New Jersey's Coastal Ocean

Basic Information on New Jersey's Coastal Ocean, Pollution, and People - a Guide to Understanding the Problems, the Issues, and the Long Term Solutions

Prepared By

The Planning Group

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Basic Information on New Jersey's Coastal Ocean, Pollution, and People - a Guide to Understanding the Problems, the Issues, and the Long Term Solutions

I. Introduction

The condition of New Jersey's coastal ocean has become a major issue for the people in New Jersey. Most everyone has experienced the New Jersey Shore as a vacation destination or for a one or two day getaway. Vacationers enjoy the beach and the surf during the summer months while boaters, fishermen, nature lovers, and shore residents extend the season from early spring to late fall. No one wants to see pollution spoil the shore.

The Summer of 1987 was very unusual. For seven weeks starting in late July the newspaper headlines were filled with reports of ocean pollution and beach closings. Yet at the same time scientists from the United States Environmental Protection Agency and the New Jersey Department of Environmental Protection were reporting that ocean water quality was excellent. The scientists were looking at high dissolved oxygen levels, water clarity, and low bacterial counts. The people on the beaches were seeing garbage in the water, isolated beach closings and dead dolphins. How can we have a situation where the ocean is healthy, while at the same time, it is suffering from a series of insults that angered everyone? If it was a simple problem there would be a simple answer. Unfortunately the problems are complex and do not lend themselves to quick and easy solutions.

The ocean serves man in many ways. Some of man's activities result in conflicting uses and pollution. One major use is commercial shipping. Cargo ships, tankers and passenger vessels use the ocean as a highway to transport raw materials, finished products, and passengers. Another use is commercial fishing. Fishermen make a living by harvesting marine resources such as fish, clams, and lobsters. The ocean contains a number of minerals which we need to support the lifestyle we all have come to expect. Oil and natural gas are found below the ocean floor. The large oil companies have developed ways to extract minerals from the offshore area and deliver the oil and gas to onshore facilities for processing. The ocean is used for recreation. Ocean bathing, boating, sailing, scuba diving, and recreational fishing are but a few of the leisure time activities of millions of people. Finally, the ocean has been used to dispose of waste materials generated from all aspects of our modern society. Some waste management practices have been found to be relatively harmless to the ocean while others are not acceptable. The ocean has a remarkable ability to process wastes naturally without harm

to living marine resources (fish, marine mammals, plants and birds). However, some chemicals, industrial wastes, and plastics have the potential for ocean pollution and must be regulated. Unfortunately, some of the harmless wastes tend to have small quantities of harmful chemicals associated with them. Disposal of these wastes in the ocean could result in harm to the living marine resources or lessen the enjoyment of swimming in the ocean.

II. Sources of Ocean Pollution

The three major ways the ocean can be polluted are from river and coastal discharges, fallout of air pollutants, and barge dumping. Each pathway is different and its contribution varies greatly. Most people think of ocean dumping of wastes from barges or scows as the primary cause of pollution. Although it is a very visible source, the overall contribution is minor in comparison with land based pollution flowing out into the ocean from our rivers, bays, and coastal areas. Rivers pick up pollutants from many upland sources and deliver them to the coastal ocean in a steady flow. Wastewater discharges from many point sources (effluent) flush out over three billion gallons a day from the Hudson, Passaic, Hackensack, and Raritan River systems. The effluent contains the treated discharges from municipal and industrial sewage treatment plants. In addition, agricultural and urban storm water runoff, accidental and illegal spills of toxic materials and liquid runoff from landfills contribute pollutants to the rivers and eventually to the ocean. The final source of pollutants to the ocean is atmospheric fallout of air pollution. The prevailing winds carry industrial and motor vehicle air pollutants over the ocean where they fall onto the ocean's surface.

