manasquan	Municipal
		Sea Girt	N. J. State Dept. of Defense National Guard Training Center
		Sea Girt	Municipal
		Spring Lake	Municipal Pitney Ave. Plant
		Spring Lake	Municipal Penn. Ave. Plant
		Spring Lake Heights	Municipal
		Wall Twp.	U. S. Army Installation Camp Evans
		Wall Twp.	N. J. Highway Authority - Asbury Park Service Area
		Wall Twp.	Geraldine L. Thompson Medical Home
J.	Manasquan River Subregion	Freehold Borough	Municipal
		Freehold Twp.	Wynnewood Sewerage Utilities Co.
		Freehold Twp.	Freehold Sewer Co.
		Freehold Twp.	Silvermeade Mobile HOmes Park, Inc.
		Howell Twp.	Howell High School-Regional Board of Education (Freehold District)
		Howell Twp.	Adelphia Sewer Company
		Howell Twp.	Farmingdale Associates
		Farmingdale Borough	Main Street Apartments (New Construct.)
		Freehold Twp.	Levitt & Sons (New Construction)
		Wall Twp.	Arthur Brishane Child Treatment Center
K.	Metedeconk Subregion	Bay Head	Municipal
		Point Pleasant Beach	Municipal
		Brick Twp.	Brick Plaza, Inc.
		Brick Twp.	Brick Twp. Srg. Auth. - Lake Riviera
		Brick Twp.	Kennedy Mall Shopping Ctr.

Regional Plant (System)	Municipality	Owner
	Brick Twp.	Brick Twp. Srg. Auth. - Green Briar
	Brick Twp.	Brick Twp. Bd. of Ed. - Middle Elem. School
	Pt. Pleasant Borough	Bd. of Ed. High School
	Pt. Pleasant Borough	Bd. of Ed. Nellie Bennett School
	Lakewood Borough	N. J. Water Co. (Lakewood)
	Lakewood Twp.	S. Lakewood Water Co.
	Jackson Twp.	Oak Tree Mobile Home Inc.
	Jackson Twp.	United Mobile Homes (South Wind Mobile Homes)
	Jackson Twp.	Harmony Sewer Co.
	Jackson Twp.	Jackson Twp. Util. Auth. Brookwood I
	Jackson Twp.	Jackson Twp. Util. Auth. Brookwood II
	Jackson Twp.	Jackson Twp. Util. Auth. Brookwood III
	Jackson Twp.	Jackson Twp. Bd. of Ed. H. S. Complex
	Howell Twp. (Monmouth Cy)	Maxim Sewer Co.
	Howell Twp. (Monmouth Cy)	Crickett Restaurant
L. Island Beach Subregion	Lavallette	Municipal
	Dover Twp.	Dover Sewer Auth. (Ortley Beach)
	Seaside Park	Municipal
	Seaside Heights	Municipal
	Berkeley Twp.	Berkeley Twp. Srg. Auth. (So. Seaside Park)
M. Central (Basin Subregion)	Dover Twp.	Dover Twp. Srg. Auth. - Toms River Boro
	Dover Twp.	Dover Twp. Srg. Auth. - Holiday City
	Dover Twp.	Toms River Chemical Co.
	Berkeley Twp.	Berkeley Twp. Srg. Auth. Berkeley Shores
	Berkeley	Berkeley Twp. Srg. Auth. - Clamming Crk. Plant

Regional Plant (System)	Municipality	Owner
	Island Heights	Municipal
	Lacey Twp.	Jersey Central Power & Light
	Lacey Twp.	N. J. Hwy. Auth. Forked River Service Area
	Lacey Twp.	N. J. Dept. Env. H-Forked River Marina
	Lakehurst Borough	Municipal
	Manchester Twp.	U. S. Naval Air Station Lakehurst
	Manchester Twp.	Crestwood Vil. Sewer Co. Inc.
	Ocean Twp. Ocean County	Mid-Jersey Sewer Corp. (Waretown)
	Union Twp.	Pebble Beach Water & Sewer Co.
N. Southern Subregion	Beach Haven Borough	Beach Haven Srg. Auth.
	Long Beach Twp.	Long Beach Twp. S. A.
	Ship Bottom Borough	Ship Bottom Srg. Auth.
	Surf City Borough	Municipal
	Stafford Twp.	Stafford Twp. M. U. A.
	Tuckerton	Tuckerton M. U. A.
	Little Egg Harbor Twp.	Mystic Isles Sewerage Company
O. Atlantic Coastal Subregion	Atlantic City	Atlantic City Sewer Co. City Island Plant
	Atlantic City	Atlantic City Sewer Co. Texas Ave. Plant -Operational summer months only
	Atlantic City	Vornado Inc. (Two Guys)
	Brigantine	Municipal
	Galloway Twp.	Seaview Country Club
	Galloway Twp.	N. J. Highway Auth. - Atlantic City Service Area

Regional Plant (System)	Municipality	Owner
	Longport	Municipal
	Linwood	Mainland Regional High School-Mainland Bd. of Ed.
	Pleasantville City	Municipal
	Somers Point	Somers Point City Srg. Auth.
	Ventnor	Ventnor-Margate Sewerage Auth.
P. Ocean City Subregion	Ocean City	Municipal 46th St. Plant
	Ocean City	Ocean City Sewer Service Co.
	Upper Twp.	Bay Motel Corp.
Q. Stone Harbor - Sea Isle City Subregion	Avalon	Avalon Sewage Authority
	Dennis Twp.	N. J. Highway Auth. Seaville Service Area
	Middle Twp.	Cape May Bd. of Chosen Freeholders - Holmes Creek Plant
	Middle Twp.	Middle Twp. Sewer District #1 Cape May Court House
	Sea Isle City	Municipal
	Stone Harbor	Municipal
R. Wildwoods Subregion	North Wildwood	Municipal
	Wildwood	Municipal
	Wildwood Crest	Municipal
	Lower Twp.	Shaw Crest Mobile Homes Corp.
	Lower Twp.	Lower Cape May Regional - Bd. of Education Lower Twp.
	Middle Twp.	Garden Lake Corp.
	Middle Twp.	Florida Motor Court

Plants Utilizing Ground Disposal

	Regional Plant (System)	Municipality	Owner
S.	Egg Harbor City	Egg Harbor City	Municipal
T.	Town of Hammonton	Hammonton	Municipal
		Hammonton	N. J. Expressway Authority
		Hammonton	N. J. Expressway Authority (Elmwood Sect.)
U.	Winslow Twp. (Ancora State Hospital)	Winslow	Ancora State Hospital
		Winslow	Winslow Sewage Co.
V.	Hamilton Twp. (Mays Landing)	Galloway Twp.	Lenox, Inc.
		Hamilton Twp.	Hamilton Twp. Munic. Util. Authority
		Hamilton Twp.	Zaberer's Restaurant
		Hamilton Twp.	Atlantic City Race Track
		Weymouth Twp.	Belcoville
		Egg Harbor Twp.	National Aviation Facilities Experimental Station
W.	Buena Borough	Buena Borough	Buena Borough Munic. Util. Authority

Miscellaneous

(1) Fort Hancock (U. S. Army Installation) - Middletown Township - to provide secondary treatment with discharge through ocean outfall to Atlantic Ocean.

(2) Isolated small plants not included in ground disposal systems are:

Pacemaker Corp. (Washington Township)
Monroe Township (Municipal Utilities Authority)
Monroe Township (American Mobile Home Park)

Detailed engineering studies to determine final pollution abatement system (tertiary treatment, ground discharge, etc.)

C. Assessment of Impact of Regional Systems on Water Quality Criteria

The communities within the New Jersey Coastal Basin have for many years discharged their wastewaters into numerous streams and embayments resulting in the depressed water quality existing in many of these inland waterways. In order to achieve the goal of maximum restoration, enhancement and protection of these coastal waters, it has been recommended, where ground recharge is not applied, that these wastewaters are to be treated at eighteen (18) regional treatment facilities and subsequently discharged by means of sixteen (16) ocean outfalls along the New Jersey coast.

The basic concept behind this course of action is that ocean disposal of wastewater effluent is considered to be more desirable than discharges into inland waterways or bays because of the greater ability of the ocean to assimilate the wastes. With the anticipated growth of population in these areas and the related increase in flows, this consideration of wastewater assimilative capacity takes an added significance.

During the summers of 1966, 1967 and 1968, the consulting firm of Fellows, Read, and Weber, Inc., undertook an extensive ocean current testing program under contract to the New Jersey State Department of Health to evaluate pertinent aspects of the ocean outfall alternative.

All proposed regional outfalls will extend into the CW-2 waters to insure protection of contact recreation usage in the CW-1 waters.

The outfalls and related diffusers will be submerged and will thus well afford maximum dilutions of the discharged effluent. The dilutions achieved may be classified due to three physical mechanisms:

a. Initial jet mixing - dilution due to the turbulence and resultant mixing action as the wastewater plume rises to the surface above the diffuser. These projected dilutions were computed for each of the proposed regional outfalls by utilizing a digital computer model developed by Baumgartner et al., (1970), to analyze submerged outfall discharges. The pertinent outfall and diffuser designs, flow rates, etc., which were used in these analyses were provided by New Jersey State Department of Environmental Protection and were largely the result of extensive oceanographic studies carried out from 1966 through 1968 (Fellows, Read and Weber, 1968). Assuming quiescent (conservative) and non-stratified conditions, these initial dilutions will range from 48: 1 to 202 : 1 for the regional outfalls. "Past observation and experience indicate that . . . waste water from secondary treatment plants will be indistinguishable when diluted 50 : 1" (5). A summary of the proposed regional outfall designs and projected dilutions are included in Table 5 .

b. Surface dispersion - dilution due to action of prevailing surface currents and eddy currents on the sewage field as it drifts away from the point of discharge. An extensive evaluation of the general current patterns and available surface dilutions along the entire Jersey Coast was performed under the aforementioned oceanographic studies. Results of these tests have also been tabulated in Table 5.

c. Bacterial die-off - beyond the obvious consideration of plume visability, the remaining major item of consideration is bacterial concentration within the nearshore waters classified for contact recreation. These concentrations will be reduced by means of the initial and surface dilutions and, in addition, will be lessened by the natural bacterial die-off resulting from salinity, sunlight, agglomeration and sedimentation It is known that the time required for 90 percent of this die-off normally ranges from 1 to 6 hours. (6)

Through the evaluation of these three mechanisms, the following conclusions concerning the coastal aesthetic and usage impact of the proposed regional outfalls have been reached :

a. The initial dilutions provided by the recommended diffuser designs and discharge locations will be adequate to produce an indiscernible surface plume under non-stratified conditions. If stratification does occur, as is likely during summer months, it is probable that the sewage plumes may never reach the surface of the CW-2 receiving waters.

TABLE NO. 5

Proposed Ocean Outfalls - New Jersey Coastal Area

Regional Treatment Plant	Design Flow (MGD) Aver.	Max.	Outfall 1/ Length(Ft)	Diffuser Design Length(Ft)	Type	Discharge Depth (Ft)	Initial Dilution
Bayshore Outfall Authority	23	33	4000	640	Single	34	73:1, 64:1
N. E. Monmouth Regional Sewerage Authority	15	33	2500	960	Single	30	77:1, 60:1
Long Branch Sewerage Authority	8.1	12.5	1800	300	Single	35	90:1, 78:1
Ocean Township Sewerage Authority	2	4	1800	300	Single	32	143:1, 100:1
Asbury Park Subregion 3/		6					
Neptune Twp. Subregion 3/		9					
South Monmouth Regional Sewerage Authority		18	1800	260	Wye	27	45:1
		10	2100	600	Single	34	
Manasquan River Subregion 3/							
Metedeconk River Subregion	10	14	2750	750	Single	35	
Island Beach Subregion	6	15	3500	1000	Single	50	202:1, 133:1
Central Subregion		4	3100	300	Single	35	135:1
		26	3100	2000	Single	40	109:1
Mill Creek - Southern Subregion		1	2600	300	Single	22	49:1
		10	2600	900	Double of Wye	22	46:1
Atlantic Coastal Subregion	51	92	13000	935	Wye	26	67:1, 50:1
Ocean City Subregion		15	9000	1000	Single	30	61:1
Stone Harbor - Sea Isle City Subregion		10	5400	600	Single	26	49:1
Wildwoods Subregion		15	8100	800	Single	36	73:1
Fort Hancock 3/	Individual Treatment Plant and Ocean Outfall						

Notes:

1/ outfall length includes diffuser length

2/ dilutions due to initial jet mixing from discharge part to surface; values listed are from digital computer program (PLUME) developed by Baumgartner et al (1970) assuming non-stratified media.

3/ recommended outfall design specific were not submitted for review - standard practice outfall design should produce acceptable results.

b. Assuming conservative total and fecal coliform concentrations (MPN) of 1000/100 ml and 200/100 ml in the chlorinated secondary effluent, the wastewater at the immediate point of discharge will not contravene the CW-2 bacterial criteria. New Jersey currently requires, and would continue to expect, lower fecal coliform values in sewage effluents. However, if the bacterial die-off factor is not considered, the treated effluent will require only a 4 : 1 dilution in order to comply with the CW-1 criteria. The calculated initial dilutions (from program plume) and the observed surface dilutions (from tracer studies) indicate that the following range of dilutions can be expected for each of these mechanisms:

Initial dilution (jet mixing) : 48:1 to 134:1

Surface dilution (dispersion) : 50:1 to 300:1

Thus, the minimum anticipated dilution of any single proposed regional discharge along the Jersey Coast will be in the order of 2400:1, when and if it ever reaches the nearshore bathing areas (CW-1 waters). It is apparent that, even when bacterial die-off is not considered a factor, the projected physical dilutions alone will preclude any contravention of water quality bacterial criteria in either the CW-1 or CW-2 waters of the Jersey Coastal Basin.

The vast assimilative capacity of the ocean, at these discharge points, will insure meeting other water quality criteria (dissolved oxygen, etc.), as described in detail in the following paragraphs.

2. Physical Effects

In addition to the consideration of bacterial and aesthetic quality, the proposed regional outfalls will have a less obvious and less significant impact on the following physical parameters:

a. dissolved oxygen - coastal waters normally have a dissolved oxygen concentration range of 4 to 14 mg/l with the lower values normally found in the deeper waters where photosynthesis is limited. The bacterial and chemical oxidation of organic materials in the effluent will undoubtedly utilize the dissolved oxygen of the receiving waters. However, the oxygen resources available will be more than sufficient to handle this demand, although there may be a slight dissolved oxygen (D.O.) depression at the immediate vicinity of the diffuser due either to the relatively low D.O. of the wastewater or due to the entrainment of low D.O. bottom waters.

b. Floatables floatables are significant in that their accumulation on the surface and possible return to shore can pose a health and nuisance problem. With proper operation of the regional treatment facilities, however, the presence of floatables will be negligible.

c. Temperature - temperature effects are of interest primarily in the immediate vicinity of the discharge, yet, the heat capacity of the ocean is so large that for discharges to open coastal waters, a single discharge will seldom have a significant effect over an area of any size.