III. The Controls Over Ocean Pollution

Ocean disposal of wastes is regulated by both the Federal government and the States of New Jersey and New York. The states have jurisdiction over inland discharge sources and out to three miles from the coastline (this area is known as the territorial sea). Beyond the 3 mile limit, federal jurisdiction takes over. Two federal laws, the Marine Protection, Research, and Sanctuaries Act (Ocean Dumping Act) and the Federal Water Pollution Control Act (Clean Water Act) are the primary tools used by the United States Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), and the U.S. Coast Guard.

The Ocean Dumping Act prohibits ocean disposal of certain types of wastes (hazardous wastes, radioactive waste and floatables). The Act does allow other types of materials to be ocean dumped provided that the material is tested to determine that it will not be harmful to the marine environment. EPA has the regulatory authority to

issue permits for the disposal of municipal sewage sludge, dilute acid wastes, and ocean incineration of wooden debris. EPA also designates the location of ocean disposal sites based on criteria of suitability. The Corps regulates the disposal of dredged material in the ocean as well as within the coastal waters of a State. The U.S. Coast Guard has primary responsibility for surveillance and enforcement of permitted ocean disposal as well as police power over illegal or inadvertent ocean disposal activities.

The States of New York and New Jersey have been given authority by EPA to administer the Clean Water Act within each respective state. All discharges from municipal sewage treatment plants, treated industrial discharges, and landfill discharges require state permits and strict adherence to the requirements of the Clean Water Act and state laws.

Storm water discharges, runoff from agricultural lands, and urban runoff are generally not regulated by permit and thus become a major source of pollution into rivers and streams. In most instances, the states rely on local governments (the counties and municipalities) to develop and implement management plans for non-point sources of pollution. Examples of management activities include street sweeping, pooper scooper laws, storm water detention, and best management practices for agriculture.

IV. Ocean Waste Management Activities Regulated by Federal Agencies

The following sections describe ocean waste management practices which are regulated by the U.S. EPA and the Corps of Engineers. Before any permit is issued, the material to be disposed of in the ocean must be tested to determine acceptability and it must be demonstrated that feasible land based alternatives are not available.

A. Municipal Sewage Sludge - Sewage sludge is the solid portion of human waste. At municipally operated plants the solids settle to the bottom of tanks during the wastewater treatment process. The treated liquid portion (effluent) is discharged through an outfall pipe to a river, bay, or the ocean. Sewage sludge produced in New Jersey is disposed of in one of four ways. It is either ocean dumped (50%), composted and/or land applied (11%), incinerated (19%) or taken to out of state landfills (20%). As the State's sewerage agencies improve their wastewater treatment plants, <u>more</u> sludge will be produced, as much as 50% statewide over the next 5-10 years.

Six large New Jersey sewerage agencies dispose of approximately 926,000 dry pounds of sludge into the ocean each day. This equates to approximately 2.8 million wet

tons per year or enough sludge to fill 3 1/2 towers of the World Trade Center. The sludge that is barged to the ocean is approximately 5% solids and 95% water.

The New Jersey sewerage agencies are the Bergen County Utilities Authority, Passaic Valley Sewerage Commissioners, Joint Meeting of Essex and Union, Linden/Roselle Sewerage Authority, Rahway Valley Sewerage Authority and the Middlesex County Utilities Authority. New York City, Nassau County, and Westchester County also utilize the ocean to dispose of sludge. New York dumpers generate an amount of sludge which could fill 5 towers of the World Trade Center each year.

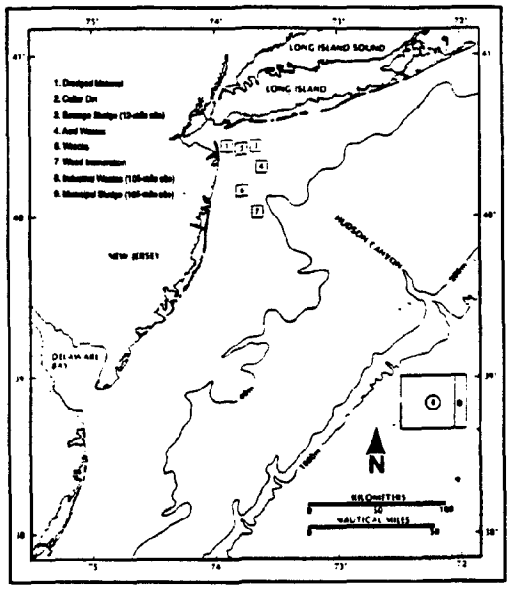
Over 150 smaller New Jersey communities have stopped ocean disposal of sewage sludge since 1976. The United States Congress mandated an end to ocean disposal of all sewage sludge by the end of 1981. New York City sued EPA in Federal Court for the right to remain in the ocean. The City claimed that Congress had banned only the disposal of "harmful sludges". The City's sewage sludge had been previously tested by EPA to determine if it was harmful to the ocean. Based on EPA's criteria of suitability, the City's sludge was found to be acceptable for ocean disposal. New York City won the case and the legal decision was equally applied to the other eight New York and New Jersey ocean dumpers. Therefore the nine sewerage agencies continue to dump under court order. Recently EPA has required that all current dumpers make application for permits which, if issued, will further regulate the disposal activities.

In 1984 EPA denied petitions from the ocean dumpers to continue to use an EPA designated site located near shore and in shallow water (the so-called 12-mile Site). All sludge dumping is being phased out of the 12-mile Site in favor of a deepwater disposal site off of the Continental Shelf (106-mile Site). The transition will be completed by the end of 1987. Scientific evidence thus far indicates that ocean disposal at the 106-mile Site is environmentally acceptable.

The current controversy surrounds a negative public reaction to the ocean and beach incidents of this past summer and a sweeping call to end all ocean dumping. Although an appropriate goal may be to advocate an end to all ocean dumping of sewage sludge, the DEP is faced with the prospect of regulating two land based alternatives which are likely to have much more serious environmental consequences and potential human health risks.

The current ocean dumpers provide sewer service to the heavily industrialized Northeastern portion of the State. A combination of industrial wastewater and household

contaminants result in the sludges having a pollutant loading consisting primarily of heavy metals and petroleum hydrocarbons. The disposal options of incineration and composting with land application each could cause significant pollution to the air or the groundwater.