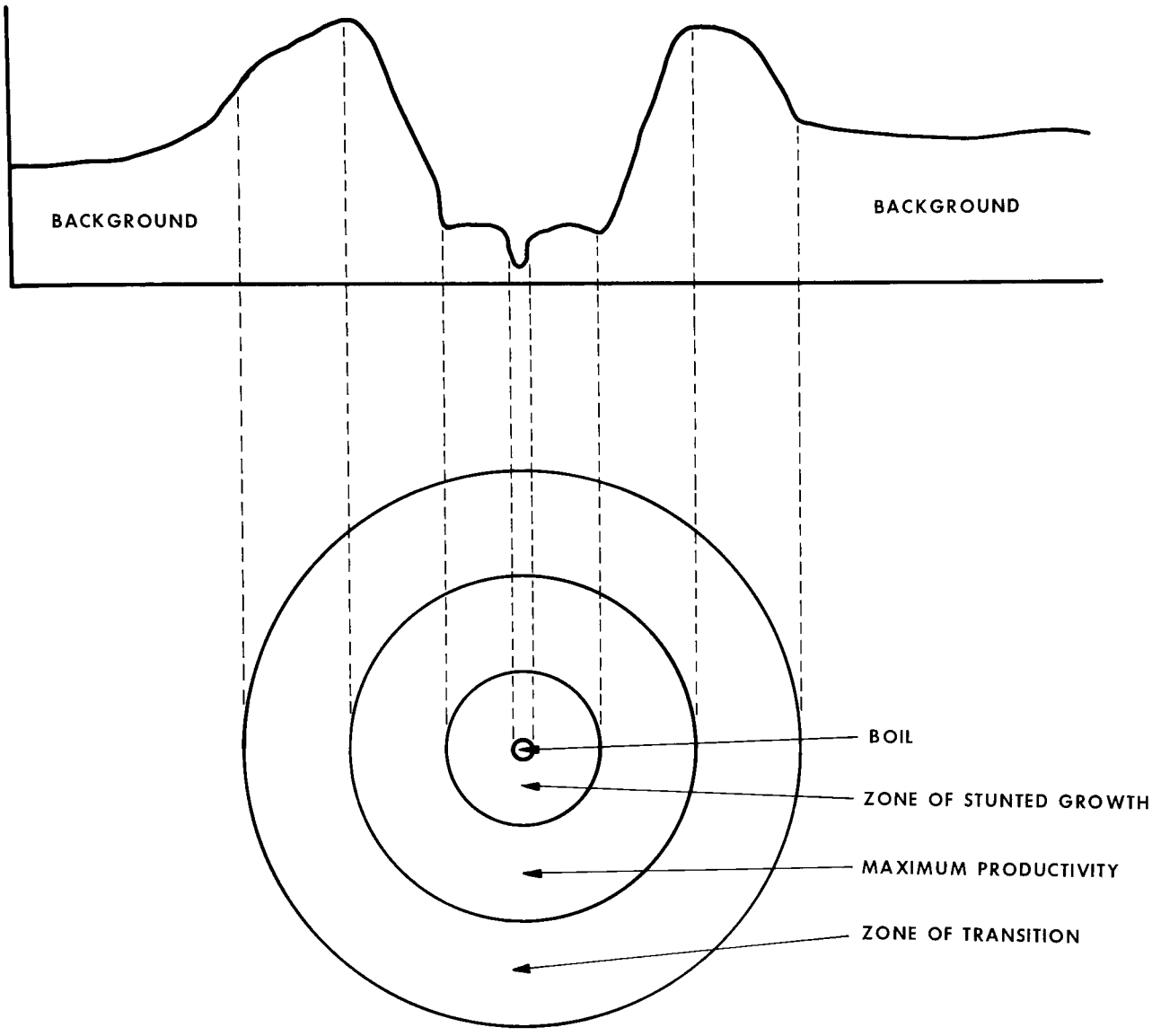
d. Transparency - coastal waters generally have extremely variable transparency due to wind and wave action, seasonal factors and runoff from land. With the anticipated dilutions (Table 5), the plumes from the Jersey Coastal outfalls will, in all likelihood, be indiscernible at the surface.

e. Sediment - in the Jersey Coastal region the natural turbulence due to tides, wind and wave action, the prevailing littoral draft patterns and the normally high oxidation rate of effluent solids will preclude any significant sediment buildup in the vicinity of the proposed outfalls.

3. Biological Effects

The biological effects of a submerged discharge on the coastal environment are usually a function not only of the relative concentrations of the wastewaters but also of the constituents contained in the effluent itself. Some substances, such as heavy metals or pesticides, may accumulate in the biota or seidments; however, most wastewater constituents are oxidized, degraded, or dissipated with time and/or dilution. (Ludwig, 1970).

Past investigations on the effects of ocean outfalls on the marine environment (Ludwig, et al.) have indicated a general pattern of productivity and related abundance and diversity of organisms in the vicinity of these outfalls. In the immediate vicinity of the outfall, inhibition of biological populations is usually observed (see Fig. VII). At some distance from the outfall, organism abundance may increase greatly to levels significantly above the average for the area. In this region the species diversity will also have increased, although it will still be less than the area average. Finally, at a greater distance from the outfall, the levels of both diversity and abundance will return to the normal "background" level. It is inferred that most wastewaters will have a toxic or inhibitory effect in addition to their biostimulatory characteristics. The toxicity of the wastewater is controlling in the immediate vicinity of the outfall, but with the reduction of toxicity by dilution, the biostimulatory effects predominate permitting the increased organism abundance noted above. The amount of potentially toxic substances from industrial sources in regional sewage treatment systems will be minimized, to the extent practicable by current technology, by establishing pre-treatment requirements and limits for industrial discharges.



PRODUCTIVITY PATTERN IN AREA OF OCEAN OUTFALL

Figure VII

Although relatively little work has been done to determine the possible effects of outfall discharges on benthic fauna, it can be concluded that this impact will result largely from the nature of the toxicants (if any) in the wastewaters, the degree of disinfection achieved, and the physical characteristics of the actual discharge media affecting the sedimentation process From the limited studies available, it has been shown that benthic organisms in addition to phytoplankton and fish exhibit the same common pattern in the variations of abundance and species diversity with distance from the outfall as is indicated in Figure VII .

In summary, overall productivity may remain constant, but a shift in kinds and numbers of organisms may occur. A widely diversified local population may succumb to a single dominant species indiginous to the water quality in the immediate vicinity of the outfall. This dominance of certain marine species will, however, become less apparent as one moves into concentric regions more distant from the discharge point. The nutrient content of the wastewaters may stimulate natural productivity of lower planktonic forms in the region beyond the diffuser to the extent that these organisms may sustain greater yields of fish and shellfish.

D. Industrial Wastes (Direct Dischargers) - Description of Implementation Plans

Implementation plans for industrial wastes are presented in Table 6 and in the following paragraphs.

TABLE NO. 6
Proposed Implementation Plant - Industrial Direct Dischargers

Name of Firm	Proposed Effluent Requirements (1)	Proposed Implementation Dates: Preliminary Plans	Proposed Implementation Dates: Complete Compliance with Proposed Limits
MONMOUTH COUNTY			
Brockway Glass	Phenol - 1 ppb in receiving stream Oil & Grease - None that will produce a visible sheen	12/15/72	
Nestle	BOD - 20 lbs/day Oil & Grease - None that will produce a visible sheen Phenol - 1 ppb in receiving stream Temp. - Differential between 10 yards upstream and 10 yards downstream won't exceed 5°F max.	12/15/72	12/15/73
3M, Minnesota, Mining & Manufacturing Co.	No change required over existing discharge		
OCEAN COUNTY			
Borden, Inc.	BOD - 11 lbs/day* TSS - 11 lbs/day* Oil & Grease - 1 lb/day* F. Coli - less than 20/100 ml	12/15/72	12/15/73
Fish Products	Oil & Grease - a maximum of 142 lbs/day increase over intake water from all discharges; None that will produce a visible sheen		
Jersey Central Power and Light	(See text)	12/15/72 (3)	7/1/75
CAMDEN COUNTY			
Mrs. Paul's Kitchen (Braddock Frosted Foods, Inc.)	No change over existing discharge		

Name of Firm	Proposed Effluent Requirements (1)	Proposed Implementation Dates: Preliminary Plans	Proposed Implementation Dates: Complete Compliance with Proposed Limits
Tom's River Chemical (See Discussion in text)	Discharge to Ocean Average (except where indicated) for #3 TSS - 800 lbs/day BOD_5 - 2000 lbs/day Cadmium - 1.0 lbs/day Chromium - 1.0 lbs/day Copper - 1.0 lbs/day Lead - 1.0 lbs/day Mercury - max. of 0.1 lbs/day* Zinc - 1.0 lbs/day Chlorinated Hydrocarbons - 300 lbs/day Nitrobenzene - max. 5 lbs/day* Discharge to Tom's River No change over existing discharge Temp. - 15°F net increase over surface water temp.*		7/1/74
BURLINGTON COUNTY			
Pacemaker	No change over existing discharge		
ATLANTIC COUNTY			
Atlantic City Electric	(See text)	12/15/72 (3)	7/1/75
Humble Oil (Terminal)	Submit Oil Spill Prevention Plan	12/15/72	
Lenox China	No change over existing discharge		
L. N. Renault & Sons (Universal Foods Corp.)	BOD_5 - 40 lbs/day* TSS - 50 lbs/day* No appreciable color differential in receiving stream	12/15/72	12/15/73
Scott Paper	No change over existing discharge required		
CAPE MAY COUNTY			
Atlantic City Electric Co.	(See text)	12/15/72 (3)	7/1/75
Borden, Inc.	TSS - 30 lbs/day* BOD_5 - 30 lbs/day* Oil & Grease - 2 lbs/day*; None that will produce a visible sheen		

Name of Firm	Proposed Effluent Requirements (1)	Proposed Implementation Dates: Preliminary Plans	Proposed Implementation Dates: Complete Compliance with Proposed Limits
Haynie Products	Maximum discharge: BOD_5 - 75 lbs/day* TSS - 3 lbs/day* Oil & Grease - 1 lb/day*; None that will produce a visible sheen Phenols - 1 ppb in receiving stream Chlorinated Hydrocarbons (2) pH - 7.0 - 8.0	12/15/72	
Wildwood Clam Co.	Eliminate discharge by inplant changes or by discharging into a municipal treatment system	12/15/72	

Notes:

(1) Except where indicated proposed effluent requirements are average values.

(2) Company will sample to see if present; chlorinated hydrocarbons must not be present in the effluent in toxic amounts.

*Maximum Discharge

(3) An environmental report has been submitted by Atlantic City Electric Company's Beesleys Point Plant to the New Jersey Department of Environmental Protection. Data has also been submitted to the State by the other companies. The proposed preliminary plans (study) should encompass all requested date (see text) not previously submitted to the State.

In general, limitations are based upon the following, which is consistent with water quality standards:

a. Biochemical Oxygen Demand - 95 percent removal or 15 mg/l effluent for discharge to estuaries or tributary streams; and 85 percent removal for discharge to the ocean.

b. Suspended Solids - in the order of 90 to 95 percent removal - in a similar range to BOD removals.

c. Oil and Grease - 10 mg/l as a maximum effluent concentration, with no visible sheen evidenced.

It is understood that, in addition to proposed effluent limits in Table 6 and discussed further in the text, levels of other substances present in each discharge should not be increased above current values.

Nestle & Co., Inc., Brockway Glass and Hagnie Products, Inc.

Proposed requirements, contained in Table 6 , for these companies include a value of 1 ppb phenol in the receiving stream. In each case, these companies discharge into a stream classified as suitable for potable water supply. The dilution capacity of the receiving streams may be limited and from a technology viewpoint, reduction of phenols to trace levels may not be economically feasible. Also, the receiving streams are not currently used as sources of potable water supply and may be unsuitable due to high salinity. Weighing these factors, we would require, at minimum, that the company's waste treatment technology and/or inplant process changes to reduce phenols be "best practical treatment."

Atlantic City Electric Co., Atlantic City
Atlantic City Electric Co., Beesley's Point
Jersey Central Power and Light, Lacey Township

For each of these plants (discharge to TW-1 coastal waters), we propose the following implementation plan for liquid waste discharges:

1. The pH shall not exceed a value of 8.5 nor have a value below 6.5.

2. The total residual chlorine in the condenser cooling water discharge and/or all other effluents, shall be limited to combined residual chlorine.

3. Chlorine or hypochlorite may be added to the condenser cooling water discharges or to any other discharge such that either:

a. the discharge contains total residual chlorine at a concentration not greater than 0.05 mg/l for a time period not to exceed 2 hours per day, or

b. the discharge contains total residual chlorine at a concentration not greater than 0.1 mg/l for a time period not to exceed 30 minutes per day.

4. The following requirements relate to thermal discharges:

a. the thermal plume in the mixing zone shall not impinge upon the bottom nor shall it impinge on the shoreline.

b. the monthly mean of the maximum daily temperature at the outer boundary of the mixing zone shall not exceed 1.5 (July - September) and 4 (October - June) Fahrenheit Degrees above levels in effect prior to addition of any heat.

c. the maximum temperature at the outer boundary of the mixing zone shall not exceed 85 Degrees Fahrenheit.

d. the rates of temperature change of the mixing zone temperature shall not exceed 1 Fahrenheit Degree per hour, and/or 7 Fahrenheit Degrees per day.

e. the thermal plume shall not block zones of fish passage

f. the thermal plume shall not interfere with spawning

g. the rate of temperature change in the designated mixing zones shall not cause mortality to the biota.

We propose that each company submit, by December 15, 1972:

a study of thermal discharge environmental decision factors, including the effect of the existing discharge on items a. through g. above, and a project proposal for remedial action where required.

Requisite facilities should be completed by July 1, 1975.

Tom's River Chemical Co.

Tom's River Chemical Company is a large, complex, chamical plant producing dyes, resins and pesticides. Their "process

wastes" are discharged to the Atlantic Ocean via an outfall extending 3500 feet from the shore. The final 1000 feet of this pipe serves as a diffuser.

The U. S. Environmental Protection Agency - Enforcement Division worked out an agreement in 1971 with Tom's River Chemical whereby the company undertook a program to reduce their mercury discharge to a maximum of .1 lb/day. On February 22, 1972, the Enforcement Division (EPA) met with Tom's River Chemical concerning other pollutants in their discharge, with the aim of obtaining voluntary compliance in limiting contaminants. In addition, recognizing the complexity of the problem, EPA Enforcement Division experts visited the Tom's River Plant to obtain a first hand view of the situation, including waste sources, existing waste treatment and inplant pollution abatement procedures, and company programs to identify and eliminate pollutants.

The effluent requirements presented in Table 6 represent values that EPA experts propose as desirable limits. These limits are proposed specifically for the Tom's River situation, after an evaluation of the discharge waterbody, and an assessment of waste sources and the "state of the art" in terms of feasible treatment techniques and in-plant pollution abatement changes.

Since a good portion of the pollution abatement work must

be accomplished through in-plant changes, the Tom's River Chemical Company has undertaken a program of in-plant waste source identification and studies to evaluate remedial measures for reduction of specific contaminants from particular product operations. The complexity of the problem is evidenced by the fact that the plant produces many different products, and at varying times.

The company will report periodically to EPA on the progress of their pollution abatement efforts, and submit proposals for remedial action, to be reviewed by EPA. Abatement actions should be reviewed with the New Jersey Department of Environmental Protection. We propose that the task of installing pollution abatement facilities be completed by July 1, 1974.