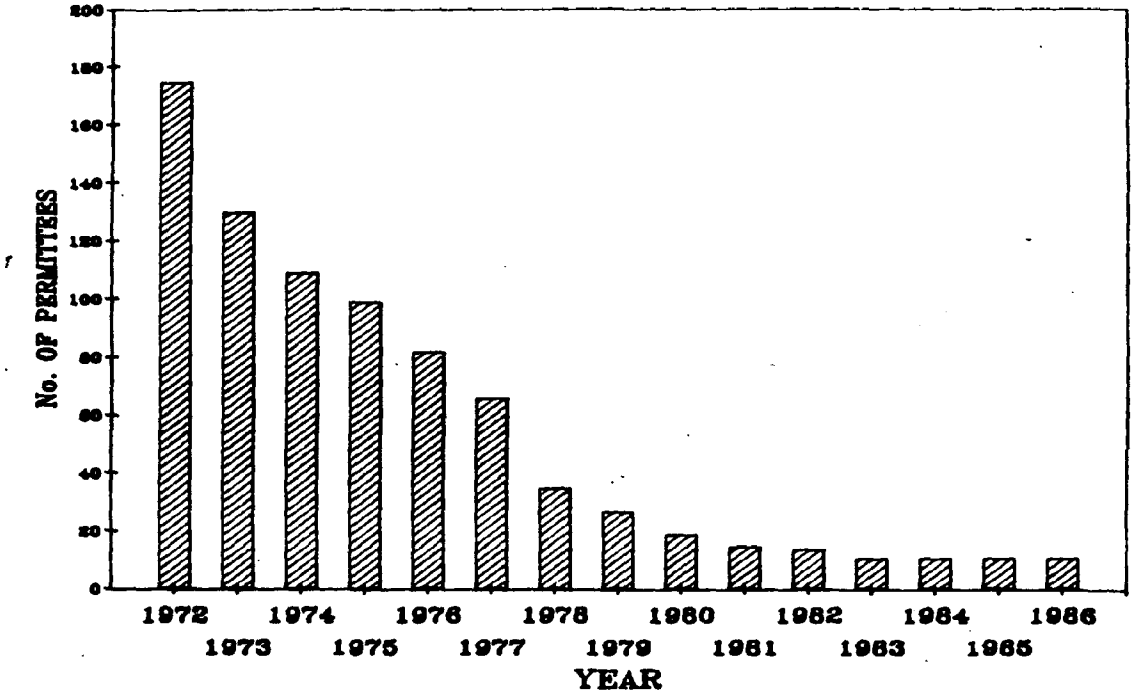


(Enlargement of map on back inside cover)

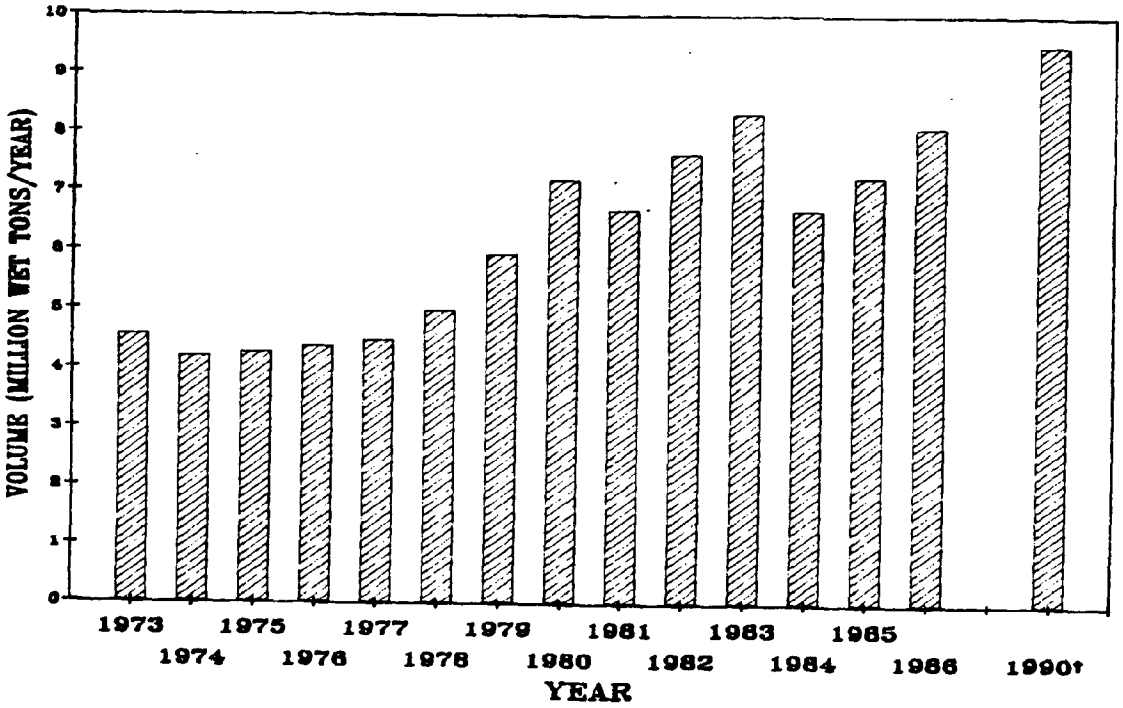
If there is a total phase-out of ocean dumping of sewage sludge, incineration is the only logical alternative. When faced with the prospect of an end to ocean dumping by 1981, the New Jersey sewerage agencies all chose incineration as the way to go. However, when permit applications were submitted to the DEP it was determined that the permits could not be issued based on projected unacceptable air pollution emissions. Since that time the sewerage agencies have implemented industrial pretreatment programs to reduce pollutants coming into their systems. There has also been advances in air pollution control technology and incinerator designs. Several of the sewerage agencies have expressed a willingness to end ocean disposal if incinerator permits could be obtained and funds provided to offset the multi-million dollar costs of incinerator construction.