For cooling water discharges to Tom's River, we propose that they be limited to their existing temperature rise, as data submitted to EPA shows that the effect on stream temperature does not exceed levels delineated in the appropriate water quality criteria.

E. Assessment of Impact of Industrial Wastes on Water Quality Criteria

Industrial waste discharges do not present a major pollution problem in the New Jersey Coastal Basin due to the relative scarcity of industries and the recreational and resort nature of the region.

A total of eighteen (18) industries within the Basin have filed under the Refuse Act Permit Program and are presently discharging treated or untreated wastewaters and/or cooling water into the New Jersey Coastal area.

All industries discharging BOD have been assigned the requirement to implement the construction of treatment facilities which will provide 95% removal of biochemical oxygen demand (BOD) for discharges to estuaries or tributary streams and, which represent a high level of treatment within the limits of present technology. It is anticipated that these levels of treatment will provide compliance by all industries with applicable water quality standards. However, further field studies and water quality management models are being utilized to confirm that water quality criteria will be met. If these studies indicate that a higher degree of treatment is essential to maintain applicable water quality criteria, such information will be presented at the conference, including revised treatment requirements.

TABLE NO. 7

Recommended Implementation Schedules - Regional Treatment Facility and Service Area Point Sources

County	Regional Facility	Submission of Final Plans	Begin Construction	Complete Constr.	Remarks
Monmouth	Atlantic Highlands - Highlands Regional Sewerage Authority	Aug. 1972	Dec. 1972	Dec. 1973	Bayshore Outfall Authority under construction
	Middletown Twp. Regional Sewerage Authority				Plant in operation - connection of all point sources to system by June, 1972.
	Bayshore Regional Sewerage Authority			Dec. 1973	Plant under construction
	N.E. Monmough Regional Sewerage Authority				Places in operation in Spring 1971
	Long Branch Sewerage Authority	July 1972	Jan. 1973	July 1974	
	Ocean Twp. Sewerage Authority	State has plans	Sept. 1972	May 1973	Regional facility completed in Sept. 1968. Schedule given is for the Borough of New Deal which is remaining community required to tie in.
	Asbury Park Subregion	Sept. 1,1973	Sept. 1, 1974	June 1, 1975	No authority formed to date
	Neptune Twp. Subregion	July 1974	Jan. 1975	Jan. 1976	No authority formed to date
	South Monmouth Regional Sewerage Authority	Jan. 1974	July 1974	Jan. 1977	Authority formed
	Manasquan River Subregion	Jan. 1974	July 1974	July 1975	No authority formed to date
Ocean	Metedeconk River Subregion	Jan. 1, 1973	July 1, 1973	April 1, 1976	This subregion has been recently designated the Northern Service Area.
	Island Beach Subregion	Dec. 1, 1973	June 1, 1973	Dec. 1, 1976	This subregion has been recently included in the newly designated Central Service Area.
	Central (Basin Subregion)	Dec. 1, 1973	June 1, 1973	Dec. 1, 1976	Same as above

County	Regional Facility	Submission of Final Plans	Begin Construction	Complete Constr.	Remarks
	Southern Subregion	May 1, 1973	Nov. 1, 1973	April 1976	
Atlantic	Atlantic Coastal Subregion	Sept. 1973	March 1973	March 1975	
Cape May	Ocean City Subregion	July 1, 1974	Jan. 1, 1975	Jan. 1, 1976	No authority formed to date
	Stone Harbor-Sea Isle City Subregion	July 1, 1974	Jan. 1, 1975	Jan. 1, 1976	No authority formed to date
	Wildwoods Subregion	July 1, 1974	Jan. 1, 1975	Jan. 1, 1976	No authority formed to date
Ground Discharge Plants	Egg Harbor City	March 1973	Sept. 1973	Sept. 1974	
	Town of Hammonton	Jan. 1, 1974	July 1, 1974	July 1, 1975	
	Winslow Twp. (Ancora)	Jan. 1, 1974	July 1, 1974	July 1, 1975	
	Hamilton Twp. (Mays Landing)	Jan. 1, 1974	July 1, 1974	July 1, 1975	
	Buena Borough	Jan. 1, 1974	July 1, 1974	July 1, 1975	

SECTION VII

CONCLUSIONS AND RECOMMENDATIONS

A. General

We have delineated in the previous section of this report the nature of the pollution problem, the sources of pollution, the existing Water Quality Standards, and proposed engineering systems to accomplish pollution control for the designated study area and thus insure meeting established water quality criteria. In the following paragraphs we propose implementation schedules for development and construction of requisite domestic sewage pollution abatement and disposal facilities, which we feel are feasible, reasonable and achievable. In addition, we propose guidelines for pre-treatment of industrial wastes in municipal systems, a factor essential to any effective pollution control program.

It must be realized that, to achieve desirable water quality levels and to insure that a particular area can maintain certain activities (recreation, shellfish, etc.), liquid waste treatment must be intergrated into a comprehensive water quality management and environmental plan for an area, including air pollution considerations, sludge handling considerations, zoning, etc.

The National Estuarine Study proposes guidelines for maintaining the designated usage of estuarine areas. This study is quite relevent considering the fact that the Jersey Coastal Area is essentially estuarine in character. Bearing this fact in mind,

we have in the following paragraphs, proposed additional recommendations which we feel are desirable and crucial to insure and protect the water quality and environmental quality of the New Jersey Atlantic Coastal Area.

B. Domestic Sewage Discharges

The regional systems under development to accommodate domestic wastes from the study area have been reviewed, in terms of implementation schedules, by EPA and New Jersey Department of Environmental Protection pollution control experts.

Table 7 presents implementation dates for engineering, construction and completion of requisite pollution abatement facilities, which we feel are feasible and realistic. As such, we propose that these implementation schedules be included into a revised Water Quality Standards Implementation Plan and thus become federally enforceable dates for abatement of pollution.

We have assigned these dates assuming that the particular point source discharger proceeds in a direct and expeditious fashion toward pollution control. In other words, we feel that if a bona fide effort is undertaken, these dates will be achievable. Probably, the most important assumption we have made in assigning implementation dates is that federal and state governments will provide a reasonable share of project funding, at the time that it is required. Perhaps an equally important

assumption is that satisfying the requirement of and possible actions under (litigation, etc.) the National Environmental Policy Act (environmental impact of proposed construction) do not result in delays in initiating construction.

It is worth noting that federal and state construction grant funds and appropriations lose a portion of their effectiveness as delays in development and construction of pollution abatement facilities occur. For example, bond issues of many states floated a few years ago are inadequate, in many cases, for many pollution control needs due to the rapid inflation of construction costs. This shrinking of the effectiveness of state and federal funds due to delays in implementation of pollution abatement plans and construction of requisite facilities is a fiscal reality that cannot be over emphasized. Delays in implementation of pollution control plans, from a funding viewpoint, cannot be tolerated.

C. Industrial Wastes (Direct Discharges)

As delineated in previous sections of the report, industrial wastes do not comprise a major factor in the pollutional situation of the Atlantic coastal area, although, to effectively complete pollution control, they must be delt with. Of the 18 industries having direct discharges in the study area, 11 are considered to require reduction of contaminant loads, and as such, treatment requirements (loadings and implementation schedules) were established. These requirements and implementation schedules are indicated in Section VI. We recommend

their inclusion into the revised Water Quality Standard, with requirements for pollution abatement given on a specific, individual basis.

D. Industrial Wastes in Municipal Systems

In general, the consideration of industrial wastes in municipal systems, as related to the overall pollution of the Jersey Coastal Area, is not an important one. Although, as is consistent with reasonable planning and good engineering practice, it should not be overlooked.

Each regional system should have as requirements a body of by-laws or regulations governing sewer use, establishing which materials and in what quantities and concentrations are acceptable for discharge to a sewer, and subsequently to a treatment plant. The regulations should protect the sewer system, the operation of the treatment plant, and also insure that undesirable materials do not pass through the plant without treatment or gain access to the environment via sludge handling procedures. The State of New Jersey has pending legislation which will empower the Department of Environmental Protection to set pre-treatment requirements for discharges to municipal sewer systems.

To accomplish these objectives, we propose the following heavy metals (plating wastes) limitations on discharges entering regional collection sewers:

Contaminant	Allowage (24 hr. average) Concentration (mg/l)
Total Chromium	0.5
Copper	1.0
Cadmium	1.0
Zinc	2.0
Nickel	2.0
Cyanide	0.1

These effluent levels are intended to be applied to a typical "process waste", undiluted by cooling water. These levels reflect values that are achievable by conventional plating waste treatment techniques (chrome reduction, heavy metals precipitation, cyanide destruction, etc.). A survey of plating waste treatment technology by the EPA Industrial Waste Technology Branch, NERC. Edison, New Jersey served as a basis for proposing these levels. These values reflect "maximum baseline levels." Where significant loadings of a particular contaminant would result, even applying these effluent criteria, it is proposed that a higher degree of reduction either via higher treatment efficiencies or in-plant process modifications be required.

Discharges of other toxic and hazardous materials not treatable by bio-oxidation (including arsenic, barium, lead, and mercury) should be accepted in the sewer system only after undergoing "best practical treatment (pretreatment)" at the source.

E. Sludge Handling - Environmental Considerations

Modern waste treatment systems require total management of the sludge handling phase. Treatment and ultimate disposal of the sludge must result in the least detrimental impact upon the environment. The management alternative chosen must not create an air pollution problem, contravene surface or ground water quality standards or result in damage to the soil structure.

The discharge of industrial wastes into the regional systems must be carefully regulated. This must be done to protect the treatment process and to prevent the concentration of toxic materials or heavy metals in the sludge. Effective industrial waste ordinances must be enforced. Elimination of the toxic materials or heavy metals from the sludge is necessary to prevent eventual discharge to the atmosphere through incineration, accumulation in the soil structure and possible contamination of surface or ground waters through land disposal or discharge to the marine environment through ocean disposal.

Where feasible, conservation of resources dictates the recycling of the sludge to the soil for reclamation on marginal lands or upgrading of other land areas. Sufficient land must be available to permit the use of this technique.

Demonstration projects for recycling of sludge should be initiated at the earliest possible date in the proposed disposal areas. This is needed to establish application rates, techniques for transport and distribution, and to evaluate the effects upon surface and ground water quality, vegetation and soil structure. A demonstration project is currently underway in Ocean County.

When recycling of the sludge is not a feasible alternative, it is necessary to consider the use of one of the several combustion or oxidation techniques. However, the installation must not create an air pollution problem. This can be avoided by proper design of the facility to ensure adequate combustion temperatures and retention times, use of efficient air pollution control devices, and effective operation and maintenance. An EPA Task Force has recently completed its work and the resulting report covers these considerations in detail. The selection of this alternative must be supported by a detailed economic analysis to clearly indicate the total annual cost of the facility. Sufficient money must be included in the annual operating budget of the operating agency to provide for the most efficient operation of the complete sludge system.

Interim EPA policy regulating the Federal construction grants program states that no grant is to be made if the sludge is to be discharged to the ocean. This policy applies to new

waste treatment plants and, in general, to expansion of existing plants. These projects can be approved only on the basis of other acceptable sludge management practices such as recycling or incineration. However, installations located in the New York New Jersey metropolitan area generally have one of two alternatives available for management of their sludge. The available alternatives are incineration or ocean disposal of sludge. Prohibition of ocean disposal of sludge would force all of these plants to use one of the available combustion techniques.

The commitment of resources required for these combustion methods would be enormous. The cumulative impact of many large facilities upon air quality may be a greater environmental hazard than the effects of controlled ocean disposal of the sludge. Incineration, after a substantial investiment by all levels of government, might prove to be the least desirable long-term solution for sludge management. Additional and unnecessary combustion should be avoided because of the need to meet the air quality standards for the area.

Therefore, the Environmental Protection Agency is considering a revision in the ocean disposal policy for waste treatment facilities in the New York - New Jersey Metropolitan area:

1. Approval of continued ocean disposal of sludge provided

   (a) Sludge is adequately treated

   (b) Industrial waste ordinances regulate the discharge of heavy metals or other toxic materials into the system. This is to be accomplished in compliance with EPA or State requirements.

(c) Ocean dumping from the New York - New Jersey metropolitan area is to be abandoned when a more effective environmental alternative is available. This alternative is to become available through the efforts and requirements of EPA, the States and regional authorities.

2. EPA is to embark upon a program to assess the impact of non-toxic municipal sludge dumping in new open sea areas. This effort is to mesh with existing on-going studies of the marine environment.

3. EPA would support the formation and operation of a regional (intra or interstate) solid waste disposal authority. This authority is to develop acceptable long-term alternatives for the management of the sludge problem. The authority would implement the most effective alternative to permit eventual abandonment of ocean disposal.

F. Other Environmental Considerations

In addition to the previous recommendations, a number of supplementary considerations are important and deserve mention. For, to achieve desired environmental results in the Jersey coastal area, requires implementation of comprehensive programs in many fields and disciplines. This attitude was expressed in the policy recommended by the National Estuarine Pollution Study which proposed: "Achievement of the best use of the values of the estuarine and coastal zones through a balance between: (a) multi-purpose development; (b) conservation; and (c) preservation over both the short and long range. Priority

consideration should be given to those resources that are non-renewable and to maintaining those resources and uses which are estuarine-dependent. It shall also recognize that the primary responsibility for management of the estuarine and coastal zones rests with the States."

In terms of liquid wastes, pollution from sub-surface disposal systems and possibly storm run-off from developed (urbanized) areas may present itself as an important factor after adequate pollution control for point source domestic sewage discharges is implemented. Close scrutiny of industrial and municipal discharges to the ground must also be maintained. Nitrogen and phosphate removal may be required to protect ground water quality. In this regard, sewage treatment facilities discharging to the ground should have adequate space for additional process units to accomplish nitrogan and phosphate removal, if deemed necessary at some future date.

In terms of state policy, current requirements for sub-surface disposal systems in low lying coastsl area and other policies promoting development of sewage systems in areas where existing sub-surface disposal is utilized are in line with recommendations of the National Estuarine Study for protecting the environment. Another notable state action to protect the estuarine environment in the Atlantic Coastal Area is the Wetlands Act, which sets forth guidelines and regulations for development in sensitive marsh lands, wetlands, etc.

In addition to direct actions that can be taken by the state to protect and enhance the qullity of the Atlantic coastal area, comprehensive federal and interstate action is of great importance, as in the case of oil spills from tankers, and in sludge dumping, which was discussed previously. Protection of the environment requires a coordinated effort at all levels of government, and also support from business and industry, citizens groups and each one of us.

G. Monitoring

After completion of construction and start-up of requisite pollution control facilities, as defined previously in this report, a network of surveillance and monitoring is essential to: first, insure that the treatment facilities operate up to their capability; and secondly, to evaluate the receiving water bodies to ascertain and profile their acceptability for their designated water usage. A planned, and possibly computerized information center, which could receive all monitoring results might be desirable. In this way, data on hazardous or unacceptable conditions and trends could be swiftly identified for remedial action.

The necessity of monitoring is entirely consistent with State and EPA policy. For example, EPA final construction grant payments are given only after monitoring data of a particular plant indicates an acceptable level or performance.

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APPENDIX A

EXISTING WATER QUALITY STANDARDS

NEW JERSEY ATLANTIC COASTAL AREA

1. Anti-Degradation Statement
2. Surface Water Classifications
3. Water Quality Criteria
4. Implementation Plan

ANTI-DEGRADATION STATEMENT

NEW JERSEY

It is the primary objective of the Water Pollution Control Program in New Jersey to protect and enhance the quality of all surface waters of the State including those classified as FW-1 which are to be retained for posterity in their natural state and which shall not be subject to any man-made wastewater discharges. The objective of protecting and upgrading our waterways will take precedence over allowable minimal quality limits for surface waters established through promulgation of rules and regulations.

In all situations where there may be an impingement of a lesser quality water upon that of a higher quality, it is the objective of the New Jersey program to upgrade the lesser quality water in order to protect or improve adjacent waters having a more critical use. It is anticipated that the surface water classification and the standards of quality for New Jersey waters will be subject to continual review and revision to achieve our basic objectives.

The overriding consideration, however, regardless of the establishment of water quality levels is that of wastewater treatment requirements. The minimum degree of wastewater treatment now being permitted in the State of New Jersey is that commonly identified as secondary treatment. In New Jersey this means treatment necessary to provide as an absolute minimum 80% reduction of biochemical oxygen demand and a maximum permissible biochemical oxygen demand concentration of 50 parts per million. In most areas in New Jersey, this standard is raised to require biochemical oxygen demand reduction of 85% and 90% with appropriate maximum permissible biochemical oxygen demand concentrations. At many inland locations where only small tributaries to streams are available, the policy in New Jersey is either to prohibit the discharge of any effluent to surface waters or to require so-called tertiary treatment which is the reduction of biochemical oxygen demand of 95% as a minimum with a maximum concentration of 15 parts per million. It has been and is presently the policy of the Department that wastewaters prior to discharge into any fresh water streams in the State must receive as a minimum at least 90% treatment.

ATLANTIC COASTAL PLAIN

CLASSIFICATION OF SURFACE WATERS

REGULATIONS CONCERNING CLASSIFICATION OF THE SURFACE WATERS OF THE ATLANTIC COASTAL PLAIN

WHEREAS, the State Department of Health of the State of New Jersey did promulgate "Regulations Establishing Certain Classifications to be Assigned to the Waters of this State and Standards of Quality to be Maintained in Waters so Qualified," effective September 1, 1964, and amended the said Regulations on January 5, 1966 and March 6, 1967, and

WHEREAS, in public hearings conducted by the State Department of Health on March 15, 22 and 29, 1967, classifications of the surface waters of the Atlantic Coastal Plain, as proposed by the State Department of Health, were presented to the general public, and

WHEREAS, the State Department of Health has given careful and thorough consideration to all statements submitted at said hearings, as well as statements and briefs submitted thereafter, relating to the proposed Classifications of the Surface Waters of the Atlantic Coastal Plain,

NOW, THEREFORE, the State Department of Health promulgates the following regulations entitled "Classification of the Surface Waters of the Atlantic Coastal Plain."

NEW JERSEY STATE DEPARTMENT OF HEALTH

Roscoe P. Kandle, M.D.
State Commissioner of Health

Filed with Secretary of State: April 27, 1967

Effective Date: May 24, 1967

CLASSIFICATION OF THE SURFACE WATERS OF THE ATLANTIC COASTAL PLAIN

Pursuant to authority vested in it under the provisions of Chapter 12, Title 58 of the Revised Statutes, the State Department of Health hereby promulgates the following classifications of the surface waters of the Atlantic Coastal Plain. Standards of Quality to be maintained in these waters as established by the State Department of Health are attached hereto.

I. Class FW-1

Waters having the potential for this Class but which are not classified as such at this time may be recommended for such classification by public or private interests controlling the land area draining to the watercourse. Because of the restrictive-use nature of the FW-1 classification any waters thus designated must be contiguous with their source. Also, since the characteristics of surface waters are sometimes changed to the detriment of their natural biota by seemingly minor associations with domestic and/or agricultural activities, they must be inspected and approved before being classified. Requests for consideration in the classification of FW-1 waters should be directed to:

New Jersey State Department of Health
P. O. Box 1540
Trenton, New Jersey 08625

A. FW-1 Manasquan River Drainage

Allaire State Park	1. That portion of the second southerly tributary of the Manasquan River west of Hospital Road situated wholly within the Allaire State Park boundaries.
	2. The easterly tributary of the brook feeding Brisbane Lake located wholly within the Allaire State Park boundaries downstream to its confluence with the westerly tributary.

B. FW-1 Cedar Creek Drainage

Greenwood Forest Fish & Game Tract	1. Webbs Mill Branch and tributaries situated wholly within the Greenwood Forest boundaries.

2. Chamberlain's Branch and tributaries situated wholly within the Greenwood Forest boundaries upstream from the blueberry farm exception, also other tributaries to Chamberlain's Branch situated wholly within the Greenwood Forest Tract boundaries.

FW-1 Wading River Drainage

1. Westerly tributary to the Howardsville Cranberry Bog Reservoir and tributaries thereto situated wholly within the Greenwood Forest Tract boundaries.

C. FW-1 Barnegat Bay Drainage

Island Beach State Park

1. All the fresh water ponds on Island Beach State Park.

D. FW-1 Manahawkin Creek Drainage

1. Tommy's Branch from its headwaters downstream to the Bass River State Forest Recreation Area service road.

2. Falkenburg Branch of Lake Absegami from its headwaters downstream to the lake.

E. FW-1 Mullica River Drainage

Wharton Tract

1. Deep Run and tributaries thereto from its headwaters downstream to Springer's Brook.

2. Skit Branch from its headwaters downstream to its confluence with Robert's Branch.

3. Tulpehocken Creek and tributaries thereto from its origin downstream to its confluence with Featherbed Branch.

4. The westerly tributaries to Tulpehocken Creek and those natural ponds within the lands bounded by Hawkins Road, Hampton Gate Road, and Sandy Ridge Road

5. Stream in the southeasterly corner of the Wharton Tract lying between

Ridge Road and Seaf Weeks Road down to the Wharton Tract boundary.

6. Brook and tributaries between and immediately to the west of Tylertown and Crowleytown from its headwaters downstream to the head of tide at mean high water.

7. The easterly branches of the Batsto River from Batsto Village upstream to the confluence of Skits Branch.

8. Gun Branch from its headwaters downstream to U. S. Route 206.

NOTE: All boundaries referred to as they existed December 1966.

F. FW-1 Great Egg Harbor River Drainage

Tuckahoe Public Hunting and Fishing Grounds

1. Hawkin's Creek and the next adjacent tributary to the Great Egg Harbor River lying to the north from their origin downstream to where the influence of impounding occurs.

II. Class FW-2

A. Cranberry Brook and tributaries thereto upstream from the intake of the Monmouth Consolidated Water Company near the New York - Long Branch Railroad Crossing.

B. Shark River and tributaries thereto upstream from Remson's Mill Road.

C. Jumping Brook and tributaries thereto above intake of Monmouth Consolidated Water Company near Old Corlies Avenue.

D. Main stem of Manasquan River and tributaries thereto upstream from Garden State Parkway.

E. All fresh waters of the Plain, from Manasquan River to and including the Mullica River, upstream from the head of tide.

F. Absecon Creek and tributaries thereto upstream from Atlantic City Reservoir Dam in the City of Absecon.

G. Patcong Creek and tributaries thereto upstream from Patcong Lake Dam.

III. Class FW-3

A. Lake Takanassee

B. Poplar Brook

Deal Lake and tributaries thereto
Sunset Lake and tributaries thereto
Lake Wesley and tributaries thereto
Fletcher Lake and tributaries thereto
Sylvan Lake and tributaries thereto

C. Shark River and tributaries thereto downstream from Renson's Mill Road to head of tide.

D. Jumping Brook and tributaries thereto downstream from Old Corlies Avenue to head of tide.

E. Silver Lake and tributaries thereto
Lake Como and tributaries thereto
Spring Lake and tributaries thereto
Wreck Pond and tributaries thereto

F. Fresh water reaches of main stem of Manasquan River and tributaries downstream from Garden State Parkway.

G. Absecon Creek and tributaries thereto downstream from above dam to head of tide.

H. Patcong Creek and tributaries thereto downstream from Patcong Lake dam to head of tide.

J. All other fresh waters of the Plain not delineated upstream from head of tide.

IV. Class TW-1

A. All tidal waters of Shark River and tributaries thereto from head of tide to surf waters.

B. All tidal waters of Jumping Brook and tributaries thereto downstream from head of tide to Shark River and to surf waters.

C. Tidal waters of main stem of Manasquan River and of tributaries thereto downstream from near the Garden State Parkway to surf waters.

D. All other tidal waters of the Plain downstream from the head of tide to surf waters.

V. Class CW-1

Ocean waters within 1,500 feet from mean low tide to a depth of 15 feet, whichever is more distant from the mean low tide line, from Sandy Hook to Cape May Point.

VI. Class CW-2

Ocean waters of the Plain not included under Class CW-1 out to the "three mile limit."

Filed with the Secretary of State: April 27, 1967

Effective Date: May 24, 1967

SECTION VI

ATLANTIC COASTAL BASIN

INTERSTATE WATERS

1. Atlantic Ocean
2. Barnegat Bay and interconnecting thorofares
3. Manahawkin Bay and interconnecting thorofares
4. Little Egg Harbor Bay and interconnecting thorofares
5. Great Bay and interconnecting thorofares
6. Little Bay and interconnecting thorofares
7. Grassy Bay and interconnecting thorofares
8. Reeds Bay and interconnecting thorofares
9. Absecon Bay and interconnecting thorofares
10. Lakes Bay and interconnecting thorofares
11. Sculls Bay and interconnecting thorofares
12. Great Egg Harbor Bay and interconnecting thorofares
13. Pecks Bay and interconnecting thorofares
14. Corsons Sound and interconnecting thorofares
15. Ludlams Bay and interconnecting thorofares
16. Townsend's Sound and interconnecting thorofares
17. Stites Sound and interconnecting thorofares
18. Great Sound and interconnecting thorofares
19. Jenkins Sound and interconnecting thorofares
20. Grassy Sound and interconnecting thorofares
21. Richardson Sound and interconnecting thorofares
22. Jarvis Sound and interconnecting thorofares
23. Cape May Harbor and interconnecting thorofares
24. Shark River and tributaries to head of tide
25. Manasquan River and tributaries to head of tide

26. Metedeconk River and tributaries to head of tide

27. Toms River and tributaries to head of tide (at Route 9)

28. Cedar Creek and tributaries to head of tide

29. Porked River and tributaries to head of tide

30. Oyster Creek and tributaries to head of tide

31. Mill Creek and tributaries to head of tide

32. Westecunk Creek and tributaries to head of tide

33. Tuckerton Creek and tributaries to head of tide

34. Mullica River and tributaries to head of tide

35. Great Egg Harbor River and tributaries to head of tide

36. Tuckahoe River and tributaries to head of tide

WATER QUALITY CRITERIA

RULES AND REGULATIONS
ESTABLISHING SURFACE WATER QUALITY CRITERIA

June 30, 1971

New Jersey Department of Environmental Protection

Richard J. Sullivan, *Commissioner*

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

Office of the Commissioner

FOREWORD

On the following pages surface water quality criteria are set forth which have been adopted by the New Jersey Department of Environmental Protection.

These criteria are definitions of acceptable water quality for the various categories of surface waters in our state. They are not intended to be enforcement standards in their own right. They represent water quality objectives hopefully to be met through a rigorous enforcement program.

The entry of wastes into a stream cannot be permitted if it will cause the quality of the stream to fail to meet the criteria. For waterways that are already polluted all waste treatment effluents and other sources of pollution must be upgraded or eliminated to permit the restoration of quality as defined by the criteria. In all such cases standards are imposed upon the effluent in the form of existing treatment regulations, administrative orders, or where necessary, orders of the court.

Similar control over effluent quality will be imposed as a condition of obtaining the required State permit for the construction of any new industrial or community waste treatment facilities. Such facilities should have incorporated in them pollution control in keeping with the currently accepted state of the art. Only by stringent regulation of effluent quality will we have any chance whatever of causing our waterways to meet these quality criteria.

Richard J. Sullivan
Commissioner

Approved: 30 June 1971

Filed With Secretary of State: 30 June 1971

INTRODUCTION

The water resources management concept is vital to an effective water pollution control program. The waters of this State are priceless natural resources which must be properly managed if they are to be retained useable for their best purposes.

The basis for such an effort includes establishing a system of defining the best uses for all surface waters including not only the present but also possible future uses and recognizing the possibility of a variety of compatible uses. This then permits the development of quality values or parameters for such best uses. These two measures are incorporated in the regulations.

The general ranking of uses to be protected for all of New Jersey's fresh, tidal and coastal waters include but are not necessarily limited to the following:

(1) Fresh Surface Waters

- (a) Those set aside for posterity to represent the natural aquatic environment and its associated biota.
- (b) Public water supply.
- (c) Recreation.
- (d) Maintenance, migration and propagation of natural and established biota.
- (e) Industrial water supply.
- (f) Agricultural water supply.
- (g) Navigation.

(2) Tidal Waters

- (a) Shellfish harvesting.
- (b) Public water supply.
- (c) Recreation.
- (d) Maintenance, migration and propagation of the natural and established biota.
- (e) Fish passage and survival.
- (f) Industrial water supply.
- (g) Agricultural water supply.
- (h) Navigation.

(3) Coastal Waters

- (a) Recreation.
- (b) Maintenance, migration and propagation of the natural and established biota.

In the Water Quality Act of 1965, the U. S. Congress authorized the establishment of water quality standards for interstate (including coastal) waters. The purpose of these standards is the protection and enhancement of the quality and productivity of the nation's interstate waters to serve a variety of beneficial uses. This Act, which amended the Federal Water Pollution Control Act, requires that the States establish standards for their interstate waters subject to review and approval by the Secretary of the Interior. The responsibility for this and other water pollution control functions has since

been transferred from the Secretary of the Interior to the Administrator of the U. S. Environmental Protection Agency.

The standards serve as both State and Federal standards which are enforceable under the State water pollution control statutes and the Federal Water Pollution Control Act, as amended (Section 10).

These water quality standards actually consist of the following three major components:

(a) A statement of policy on the protection and enhancement of water resources including numerical values and narrative descriptions of water quality parameters for specific water uses.
(b) Classification of surface waters designating specific best uses.
(c) A plan of implementation and enforcement including treatment and control requirements for all wastewaters discharged into or affecting surface waters.

The State Department of Health, the agency previously responsible for water pollution control, adopted regulations effective September 1, 1964 establishing numerical values and narrative descriptions of water quality parameters for specific water uses. It is these September 1, 1964 regulations that are to be amended and updated and will hereinafter be referred to in this document as "Surface Water Quality Criteria." The other two components of New Jersey's water quality standards (b and c above) will, if necessary, be amended in the future and submitted to the Administrator of the U. S. Environmental Protection Agency for approval.

In addition to the adoption of Surface Water Quality Criteria, the Department has classified New Jersey's waters, interstate and intrastate, as to their best intended uses. The water quality standards were submitted to the Department of Interior on June 27, 1967 for Federal approval in accordance with the statutory timetable. Subsequently, certain revisions were made in the original submission. The Secretary of the Interior on March 13, 1968 approved the standards with certain exceptions.