If the New Jersey sewerage agencies get out of the ocean, it is not a total solution since 60% of the sludge volume comes from New York sewage treatment plants. A bi-state initiative will be necessary to fully end ocean disposal of municipal sewage sludge.

THE PHASING-OUT OF OCEAN DUMPING: MUNICIPAL AND INDUSTRIAL DISCHARGERS -EPA REGION II-



OCEAN DISPOSAL OF SEWAGE SLUDGE NEW YORK AND NEW JERSEY TOTALS



† THE 1990 NUMBER IS A PROJECTED VOLUME

B. Dredged Material - Dredged material is sand, silt and mud which must be periodically removed from navigational channels and docking areas throughout the Port of New York and New Jersey. Natural water depths within the harbor are far too shallow to permit ocean going vessels to enter the Port. Channels must be dug and then maintained at 40 foot water depths in order to accommodate fully loaded vessels. Dredging is a process of "scooping-out" the mud, sand, and silt which accumulates in the channels and docking areas.

New York Harbor dredged material ranges from clean sand taken from the Ambrose Channel (the entrance channel to the harbor) to highly contaminated muds and silts adjacent to industrial areas or sewer outfall pipelines. The contaminents of concern are heavy metals (lead, mercury, chromium etc.), PCBs, and oil and grease. These substances can be toxic to marine life and have the potential of getting into the food chain (i.e. to fish and ultimately to man). In fact, the pollution stress or load from dredged material can be significant, as illustrated by the pie-diagrams on page 9.

It is the general practice for dredged material from the harbor area to be placed onto barges and transported to a disposal site approximately six miles east of Sea Bright, New Jersey. The "Mud Dump Site" is managed by the United States Army Corps of Engineers. The Corps also has responsibility for determining the suitability of the dredged material for ocean disposal and acting on permits under the federal Ocean Dumping Act.

The public concern is the near shore ocean disposal of an average of 7 to 8 million cubic yards of harbor dredged material each year. That amount of dredged material could fill up approximately 4 towers of the World Trade Center annually.

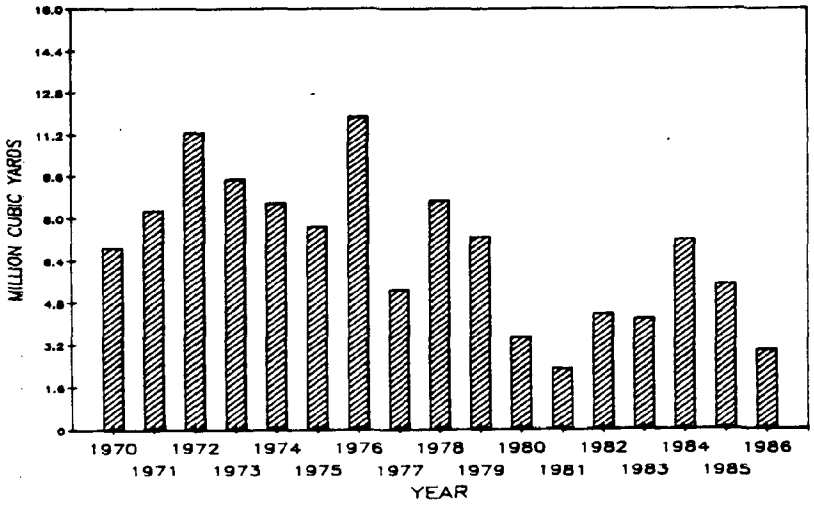
The Corps requires that dredged material from each area of the harbor be thoroughly tested before it is allowed to be disposed of in the ocean. The testing involves exposing marine organisms (a clam, a worm and a shrimp) to a sample of the dredged material in an aquarium. If a large percentage of the animals die, the material fails the test (this is known as a bioassay). If the organisms survive in the aquarium for 10 days, they are then placed in a blender and ground-up. The tissue is then analyzed to determine if the animals picked up chemical contamination while in the fish tank (this is known as bioaccumulation). Ocean disposal is permitted when the proposed dredged material passes both the bioassay and bioaccumulation tests.