The exceptions contained in the Secretary's approval have been accommodated in these criteria. The criteria also reflect considerable reliance upon the findings and recommendations in the "Report of the Committee on Water Quality Criteria" published April 1, 1968 by the Federal Water Pollution Control Administration.

The Surface Water Quality Criteria also reflect the efforts and opinions of members of the State Interdepartmental Committee on Surface Water Pollution Abatement. Representation on this Committee includes the Division of Water Resources, Division of Fish, Game and Shellfisheries, Division of Parks and Forests, all within the Department of Environmental Protection, the Division of Rural Resources of the Department of Agriculture, the Division of State and Regional Planning of the Department of Community Affairs, and the Division of Economic Development of the Department of Labor and Industry.

The amended Surface Water Quality Criteria consists of the following:

(a) Statement of policy on the protection and enhancement of water resources.

(b) Glossary of terms.
(c) Parameters of quality consisting of numerical values and narrative descriptions for defined water uses.

These criteria do not describe existing quality conditions of New Jersey's waterways. They do represent objectives of cleanliness which hopefully can be achieved through the administrative and enforcement mechanisms available to the State Department of Environmental Protection.

We believe that these criteria are achievable through rather severe wastewater treatment requirements that are already in effect in addition to the contemplated construction of regional water pollution control projects or the reconstruction and improvement of existing facilities. Additional measures may be required to deal with nonspecific pollution sources.

These criteria will provide the basis for protecting and enhancing the quality of both interstate and intrastate waters; they are compatible with those adopted by our neighboring states.

Considerable water quality data will be gathered and studies made to permit a continuing evaluation of the proposed criteria and effluent regulations. Scientific analyses of such data will, in turn, enable the Department to expand specific wastewater effluent quality standards including equitable load allocation for each approved discharge source. This approach has already been taken in the Delaware River Estuary area.

These criteria may also be utilized to assist in determining the influence of man's activities beyond those involving the discharge of used community or industrial waters. These indirect sources of water pollution include land development, water impoundments, dredging, landfills and agricultural operations.

It should be pointed out that the criteria are not intended to be applicable in instances where water quality does not conform to specified values solely as a result of natural causes.

With the exception of a relatively few toxic substances, tolerable levels of many toxic substances in waters have not been fully established. In addition, toxicity may vary depending upon the presence or interaction of different constituents and the nature or characteristics of the stream or waterway involved. Therefore, maximum permissible limits for toxic substances will be determined by appropriate bioassays in addition to available technical guidance.

Because of the complex interrelationships between the physical, chemical, biological and hydrological factors affecting the aquatic environment, utilization of these criteria, particularly where specific numerical values are involved, must be carried out with great care. Sufficient valid data must be obtained and assessed to determine with reasonable accuracy levels of quality for a particular waterway. This cannot be overemphasized since these criteria will be utilized not only by the State Department of Environmental Protection but by other water pollution control and water resource agencies, local boards of health, private citizens, civic and other groups.

These criteria and other information will guide the Department in determining the required degree of treatment, and therefore the quality of effluent for all waste treatment facilities.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

RULES AND REGULATIONS

SURFACE WATER QUALITY CRITERIA

Section 1 - Statement of Policy . . . . . Pages 1 and 2

Section 2 - Glossary of Terms . . . . . Pages 3 and 4

Section 3 - Surface Water-Use Designations and Criteria of Quality to be Maintained in Waters so Designated . . . . . Pages 5 - 19

SECTION 1

A STATEMENT OF POLICY

1.1 Chapter 12 of Title 58 of the Revised Statutes of New Jersey (N.J.S.A.) 58:12-3 provides that no plant for the treatment of domestic or industrial wastes or other polluting substance from which the effluent is to flow into any of the waters of this State, shall be constructed except under such conditions as shall be established by the State Department of Environmental Protection.

1.2 The protection and enhancement of the quality and function of the waters of this State into which effluents from sewerage facilities are discharged is a principal objective of the State Department of Environmental Protection when considering the approval of designs for proposed sewerage facilities.

1.3 Waters which are designated to be retained in their natural state and therefore not subject to any man-made wastewater discharges shall be protected.

1.4 The protection and enhancement of the State's waterways shall take precedence over such allowable minimal water quality levels as may be established.

1.5 In all situations where there may be an impingement of a lesser quality water upon that of a higher quality of water, the lesser quality of water shall be upgraded in order to protect or improve adjacent higher quality waters.

1.6 Existing approved shellfish harvesting areas shall be protected. Tidal waters that now are at levels of quality below acceptable limits for shellfish harvesting shall be restored.

1.7 Any industry or community does not have the privilege of utilizing the theoretical capacity of surface waters to receive waste discharges.

1.8 Water is vital to life and comprises an invaluable natural resource which is not to be abused by any segment of the State's population or its economy.

1.9 Where existing water quality is better than the established criteria, the Department of Environmental Protection in the administration of its regulations shall maintain the quality of such waters unless it can be demonstrated that change is justifiable as a result of necessary economic or social development.

1.10 The water quality criteria for the main stem of the Delaware River (fresh and tidal) to and including the Delaware Bay are established in the current Water Quality Standards for the Delaware River Basin adopted by the Delaware River Basin Commission as part of its Comprehensive Plan.

1.11 The water quality criteria for the Raritan Bay shall be those established for TW-1 waters, as a minimum, but that the management of the quality of the water system comprising the Raritan Bay shall be such as to

assure that regulations of the Interstate Sanitation Commission with respect to dissolved oxygen will be met.

1.12 The levels of quality specified for various water uses, where applicable, are expected to be maintained under conditions comprising minimum consecutive seven day fresh water flows with ten year recurrence intervals

1.13 The minimum degree of wastewater treatment permitted shall consist of the reduction of biochemical oxygen demand by at least 80 percent at all times. Higher treatment requirements will be established where necessary.

1.14 Effective year-round disinfection shall be required for all treated wastewater discharges containing pathogenic organisms.

SECTION 2

GLOSSARY OF TERMS

2.1 Agricultural Water Supply - Water used for livestock or irrigation.

2.2 Anadromous Fish - Fish that spend a part of their lives in the sea or lakes, but ascend rivers to spawn.

2.3 Aquatic Substrata - Soil material and attached biota underlying the water.

2.4 Biota - The animal and plant life of the region; flora and fauna collectively.

2.5 Department - New Jersey State Department of Environmental Protection.

2.6 Eutrophic Lake - Lakes with a good supply of nutrients; they may support rich organic production, such as algae blooms and are commonly deficient in dissolved oxygen below the thermocline when stratified.

2.7 Industrial Water Supply - Water used for processing and cooling.

2.8 Mixing Zones - Localized areas of surface waters, as may be designated by the Department, into which wastewater effluents, including heat, may be discharged for the purpose of mixing, dispersing or dissipating such wastewater without creating nuisances or hazardous conditions.

2.9 Natural Temperature - Temperature that would exist in a waterway without the addition of heat of artificial origin.

2.10 Nontrout Waters - Waters, that because of their physical and/or chemical and/or biotic characteristics, are not suitable for trout but which, in general, are suitable for a wide variety of other fish species.

2.11 Primary Contact Recreation - Recreational activities that involve significant ingestion risks and including but not limited to the following: (1) wading, (2) swimming, (3) diving, (4) surfing, and (5) water skiing.

2.12 Secondary Contact Recreation - Recreational activities where the probability of significant contact or water ingestion is minimal and including but not limited to: (1) boating, (2) fishing, (3) and those other activities involving limited contact with surface waters incident to shoreline recreation.

2.13 Surface Water Classifications - Surface waters of this State identified as (1) Fresh (FW), (2) Tidal (TW) and (3) Coastal (CW). This includes both interstate and intrastate waters.

2.14 Thermocline - The layer in a body of water in which the drop in temperature equals or exceeds 1^{o} C. per meter of depth.

2.15 Thermal Alterations - The increase or decrease in temperature of surface waters above or below the natural that may be caused by the activities of man.

2.16 Trout Maintenance Waters - Waters that support trout throughout the year or which have high potential for such use pending the correction of short term environmental alterations. Waters in which the biotic community is manipulated for the purpose of trout maintenance and which are otherwise not naturally suited for such purposes are not included.

2.17 Trout Production Waters - Waters that are used by trout for spawning and/or nursery purposes during their first summer; or which are considered to have high potential for such use pending the correction of short term environmental alterations.

2.18 Wildlife - All undomesticated animals and fowl.

SECTION 3

SURFACE WATER USE DESIGNATIONS AND CRITERIA OF QUALITY
TO BE MAINTAINED IN WATERS SO DESIGNATED

* * *

SECTION 3.1 - SURFACE WATER QUALITY CRITERIA FOR FW-1 WATERS

CLASS FW-1 - Fresh waters, including rivers, streams, lakes, or other bodies of water, that because of their clarity, color, scenic setting, or other characteristic of aesthetic value or unique special interest, have been designated by authorized State agencies in conformance with laws pertaining to the use of private lands, are set aside for posterity to represent the natural aquatic environment and its associated biota.

3.1.1 These waters shall be maintained as to quality in their natural state and shall not be subject to any man-made wastewater discharges.

SECTION 3.2 - SURFACE WATER QUALITY CRITERIA FOR FW-2 WATERS

CLASS FW-2 - Fresh surface waters approved as sources of public water supply. These waters shall be suitable for public potable water supply after such treatment as shall be required by the Department.

These waters shall also be suitable for the maintenance, migration and propagation of the natural and established biota; and for primary contact recreation; industrial and agricultural water supply and any other reasonable uses.

3.2.1 FLOATING SOLIDS, SETTLEABLE SOLIDS, OIL, GREASE, COLOR AND TURBIDITY

None noticeable in the water or deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota. None which would render the waters unsuitable for the designated uses.

3.2.2 TOXIC OR DELETERIOUS SUBSTANCES INCLUDING BUT NOT LIMITED TO MINERAL ACIDS, CAUSTIC ALKALI, CYANIDES, HEAVY METALS, CARBON DIOXIDE, AMMONIA OR AMMONIUM COMPOUNDS, CHLORINE, PHENOLS, PESTICIDES, ETC.

None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota or which would render the waters unsuitable for the designated uses. None which would cause the Potable Water Standards of the Department for drinking water to be exceeded after appropriate treatment.

3.2.3 TASTE AND ODOR PRODUCING SUBSTANCES

None offensive to humans or which would produce offensive tastes and/or odors in water supplies and fauna used for human consumption. None which would render the waters unsuitable for the designated uses.

3.2.4 pH

Between 6.5 and 8.5.

3.2.5 DISSOLVED OXYGEN

(a) Trout Production Waters - Not less than 7.0 mg/l at any time.

(b) Trout Maintenance Streams - Daily average not less than 6.0 mg/l. Not less than 5.0 mg/l at any time.

(c) Trout Maintenance Lakes - Daily average not less than 6.0 mg/l. Not less than 5.0 mg/l at any time.

In eutrophic lakes when stratification is present, not less than 4.0 mg/l in or above the thermocline where water temperatures are below 72° F. At depths where the water is 72° F. or above,

daily average not less than 6.0 mg/l and not less than 5.0 mg/l at any time.

(d) Nontrout Waters - Daily average not less than 5.0 mg/l. Not less than 4.0 mg/l at any time.

3.2.6 TEMPERATURE

(a) Trout Production Waters - Natural temperatures shall prevail except where properly treated wastewater effluents may be discharged. Where such discharges occur, stream temperatures shall not be raised more than 1^{o} F.

(b) Trout Maintenance Streams - No heat may be added which would cause temperatures to exceed 2^{o} F. over the natural temperatures at any time or which would cause temperatures in excess of 68^{o} F.

Reductions in temperatures may be permitted where it can be shown that trout will benefit without detriment to other designated water uses. The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

(c) Trout Maintenance Lakes - No thermal alterations except where it can be shown to benefit the designated uses.

(d) Nontrout Waters - No thermal alterations, except in designated mixing zones, which would cause temperatures to deviate more than 5^{o} F. at any time from natural stream temperatures or more than 3^{o} F. in the epilimnion of lakes and other standing waters.

No heat may be added, except in designated mixing zones, which would cause temperatures to exceed 82^{o} F. for small mouth bass or yellow perch waters or 86^{o} F. for other nontrout waters.

The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

3.2.7 RADIOACTIVITY

Current U. S. Public Health Service Drinking Water Standards shall apply.

3.2.8 BACTERIAL QUALITY

Fecal coliform levels shall not exceed a geometric mean of 200/100 ml. Samples shall be obtained at sufficient frequencies and at locations and during periods which will permit valid interpretation of laboratory analyses.

Appropriate sanitary surveys shall also be carried out as a supplement to such sampling and laboratory analyses.

SECTION 3.3 - SURFACE WATER QUALITY CRITERIA FOR FW-3 WATERS

CLASS FW-3 - Fresh surface waters suitable for the maintenance, migration and propagation of the natural and established biota; and for primary contact recreation; industrial and agricultural water supply and any other reasonable uses.

3.3.1 FLOATING SOLIDS, SETTLEABLE SOLIDS, OIL, GREASE, COLOR AND TURBIDITY

None noticeable in the water or deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota. None which would render the waters unsuitable for the designated uses.

3.3.2 TOXIC OR DELETERIOUS SUBSTANCES INCLUDING BUT NOT LIMITED TO MINERAL ACIDS, CAUSTIC ALKALI, CYANIDES, HEAVY METALS, CARBON DIOXIDE, AMMONIA OR AMMONIUM COMPOUNDS, CHLORINE, PHENOLS, PESTICIDES, ETC.

None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota or which would render the waters unsuitable for the designated uses.

3.3.3 TASTE AND ODOR PRODUCING SUBSTANCES

None offensive to humans or which would produce offensive tastes and/or odors in fauna used for human consumption. None which would render the waters unsuitable for the designated uses.

3.3.4 pH

Between 6.5 and 8.5.

3.3.5 DISSOLVED OXYGEN

(a) Trout Production Waters - Not less than 7.0 mg/l at any time.

(b) Trout Maintenance Streams - Daily average not less than 6.0 mg/l. Not less than 5.0 mg/l at any time.

(c) Trout Maintenance Lakes - Daily average not less than 6.0 mg/l. Not less than 5.0 mg/l at any time.

In eutrophic lakes when stratification is present, not less than 4.0 mg/l in or above the thermocline where water temperatures are below 72° F. At depths where the water is 72° F. or above, daily average not less than 6.0 mg/l and not less than 5.0 mg/l at any time.

(d) Nontrout Waters - Daily average not less than 5.0 mg/l. Not less than 4.0 mg/l at any time.

3.3.6 TEMPERATURE

(a) Trout Production Waters - Natural temperatures shall prevail except where properly treated wastewater effluents may be discharged. Where such discharges occur, stream temperatures shall not be raised more than 1° F.

(b) Trout Maintenance Streams - No heat may be added which would cause temperatures to exceed 2° F. over the natural temperatures at any time or which would cause temperatures in excess of 68° F.

Reductions in temperatures may be permitted where it can be shown that trout will benefit without detriment to other designated water uses. The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

(c) Trout Maintenance Lakes - No thermal alterations except where it can be shown to benefit the designated uses.

(d) Nontrout Waters - No thermal alterations, except in designated mixing zones which would cause temperatures to deviate more than 5° F. at any time from natural stream temperatures or more than 3° F. in the epilimnion of lakes and other standing waters.

No heat may be added, except in designated mixing zones, which would cause temperatures to exceed 82° F. for small mouth bass or yellow perch waters or 86° F. for other nontrout waters.

The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

3.3.7 RADIOACTIVITY

Current U. S. Public Health Service Drinking Water Standards shall apply.

3.3.8 BACTERIAL QUALITY

Fecal coliform levels shall not exceed a geometric mean of 200/100 ml. Samples shall be obtained at sufficient frequencies and at locations and during periods which will permit valid interpretation of laboratory analyses.

Appropriate sanitary surveys shall also be carried out as a supplement to such sampling and laboratory analyses.

SECTION 3.4 - SURFACE WATER QUALITY CRITERIA FOR TW-1 WATERS

CLASS TW-1 - Tidal waters approved as sources of public potable water supply. These waters shall be suitable for public potable water supply after such treatment as shall be required by the Department.

These waters shall be suitable for shellfish harvesting where permitted.

These waters shall also be suitable for the maintenance, migration and propagation of the natural and established biota; and for primary contact recreation; industrial and agricultural water supply and any other reasonable uses.

3.4.1 FLOATING SOLIDS, SETTLEABLE SOLIDS, OIL, GREASE, COLOR AND TURBIDITY

None noticeable in the water or deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota. None which would render the waters unsuitable for the designated uses.

3.4.2 TOXIC OR DELETERIOUS SUBSTANCES INCLUDING BUT NOT LIMITED TO MINERAL ACIDS, CAUSTIC ALKALI, CYANIDES, HEAVY METALS, CARBON DIOXIDE, AMMONIA OR AMMONIUM COMPOUNDS, CHLORINE, PHENOLS, PESTICIDES, ETC.

None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota or which would render the waters unsuitable for the designated uses. None which would cause the Potable Water Standards of the Department for drinking water to be exceeded after appropriate treatment.

3.4.3 TASTE AND ODOR PRODUCING SUBSTANCES

None offensive to humans or which would produce offensive tastes and/or odors in water supplies and biota used for human consumption. None which would render the waters unsuitable for the designated uses.

3.4.4 pH

Between 6.5 and 8.5

3.4.5 DISSOLVED OXYGEN

(a) Trout Maintenance Waters - Daily average not less than 6.0 mg/l. Not less than 5.0 mg/l at any time.

(b) Nontrout Waters - Daily average not less than 5.0 mg/l. Not less than 4.0 mg/l at any time.

3.4.6 TEMPERATURE

(a) Trout Maintenance Streams - No heat may be added which would cause temperatures to exceed 2^{o} F. over the natural temperatures at any time or which would cause temperatures in excess of 68^{o} F.

Reductions in temperatures may be permitted where it can be shown that trout will benefit without detriment to other designated water uses. The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

(b) Nontrout Waters - No heat may be added except in designated mixing zones, which would cause temperatures to exceed 85^{o} F., or 82^{o} F. in yellow perch waters, or which will cause the monthly mean of the maximum daily temperature at any site, prior to the addition of any heat, to be exceeded by more than 4^{o} F. during September through May, or more than 1.5^{o} F. during June through August. The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

3.4.7 RADIOACTIVITY

Current U. S. Public Health Service Drinking Water Standards shall apply.

3.4.8 BACTERIAL QUALITY

(a) Approved Shellfish Harvesting Waters - Where harvesting of shellfish is permitted, requirements established by the National Shellfish Sanitation Program as set forth in its current manual of operations shall apply.

(b) All Other Waters - Fecal coliform levels shall not exceed a geometric mean of 200/100 ml.

Samples shall be obtained at sufficient frequencies and at locations and during periods which will permit valid interpretation of laboratory analyses.

Appropriate sanitary surveys shall be carried out as a supplement to such sampling and laboratory analyses.

SECTION 3.5 - SURFACE WATER QUALITY CRITERIA FOR TW-2 WATERS

CLASS TW-2 - Tidal waters suitable for secondary contact recreation but not primary contact recreation; the maintenance of fish populations; the migration of anadromous fish; the maintenance of wildlife and any other reasonable uses.

3.5.1 FLOATING SOLIDS, SETTLEABLE SOLIDS, OIL, GREASE, COLOR AND TURBIDITY

None noticeable in the water or deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota. None which would render the waters unsuitable for the designated uses.

3.5.2 TOXIC OR DELETERIOUS SUBSTANCES INCLUDING BUT NOT LIMITED TO MINERAL ACIDS, CAUSTIC ALKALI, CYANIDES, HEAVY METALS, CARBON DIOXIDE, AMMONIA OR AMMONIUM COMPOUNDS, CHLORINE, PHENOLS, PESTICIDES, ETC.

None, either alone or in combination with other substances, in such concentrations as to be detrimental to fish or inhibit their natural migration or which would render the waters unsuitable for the designated uses.

3.5.3 TASTE AND ODOR PRODUCING SUBSTANCES

None offensive to humans or which would produce offensive tastes and/or odors in biota used for human consumption. None which would render the waters unsuitable for the designated uses.

3.5.4 pH

Between 6.5 and 8.5.

3.5.5 DISSOLVED OXYGEN

Not less than 4.0 mg/l at any time.

3.5.6 TEMPERATURE

No heat may be added, except in designated mixing zones, which would cause temperatures to exceed 85° F., or which would cause the monthly mean of the maximum daily temperature at any site, prior to the addition of any heat, to be exceeded by more than 4° F. during September through May, or more than 1.5° F. during June through August. The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

3.5.7 RADIOACTIVITY

Current U. S. Public Health Service Drinking Water Standards shall apply.

3.5.8 BACTERIAL QUALITY

Fecal coliform levels shall not exceed a geometric mean of 770/100 ml. Samples shall be obtained at sufficient frequencies and at locations and during periods which will permit valid interpretation of laboratory analyses.

Appropriate sanitary surveys shall also be carried out as a supplement to such sampling and laboratory analyses.

SECTION 3.6 - SURFACE WATER QUALITY CRITERIA FOR TW-3 WATERS

CLASS TW-3 - Tidal waters used primarily for navigation, not recreation. These waters shall be suitable for fish survival and the passage of anadromous fish and for any other reasonable uses.

3.6.1 FLOATING SOLIDS, SETTLEABLE SOLIDS, OIL, GREASE, COLOR AND TURBIDITY

None noticeable in the water or contributing to the formation of sludge deposits.

3.6.2 TOXIC OR DELETERIOUS SUBSTANCES INCLUDING BUT NOT LIMITED TO MINERAL ACIDS, CAUSTIC ALKALI, CYANIDES, HEAVY METALS, CARBON DIOXIDE, AMMONIA OR AMMONIUM COMPOUNDS, CHLORINE, PHENOLS, PESTICIDES, ETC.

None, either alone or in combination with other substances, in such concentrations as to cause fish mortality or inhibit their natural migration or which would render the waters unsuitable for the designated uses.

3.6.3 TASTE AND ODOR PRODUCING SUBSTANCES

None offensive to humans or which would produce offensive tastes and/or odors in fauna used for human consumption. None which would render the waters unsuitable for the designated uses.

3.6.4 pH

Between 6.5 and 8.5.

3.6.5 DISSOLVED OXYGEN

Not less than 3.0 mg/l at any time.

3.6.6 TEMPERATURE

No heat may be added, except in designated mixing zones, which would cause temperatures to exceed 85° F., or which would cause the monthly mean of the maximum daily temperature at any site, prior to the addition of any heat, to be exceeded by more than 4° F. during September through May, or more than 1.5° F. during June through August. The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

3.6.7 RADIOACTIVITY

Current U. S. Public Health Service Drinking Water Standards shall apply.

3.6.8 BACTERIAL QUALITY

Fecal coliform levels shall not exceed a geometric mean of 1500/100 ml. Samples shall be obtained at sufficient frequencies and at locations and during periods which will permit valid interpretation of laboratory analyses.

Appropriate sanitary surveys shall also be carried out as a supplement to such sampling and laboratory analyses.

SECTION 3.7 - SURFACE WATER QUALITY CRITERIA FOR CW-1 WATERS

CLASS CW-1 - The waters of the Atlantic Ocean within 1500 feet from mean low tide shoreline or to a bottom depth of 15 feet below the mean low tide elevation, whichever is more distant from the mean low tide shoreline.

These waters shall be suitable for primary contact recreation; the maintenance, migration and propagation of the natural and established biota and any other reasonable uses.

3.7.1 FLOATING SOLIDS, SETTLEABLE SOLIDS, OIL, GREASE, COLOR AND TURBIDITY

None noticeable in the water or deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota. None which would render the waters unsuitable for the designated uses.

3.7.2 TOXIC OR DELETERIOUS SUBSTANCES INCLUDING BUT NOT LIMITED TO MINERAL ACIDS, CAUSTIC ALKALI, CYANIDES, HEAVY METALS, CARBON DIOXIDE, AMMONIA OR AMMONIUM COMPOUNDS, CHLORINE, PHENOLS, PESTICIDES, ETC.

None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota or which would render the waters unsuitable for the designated uses.

3.7.3 TASTE AND ODOR PRODUCING SUBSTANCES

None offensive to humans or which would produce offensive tastes and odors in biota used for human consumption. None which would render the waters unsuitable for the designated uses.

3.7.4 pH

Between 6.5 and 8.5.

3.7.5 DISSOLVED OXYGEN

Not less than 5.0 mg/l at any time.

3.7.6 TEMPERATURE

No heat may be added directly to these waters. As a result of any heat which may be added elsewhere, the temperature at any given site may not exceed 80° F., nor may the monthly mean of the maximum daily temperature, prior to the addition of any heat, be exceeded by more than 4° F. during September through May or more than 1.5° F. during June through August.

3.7.7 RADIOACTIVITY

Current U. S. Public Health Service Drinking Water Standards shall apply.

3.7.8 BACTERIAL QUALITY

Fecal coliform levels shall not exceed a geometric mean of 50/100 ml. Samples shall be obtained at sufficient frequencies and at locations and during periods which will permit valid interpretation of laboratory analyses.

Appropriate sanitary surveys shall also be carried out as a supplement to such sampling and laboratory analyses.

SECTION 3.8 - SURFACE WATER QUALITY CRITERIA FOR CW-2 WATERS

CLASS CW-2 - Atlantic Ocean waters beyond those established under CW-1 to the three mile limit.

These waters shall be suitable for secondary contact recreation; the maintenance, migration and propagation of the natural and established biota and any other reasonable uses.

3.8.1 FLOATING SOLIDS, SETTLEABLE SOLIDS, OIL, GREASE, COLOR AND TURBIDITY

None noticeable in the water or deposited on the aquatic substrata in quantities detrimental to the natural biota. None which would render the waters unsuitable for the designated uses.

3.8.2 TOXIC OR DELETERIOUS SUBSTANCES INCLUDING BUT NOT LIMITED TO MINERAL ACIDS, CAUSTIC ALKALI, CYANIDES, HEAVY METALS, CARBON DIOXIDE, AMMONIA OR AMMONIUM COMPOUNDS, CHLORINE, PHENOLS, PESTICIDES, ETC.

None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota or which would render the waters unsuitable for the designated uses.

3.8.3 TASTE AND ODOR PRODUCING SUBSTANCES

None offensive to humans or which would produce offensive tastes and odors in fauna used for human consumption. None which would render the waters unsuitable for the designated uses.

3.8.4 pH

Between 6.5 and 8.5.

3.8.5 DISSOLVED OXYGEN

Not less than 5.0 mg/l at any time.

3.8.6 TEMPERATURE

No heat may be added, except in designated mixing zones, which would cause the temperature to exceed 80° F., or which would cause the monthly mean of the maximum daily temperature at any site, prior to the addition of any heat, to be exceeded by more than 4° F. during September through May; or more than 1.5° F. during June through August. The rate of temperature change in designated mixing zones shall not cause mortality of the biota.

3.8.7 RADIOACTIVITY

Current U. S. Public Health Service Drinking Water Standards shall apply

3.8.8 BACTERIAL QUALITY

Fecal coliform levels shall not exceed a geometric mean of 200/100 ml. Samples shall be obtained at sufficient frequencies and at locations and during periods which will permit valid interpretation of laboratory analyses.

Appropriate sanitary surveys shall also be carried out as a supplement to such sampling and laboratory analyses.

ATLANTIC COASTAL PLAIN

IMPLEMENTATION PLAN

NEW JERSEY STATE DEPARTMENT OF HEALTH

DIVISION OF CLEAN AIR AND WATER

WATER POLLUTION CONTROL PROGRAM

STREAM CLASSIFICATION - STANDARDS OF QUALITY - IMPLEMENTATION

SECTION VI

ATLANTIC COASTAL PLAIN

Hearing

Three hearings were held at locations within the Atlantic Coastal Plain. The locations were Asbury Park (March 15, 1967), Toms River (March 22, 1967) and Ocean City (March 29, 1967). The hearings were conducted by representatives of the State Department of Health assigned by the State Commissioner of Health. The hearings were well attended.

Preparations for the hearings included recommendations for classification made by the Interdepartmental Committee, advertising and other formal notification, etc. These procedures, with some refinements, were substantially the same as those followed for the hearing on the Raritan River Basin detailed herein (Section II); documentation is included herewith.

Classification

Effective May 24, 1967 the State Department of Health issued regulations entitled "Regulations Concerning Classifications of the Surface Waters of the Atlantic Coastal Plain." These regulations cover interstate as well as intrastate streams in the coastal plain.

The fresh water streams were classified as FW-1, FW-2 and FW-3, depending upon the anticipated uses of the streams. The only change reflected by the regulations adopted by the State Department of Health from the recommendations made by the Interdepartmental Committee had to do with the fresh water streams in Ocean County. The classification established for these streams was FW-2 rather than FW-3. This was in consideration of the request made by the Board of Chosen Freeholders of the County of Ocean at the hearing, and later confirmed by the Freeholders as well as the Toms River Water Company which serves a substantial population in the Toms River area of Ocean County. This change merely establishes somewhat more stringent control over future discharges, if any, especially industrial wastes to these fresh waters

so that they may be available as sources of public water supply in the future. The interstate waters of the basin were classified as TW-1, CW-1 and CW-2. For details of the standards of quality applicable to each water classification, reference is made to the "Regulations Establishing Certain Classifications to be Assigned to the Waters of this State and Standards of Quality to be Maintained in Waters so Classified, "adopted by the State Department of Health, effective September 1, 1964 and amended on January 5, 1966 and March 6, 1967.

Notification of Classification

Notification of classification of the waters of the Atlantic Coastal Plain was given to all parties present at the hearings held on March 15, 22 and 29. There also was wide coverage of the classifications in the press throughout the drainage basin as well as elsewhere in the State of New Jersey.

Implementation Plan

For details on the Implementation Plan in the Atlantic Coastal Plain, which is basically the same for the entire State of New Jersey, reference is made to Section II herein.

The initial step for implementation of the classification program in the Atlantic Coastal Plain was the enactment of rules and regulations establishing minimum degrees of treatment for domestic and industrial wastes. These regulations entitled "Regulations Concerning Treatment of Wastewaters, Domestic and Industrial Separately or in Combination, Discharged into the Waters of the Atlantic Coastal Plain, including the Atlantic Ocean" carry an effective date of June 1, 1967.

Formal orders establishing timetables for appropriate action including terminal dates for the completion of indicated construction have been issued against every municipality and other entities known to be contributors to the pollution of the interstate waters of the Atlantic Coastal Plain (list included herewith). (A copy of the order issued against the Borough of Pleasantville is included herewith as a sample. The timetable is identical for all orders issued in the Coastal Plain. Similar orders will be issued late in June or early in July 1967 against all offenders discharging to the fresh waters of the Coastal Plain.)

The interstate waters of the Atlantic Coastal Plain are used for recreational purposes including bathing, boating and fishing, and, "where permitted," shellfish harvesting. There are no changes anticipated in the uses of these waters, except that it is hoped that some of the waters may be restored so that expansion of the waters where shellfish harvesting is permitted may be practicable.

Enhancement of the quality of the polluted inland tidal waters (interstate waters) of the Atlantic Coastal Plain is a foregone conclusion. Almost without exception the only sewage treatment provided in this area to date has been primary treatment plus chlorination. The new standards require a very high degree of treatment (95%) removal of biochemical oxygen demand at all times.

There is no reason to anticipate substantial measureable enhancement of the quality of the relatively clean ocean surf waters in the immediate future. However, the high degree of treatment (85% biochemical oxygen demand removal) being required with discharge into waters 30 to 50 feet in depth will provide a safety factor in protection for the future beyond that which can be anticipated at present with only primary treatment and chlorination with effluent discharge only a thousand feet beyond mean low water. Henceforth no "to sea" pumping of sludge through outfall pipes will be permitted in designs of new facilities to be constructed under Orders issued. All outfall locations will be as recommended from engineering and oceanographic studies. It is anticipated that there may be some consideration of ground water recharge with effluents especially in the Cape May County area but there is nothing definitive along this line.

The most significant criterion for acceptance or rejection of the quality of the inland tidal waters along the Atlantic Coast in New Jersey is, of course, their acceptability for shellfish harvesting. The shellfish program of the State Department of Health in collaboration with the water pollution control program maintains a continual surveillance of the shellfish waters and voluminous bacteriological data are maintained. This information is in the possession of the Federal authorities, especially the United States Public Health Service, and the Federal Water Pollution Control Administration.

The length of the coast line involved in consideration of the shellfish industry is approximately 120 miles. Charts included herewith show the location of the waters of concern to the shellfish program and industry. Of the 164,855 acres of waters in question, 35,510 acres are closed for shellfish harvesting. Approximately 1,870 acres are open seasonally.

The largest single "open" body of water is Barnegat Bay where high water quality has been maintained. Water quality decreases sharply below Great Bay. At least 75% of the Bay water in Atlantic and Cape May Counties is "condemned." This is attributed in large measure to the discharge of sewage treatment plant effluents (primary treatment and chlorination) into these waters. In contrast to this situation, most of the sewage collected in coastal communities and nearby communities along the Barnegat Bay use the Atlantic Ocean for ultimate treated waste disposal.

The detrimental effect of localized pollution of fresh water streams entering the inland tide waters along the coast is known to be

minimal even though there has been no comprehensive scientific analyses made in this situation. There are included herewith tabulations of typical analyses of samples collected from major fresh water tributaries discharging to the inland tidal waters.

Reference is made to Section II herein for information upon the routine surveillance program, routine stream sampling and law enforcement procedures which are common to all watersheds in the State of New Jersey. It is significant to add that in the ocean bathing areas, routine surveillance is intensified during the summer season by random spot checks on treatment plant operation on Saturdays, Sundays and Holidays. This has the effect of alerting the treatment plant operators to their responsibilities and this additional surveillance is carried on under the threat of beach closings if such should be found necessary. It is believed that this activity has been most effective.

SECTION VI
ATLANTIC COASTAL PLAIN
SOURCES OF POLLUTION COVERED BY ORDERS ISSUED
PART 1 - OCEAN DISCHARGES

Municipality	Owner	Present Method of Treatment
Borough of Allenhurst	Borough of Allenhurst	Primary
City of Asbury Park	City of Asbury Park	Primary
Borough of Avon-By-The-Sea	Borough of Avon-By-The-Sea	Primary
Borough of Bay Head	Borough of Bay Head	Primary
Borough of Beach Haven	Beach Haven Sewerage Authority	Primary
Borough of Belmar	Borough of Belmar	Primary
Berkeley Township	Berkeley Township Sewerage Authority (So. Seaside Park)	Secondary
Borough of Bradley Beach	Borough of Bradley Beach (Evergreen Avenue)	Primary
Borough of Bradley Beach	Borough of Bradley Beach (Ocean Park Avenue)	Primary
Borough of Deal	Borough of Deal	Primary
Dover Township	Dover Sewerage Authority (Ortley Beach)	Primary
Borough of Lavallette	Borough of Lavallette	Primary
Long Beach Township	Long Beach Sewerage Authority	Primary
City of Long Branch	Long Branch Sewerage Authority (Joline Avenue)	Primary
City of Long Branch	Long Branch Sewerage Authority (Long Branch Avenue)	Primary
Borough of Manasquan	Borough of Manasquan	Primary
Borough of Neptune City	Borough of Neptune City	Primary
Neptune Township	Township of Neptune (#1)	Secondary

Municipality	Owner	Present Method of Treatment
Neptune Township	Township of Neptune (#2)	Primary
Neptune Township (Ocean Grove)	Ocean Grove Camp Meeting Assn. of the Methodist Church	Primary
Ocean Township	Twp. of Ocean - Borough of Interlaken Joint Sewer Commission	Primary
Ocean Township	Township of Ocean Sewerage Authority	Secondary (Under Construction)
Borough of Point Pleasant Beach	Borough of Point Pleasant Beach	Primary
Borough of Sea Bright	Borough of Sea Bright	Primary
Borough of Sea Girt	Borough of Sea Girt	Primary
Borough of Seaside Heights	Borough of Seaside Heights	Primary
Borough of Seaside Park	Borough of Seaside Park	Primary
Borough of Ship Bottom	Ship Bottom Sewerage Authority	Primary
Borough of Spring Lake	Borough of Spring Lake (Pennsylvania Avenue)	Primary
Borough of Spring Lake	Borough of Spring Lake (Pitney Avenue)	Primary
Borough of Spring Lake Heights	Borough of Spring Lake Heights	Primary
Borough of Surf City	Borough of Surf City	Primary

SECTION VI
ATLANTIC COASTAL PLAIN
SOURCES OF POLLUTION COVERED BY ORDERS ISSUED
PART 2 - INLAND TIDEWATER DISCHARGES

Municipality	Owner	Present Method of Treatment
Atlantic City	Atlantic City Sewer Company (City Island)	Primary
Atlantic City	Atlantic City Sewer Company (Texas Avenue)	Primary
Atlantic City	Vornado Inc.	Secondary
Atlantic City	Spencer Gifts Inc.	Secondary
Borough of Avalon	Avalon Sewerage Authority	Secondary
Berkeley Township	Berkeley Township Sewerage Authority (Clamming Creek)	Secondary
Berkeley Township	Berkeley Township Sewerage Authority (Berkeley Shores)	Secondary
Brick Township	Brick Township	Tertiary
City of Brigantine	City of Brigantine	Secondary
Dennis Township	New Jersey Highway Authority (Seaville Service Center)	Secondary
Dover Township	Dover Sewerage Authority (Tom's River)	Secondary
Dover Township	Dover Sewerage Authority (Bellcrest)	Secondary
Dover Township	Dover Township Board of Education	Secondary
Galloway Township	New Jersey Highway Authority (Atlantic City Service Center)	Tertiary
Galloway Township	Seaview Country Club	Primary
Borough of Island Heights	Borough of Island Heights	Secondary
Lacey Township	New Jersey Highway Authority (Forked River Service Center)	Secondary

Municipality	Owner	Present Method of Treatment
Lacey Township	State of New Jersey (Forked River Marina)	Secondary
Little Egg Harbor Township	Mystic Isles Sewerage Company, Inc.	Secondary
Borough of Longport	Borough of Longport (35th Street)	Primary
Lower Township	Board of Education of the Lower Cape May Regional School District	Secondary
Middle Township	Garden Lake Corporation	Secondary
Middle Township	Middle Township Sewerage District #1 (Cape May Court House)	Primary
City of North Wildwood	City of North Wildwood	Primary
Ocean City	Ocean City	Secondary
Ocean City	Ocean City Sewer Service Company	Primary
Ocean Township	Mid-Jersey Sewerage Company Inc. (Skipper's Cove)	Secondary
City of Pleasantville	City of Pleasantville	Secondary
Borough of Point Pleasant	Point Pleasant Board of Education	Secondary
Sea Isle City	Sea Isle City	Primary
City of Somer's Point	Somer's Point City Sewerage Authority	Secondary
Stafford Township	Stafford Township Municipal Utilities Authority	Tertiary
Borough of Stone Harbor	Borough of Stone Harbor	Primary
Borough of Tuckerton	Tuckerton Municipal Utilities Authority	Secondary
Union Township (Ocean County)	Indianola Sewage Company	Tertiary

Municipality	Owner	Present Method of Treatment
City of Ventnor	Ventnor-Margate Joint Sewer Commission	Primary
Wall Township	New Jersey Highway Authority	Secondary
City of Wildwood	City of Wildwood	Primary
Borough of Wildwood Crest	Borough of Wildwood Crest	Primary

STATE OF NEW JERSEY

DEPARTMENT OF HEALTH

JOHN FITCH PLAZA, P.O. BOX 1540, TRENTON, 08625

ORDER

WHEREAS, the State Department of Health of the State of New Jersey did promulgate "Regulations Establishing Certain Classifications to be Assigned to the Waters of this State and Standards of Quality to be Maintained in Waters so Classified," effective September 1, 1964 and amended the said regulations on January 5, 1966 and March 6, 1967, and

WHEREAS, the State Department of Health of the State of New Jersey did after public hearings conducted by the Department on March 15, 22 and 29, 1967 promulgate regulations entitled "Regulations Concerning Classification of the Surface Waters of the Atlantic Coastal Plain," effective May 24, 1967, and

WHEREAS, the State Department of Health of the State of New Jersey did promulgate regulations entitled "Regulations Concerning Treatment of Wastewaters, Domestic and Industrial Separately or in Combination, Discharged into the Waters of the Atlantic Coastal Plain, including the Atlantic Ocean," effective June 1, 1967, and

WHEREAS, the State Department of Health of the State of New Jersey has found through investigations made by its representatives that the sewage treatment plant owned and operated by the City of Pleasantville, in the County of Atlantic and the State of New Jersey, does not conform to the aforesaid regulations of the State Department of Health, and is inadequate in capacity or unit design to properly care for, treat and dispose of the sewage received therein before an effluent from the said sewage treatment plant is discharged into the waters of the Lakes Bay, being waters of the Atlantic Coastal Plain, being waters of this State, thereby causing or threatening injury to the inhabitants of this State either in their health, comfort or property, and

WHEREAS, the State Department of Health of the State of New Jersey, in consideration of the aforesaid, is of the opinion that in order for the sewage to be properly, adequately and sufficiently treated at the said sewage treatment plant before an effluent is discharged into the said waters of this State, the said sewage treatment plant must be altered, added to or improved in a manner approved by the State Department of Health, and

WHEREAS, it is incumbent upon the State Department of Health of the State of New Jersey to be specific as to the minimum degree of sewage treatment meeting the approval of the said State Department of Health, and a timetable of significant events including the contemplated dates for the completion of construction of sewage treatment projects,

THEREFORE, NOTICE IS HEREBY GIVEN by the State Department of Health of the State of New Jersey pursuant to R.S. 58:12-2 to the City of Pleasantville, in the County of Atlantic and the State of New Jersey, requiring that the said City of Pleasantville must and shall, prior to November 30, 1970, cease the discharge of improperly, inadequately and insufficiently treated sewage into the waters of the Lakes Bay being waters of the Atlantic Coastal Plain, being waters of this State, and must alter add to or improve the sewage treatment plant operated by the City of Pleasantville including sewage treatment units designed to provide at all times a minimum of ninety-five percent (95%) reduction in biochemical oxygen demand of the sewage received at the said sewage treatment plant, the biochemical oxygen demand of the effluent of said plant not to exceed fifteen (15) parts per million, or, if in lieu of the discharge of the effluent to the Lakes Bay an effluent is to be discharged into the Atlantic Ocean, then the treatment units shall be designed to provide at all times a minimum of eighty-five percent (85%) reduction in biochemical oxygen demand of the sewage received at the said sewage treatment plant, the biochemical oxygen demand of the effluent of said plant not to exceed forty (40) parts per million, and including units for effective year around effluent disinfection, in order that the sewage received therein shall be cared for, treated and disposed of and the effluent discharged in a manner approved by the State Department of Health of the State of New Jersey, and in order that the treatment and disposal of said effluent shall meet the applicable standards of water quality described by regulations of the State Department of Health entitled "Regulations Concerning Classification of the Surface Waters of the Atlantic Coastal Plain," effective May 24, 1967, and, the regulations of the State Department of Health entitled "Regulations Concerning Treatment of Wastewaters, Domestic and Industrial Separately or in Combination, Discharged into the waters of the Atlantic Coastal Plain, Including the Atlantic Ocean," effective June 1, 1967, and in effecting abatement of pollution of the waters of this State within the time hereinabove provided shall execute the following work performance schedule:

(1) Complete an engineering report upon the proposed basis of design of additions and alterations with review and approval of same by the State Department of Health on or before April 30, 1968;

(2) Complete preparation of and secure review and approval of preliminary engineering plans on or before October 30, 1968;

(3) Complete preparation of and secure review and approval of detailed contract plans and specifications on or before June 1, 1969;

(4) Award construction contracts on or before October 1, 1969;

(5) Complete construction on or before November 30, 1970;

(6) The work performance scheduled herein shall be in conformity with the master engineering plan for sewerage services in the County of Atlantic as approved by the New Jersey State Department of Health and the design of any ocean outfall sewer shall be in conformity with a feasibility study and report upon the design of such ocean outfalls along the coast of Atlantic County as approved by the New Jersey State Department of Health.

STATE DEPARTMENT OF HEALTH OF THE STATE OF NEW JERSEY

Richard J. Sullivan, Director
Division of Clean Air and Water

Dated: June 16, 1967

REGULATIONS CONCERNING TREATMENT OF WASTEWATERS, DOMESTIC AND INDUSTRIAL SEPARATELY OR IN COMBINATION, DISCHARGED INTO THE WATERS OF THE ATLANTIC COASTAL PLAIN, INCLUDING THE ATLANTIC OCEAN

WHEREAS, the State Department of Health is charged with the responsibility for the Water Pollution Control Program, including the approval of the designs of wastewater treatment facilities, in the State of New Jersey, and

WHEREAS, the citizens of this State, particularly the citizens in the Atlantic Coastal Plain, have been obliged in recent years to suffer repeatedly the consequences of serious oxygen depletion and other exemplifications of pollution in waters of the Atlantic Coastal Plain, said exemplifications of water pollution constituting threats to the public health, comfort or property of citizens of this State, and

WHEREAS, the State Department of Health did promulgate rules and regulations entitled "Regulations Establishing Certain Classifications to be Assigned to the Waters of this State and Standards of Quality to be Maintained in Waters so Classified," effective September 1, 1964, and amended said rules and regulations on January 5, 1966 and March 6, 1967, and

WHEREAS, the State Department of Health has concluded after extensive investigations and analyses of factual data that more intensive treatment of wastewaters must be provided throughout the Atlantic Coastal Plain in order to attain water quality specified by the aforesaid regulations of the Department, and

WHEREAS, the State Department is of the opinion that the attainment and maintenance of water quality in the Atlantic Coastal Plain as specified by the aforesaid regulations of the Department is necessary in order to abate a present threat to the public health, comfort or property of citizens of this State,

NOW, THEREFORE, the State Department of Health promulgates the following regulations entitled "Regulations Concerning Treatment of Wastewaters, Domestic And Industrial, Separately or in Combination, Discharged into the Waters of the Atlantic Coastal Plain, including the Atlantic Ocean."

NEW JERSEY STATE DEPARTMENT OF HEALTH

Filed with Secretary of State: May 1, 1967

Effective Date: June 1, 1967

REGULATIONS CONCERNING TREATMENT OF WASTEWATERS, DOMESTIC AND INDUSTRIAL SEPARATELY OR IN COMBINATION, DISCHARGED INTO THE WATERS OF THE ATLANTIC COASTAL PLAIN, INCLUDING THE ATLANTIC OCEAN

Pursuant to the authority vested in it under the provisions of Chapter 12, Title 58 of the Revised Statutes, the State Department of Health hereby promulgates the following regulations concerning treatment of wastewaters, domestic and industrial, separately or in combination, discharged into the waters of the Atlantic Coastal Plain.

I. Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Atlantic Coastal Plain classified as FW-2 or FW-3 or TW-1, shall be treated to a degree providing, as a minimum, ninety-five percent (95%) of reduction of biochemical oxygen demand at all times including any four-hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions; it is an objective of this regulation that the biochemical oxygen demand of effluents discharged shall not exceed 15 parts per million.

II. Henceforth, industrial wastes, prior to discharge into waters of the Atlantic Coastal Plain, classified as FW-2, FW-3 or TW-1, shall be treated to a degree providing, as a minimum, ninety-five percent (95%) of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain receiving waters, after reasonable effluent dispersion, as specified in the rules and regulations entitled "Regulations Concerning Classification of the Surface Waters of the Atlantic Coastal Plain," effective May 24, 1967; it is an objective of this regulation that the biochemical oxygen demand of effluents discharged shall not exceed 15 parts per million.

III. Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Atlantic Coastal Plain classified as CW-1 or CW-2, shall be treated to a degree providing, as a minimum, eighty-five percent (85%) of reduction of biochemical oxygen demand at all times, including any four-hour period of a day when the average of the wastes to be treated might be expected to exceed average conditions; it is an objective of this regulation that the biochemical oxygen demand of effluents discharged shall not exceed 40 parts per million.

IV. Henceforth, industrial wastes prior to discharge into waters of the Atlantic Coastal Plain, classified as CW-1 or CW-2, shall be treated to a degree providing, as a minimum, eighty-five percent (85%) of reduction of biochemical oxygen demand at all times and such further reduction of biochemical oxygen demand as may be necessary in order to maintain the receiving waters in a quality as specified by the rules and regulations entitled "Classification of the Surface Waters of the Atlantic Coastal Plain," effective May 24, 1967.

V. It is recognized, especially in connection with some industrial wastes, that the pollution load imposed upon the waters of the Plain

cannot be evaluated fully exclusively by the biochemical oxygen demand test; therefore, each industrial waste problem shall be considered individually and treatment shall be required as needed to effect compliance with the Water Quality Criteria established for the various classifications of waters in the Plain.

VI. Treatment standards set by these regulations are the minimum acceptable for the Atlantic Coastal Plain. Treatment more intensive than that specified hereinabove shall be provided whenever it is determined by the State Department of Health that such treatment is necessary.

Filed with Secretary of State: May 1, 1967

Effective Date: June 1, 1967

APPENDIX B

SLUDGE POLICY STATEMENT

NEW JERSEY

STATEMENT BY GOVERNOR WILLIAM T. CAHILL ON SLUDGE BARGING TO SEA

Earlier this week, it became necessary for me to proclaim a state of emergency in New Jersey in order to prevent horrendous pollution of our northeast rivers and bays. Under my statutory powers to protect the public in an emergency it was further necessary for this State to commandeer three ocean-going barges and their crews to effect the disposal of sludge--the material removed from sewage by treatment--from six of the State's largest sewage treatment plants. Still further, it was necessary for me to seek, and obtain, through the offices of the President of the United States the use of U.S. Coast Guard tugs to propel these barges to sea for dumping. Our inability or failure to take any one of these steps would have resulted in the release into our rivers and bays of 500 million gallons per day of untreated sewage and industrial wastes. This amounts to about one-half of the wastes treated in all of New Jersey's sewage plants and its raw release is clearly intolerable.

The immediate cause of this emergency was the labor strike of tugboat operators. It seems to me, however, that much larger issues are involved than that of the strike.

In the last fifty years, the citizens of New Jersey have invested almost $1 billion in sewage collection and disposal systems for the convenience and water quality protection they would provide. With the aid of our 1969 clean water bond issue we are now launched on another $1 billion construction program for water pollution control. For the operation of a substantial part of these facilities precariously to depend on whether or not there is a tugboat strike, or a strike of barge operators, or upon the vagaries of weather affecting ocean-going travel, or upon other such uncertainties is wrong and unacceptable. Such brinkmanship is incompatible with our ambitious efforts to eliminate the pollution of our waterways.

In addition there is the question of the impact upon our marine environment of the continued practice of dumping millions of tons of sewage sludge, harbor dredgings and certain chemicals in disposal areas less than twelve miles off the Sandy Hook Beach. A study of this impact has been underway for more than a year by the Sandy Hook Marine Laboratory on behalf of the U.S. Army Corps of Engineers. An interim report of the findings of this study was made available to us late yesterday. I have discussed this issue and the significance of the report with officials of the State Health Department.

The report offers evidence that harbor dredgings dumped at the sea disposal site are finding their way to the New Jersey Coastline. Evidence has not yet been adduced that sludge dumpings reach our surf waters. It is clear that the disposal sites and their environs are

devoid of marine life. I am also informed that the invasion of the red tide--a proliferation of toxic microorganisms--which afflicted our beaches two summers ago may have its genesis in the nutrient materials at the dump site.

While the report deals exclusively with dumping off Sandy Hook, similar questions can be raised about dump sites ten miles from the entrance to Delaware Bay used by the Cities of Camden, Philadelphia, Baltimore and others.

All things considered, it is my judgment that the ocean dumping of harbor dredgings and sewage sludge a scant twelve miles from our coast is a primitive, insensitive, and unacceptable method of disposal. I realize that as is usually the case in environment protection there is not a clear choice between the right way and the wrong way. There is a need to make a choice among several somewhat unsatisfactory alternatives. In my opinion we should do the following:

1. Begin phasing out ocean dumping as a regular, accepted, method of disposal of sewage sludge off our coast, and of toxic industrial materials off the continental shelf one hundred miles to sea.

2. For the next few years that it will inevitably take to provide on-land sludge disposal facilities require that all dumping of sewage sludge and harbor dredgings be one hundred miles at sea off the continental shelf. This can be accomplished by agreement or by Congressional enactment requiring that such deep sea dumping be a condition of all permits issued by the Army Corps of Engineers.

3. Incorporate in the design of all new sewage treatment plants facilities for sludge disposal other than by dumping at sea.

4. Seek through agreement or by Congressional enactment the requirement by the Army Corps of Engineers that a condition of ocean dumping permits will be a showing by the applicant that some steps are being taken to provide for on-shore treatment and disposal in the future.

5. Seek the agreement of New York State in this changed approach to sludge disposal in recognition of the fact that New York City and other communities now dump more than twice as much sludge as does the State of New Jersey; and, as well, to seek the concurrence of the States of Pennsylvania and Maryland.

I am informed that sludge disposal by landfill or by incineration are not without their own problems--problems of potential land and air pollution, as well as the high cost of facilities. I am also informed that many of the toxic industrial chemicals now disposed of by deep-sea dumping are difficult and expensive to treat otherwise. We hope that in all of these areas technology, upon demand, will give us innovative improvements. In any case, however, hard choices must be made now if we are to restore and protect the quality of our physical environment.

APPENDIX C

HEAVY METALS SAMPLING RESULTS

NEW JERSEY COASTAL SEWAGE TREATMENT PLANTS

ENVIRONMENTAL PROTECTION AGENCY

March 1, 1972

Chief, Technical Support Branch
S&A, Edison, N.J.

Laboratory Results - New Jersey Coastal Sewage Treatment Plants (2/17/72)

Chief, Surveillance & Analysis Branch

	Lab No.	Settleable Solids ml/l	Total Susp. Solids mg/l	BOD_5 mg/l	TKN mg/l
Atlantic City Infl.	21055	2.0	83	77	20.0
Atlantic City Effl.	21056	0.5	61	94	18.2
Pleasantville Infl.	21057	12.0	215	225	35.2
Pleasantville Effl.	21058	0.1	68	39	28.0
Lakewood Infl.	21060		241	348	30.0
Lakewood Effl.	21059	0.1	44	64	20.0
Belmar Infl.	21061	2.0	64	104	16.4
Belmar Effl.	21062	< .05	36	76	16.0

	Lab No.	NO_3-N mg/l	T-P mg/l	Total Hg mg/l	Cd mg/l	Cu mg/l	Zn mg/l	Cr mg/l	Ni mg/l	CN^- mg/l	Phen mg/
Atlantic City Infl.	21055	.18	6.0	0.001	0.04	0.08	0.15	0.03	<0.05	<0.02	0.0
Atlantic City Effl.	21056	.21	6.0	0.002	0.04	0.08	0.14	0.03	<0.05	<0.02	0.0
Pleasantville Infl.	21057	.31	9.0	0.009	0.03	0.24	3.6	0.02	<0.05	<0.02	0.0
Pleasantville Effl.	21058	.54	9.0	0.001	0.03	0.12	0.4	0.01	<0.05	<0.02	0.0
Lakewood Infl.	21060	.36	13.6	0.001	0.04	0.20	0.30	0.02	<0.05	<0.02	0.2
Lakewood Effl.	21059	.22	8.4	0.001	<0.03	0.07	0.07	0.02	<0.05	<0.02	0.1
Belmar Infl.	21061	.69	7.4	0.002	<0.03	0.06	0.14	<0.01	<0.05	<0.02	0.0
Belmar Effl.	21062	.67	5.2	0.002	<0.03	0.06	0.11	<0.01	<0.05	<0.02	0.0

Francis T. Brezenski

APPENDIX D

Appendix D

The Jersey Atlantic Coastal and Estuarine Environment

The Jersey Coastal Area is essentially estuarine in character and comprises a highly delicate and a highly productive marine environment.

The estuarine zone has often been described as a "buffer zone" between the freshwater runoff from the land and the salt water of the sea - a body of water wherein the salinity of the open ocean has been measurably diluted by the influent from tributary stream (7). It constitutes an environment of land, water and air inhabited by specific plants and animals which are highly interdependent and which are unique in themselves in that their characteristics are the direct result of the interaction of the land and sea upon one another.

The estuarine zone is recognized as the most productive part of the natural environment. The many forms of life include animals and plants which live in the bottom, on the bottom, in the water, on the water, and in the marshes which border much of the coast.

The New Jersey coastal estuaries are characterized by restricted embayments which have been formed over recent geological time by the gradual buildup and connection of offshore barrier beaches and sand spits. These bays are generally elongated and stretch parallel to the mainland. Of the total bay shore length of 240 miles, about 35 miles of the inland bays have sandy beaches. Most of the coastal sounds are

connected to the ocean by rather narrow inlets which range in depth from three to five feet (except for Cape May and Little Egg Inlets). Due to the restrictive nature of these inlets, the embayments normally experience only limited tidal action and as a result are generally quiescent. Since tidal action is dampened, the principle mixing mechanisms are often provided by the prevailing wind and meteorologic conditions. "Except in the immediate vicinity of the coastal inlets, the quantity of littoral drift along the shores of the bay areas is very low. Where shoreline erosion has occurred, it has usually been due principally to the action of storm or wind generated waves and currents, rather than to a continual process of erosion by littoral forces" (8). Thus, the bays themselves tend to be quite shallow and are subject to the continual sedimentation of organic matter from both upland sources and from local biotic growths. Most inland areas along the Jersey coastal region exhibit high animal and plant productivity due largely to their shallow and quiescent nature, as well as to the availability of nutrient sources provided by natural and man-made sources.

The northern shore estuaries, inside the barrier beaches, are relatively broad and shallow and, as such, are generally characteristic of bar-built embayments. Barnegat Bay, for instance, experiences only minor tidal action (ranging approximately one half a foot) except during strong wind periods when this range may vary up to three (3) feet beyond the normal tidal limits.

Conversely, the southern shore estuaries are characterized by relatively narrow, twisting channels connecting shallow sounds and interspersed marshlands. The circulation and mixing phenomena prevalent to some extent in the larger embayments of the north are almost non-existent in this region due to the geophysical restrictions, the smaller surface areas and the general lack of any significant feeder streams. As a consequence, these water systems are highly susceptible to degradation from even the most minute discharges from man-oriented sources.

The bays areas are separated from the coastal waters proper by long, sandy barrier islands "the northern edges of which tend to be eroded and will shrink unless replenished with sand, while the southernmost tips of the islands are elongated" (9).

The coastal shoreline region itself may be separated into two (2) distinct sectors due to the similarities of geomorphologic and hydrologic characteristics within each. The northern sector extends from the northernmost extremity of Sandy Hook southward to Manasquan Inlet. The shoreline of this reach is about 27 miles in length and comprises about 22 percent of the total ocean frontage along the Atlantic Coast of New Jersey. The northern portion of this reach along the Sandy Hook peninsula is covered with low sand dunes interspersed with low sandy beach ridges. The southerly portion of this includes bluff

areas immediately adjoining the ocean and rising up to 25 feet above mean sea level. The accretion of sand along the south side of groins and jetties within this sector and the elongation of Sandy Hook indicate a general predominance of northward littoral drift (8).

The southern sector extends from Manasquan Inlet to Cape May Point and consists mostly of long, sandy barrier islands separated from the mainland by the previously discussed tidal marshes, bays, creeks and lagoons. The entire shore length in this sector stretches 97 miles and all areas have a beach zone. The net direction of littoral drift in the reach is to the southwest (downcoast), due primarily to the predominance of wave activity from the northeast quadrant. Due to the general shielding effect of Long Island, New York, wave activity from the northeast quadrant is significantly reduced in the reach to the northeast of Barnegat Inlet. The result is the creation of a nodal zone generally in the vicinity of this Inlet. Thus, the net direction in the reaches above Barnegat Inlet is to the northeast. In the vicinity of many of the coastal inlets within this sector, local reverses in the direction of the littoral drift have been observed (8). This phenomena, however, is apparently due to the interaction of the immediate tidal currents and the prevailing southwest littoral drift.

Apart from the alongshore currents prevalent in the Jersey coastal region, past drift bottle studies show that a combination of eddies, tidal current and drifts exert a shore-ward component of current during the summer bathing season (10). Similar bed drifter returns suggest bottom currents with a shoreward component of several tenths of a mile per day (11). More recent dye tracer studies performed along the New Jersey Coastal Region were used to evaluate onshore and longshore currents in the selection of desirable regional outfall sites (5).