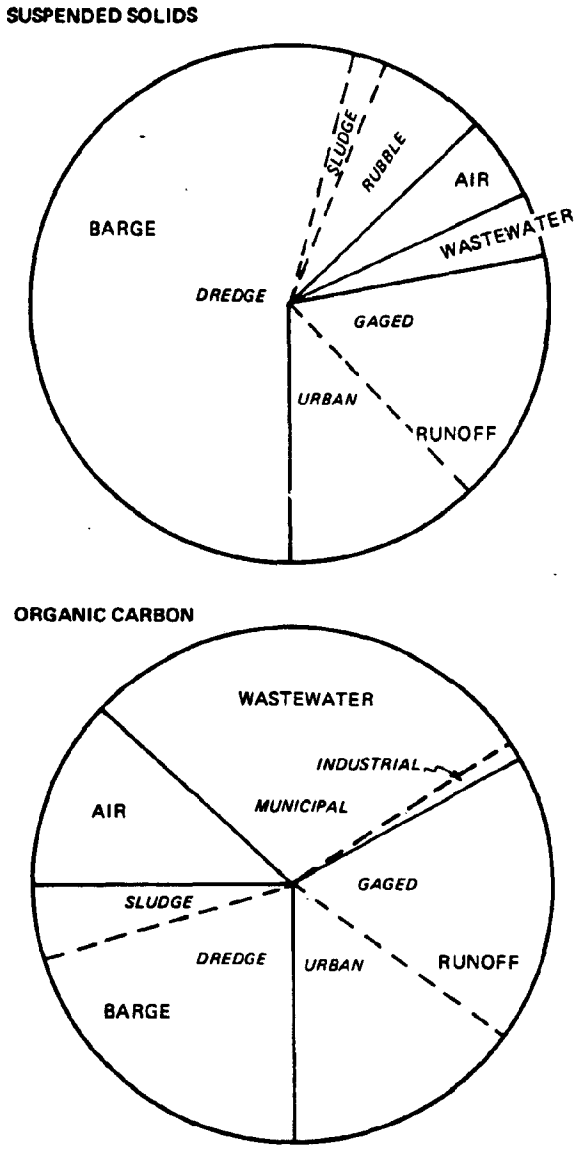
The dredged material, for the most part, remains in place on the ocean bottom at the Mud Dump Site. The pollutants are bound to the sediment particles at the site so dredged material does not pose a threat to beaches or swimmers. However, dredged material covers over marine life on the ocean floor and there is environmental stress to marine organisms at and near the disposal site.

The U.S. Congress enacted a law in 1986 which requires the United States EPA and the Corps to find a new site at least 20 miles offshore and relocate the dredged material disposal from the Mud Dump. Studies are now being conducted to find an environmentally acceptable location for the new site.

For the past ten years, the Corps, the States of New Jersey and New York, other federal agencies, and various public interest groups have been searching for alternative ways to dispose of dredged material from the harbor. Upland disposal is simply not practical based on the volume of material and the total lack of disposal sites in the built-up metropolitan area. Promising alternatives for a portion of the annual volume include the creation of a containment island in Lower New York Bay or in Raritan Bay, filling-in existing holes in the harbor area (technically known as subaqueous borrow pits), and using clean sand to re-establish eroded beaches (beach nourishment). Stopping all dredging is not a realistic option as the Port would have to close down in 2-3 years because of a natural build up of sediments in the channels and docking areas. The Port of New York and New Jersey generates over $75 billion to our regional economy each year. If dredging was to stop, approximately 175,000 people could loose their jobs.

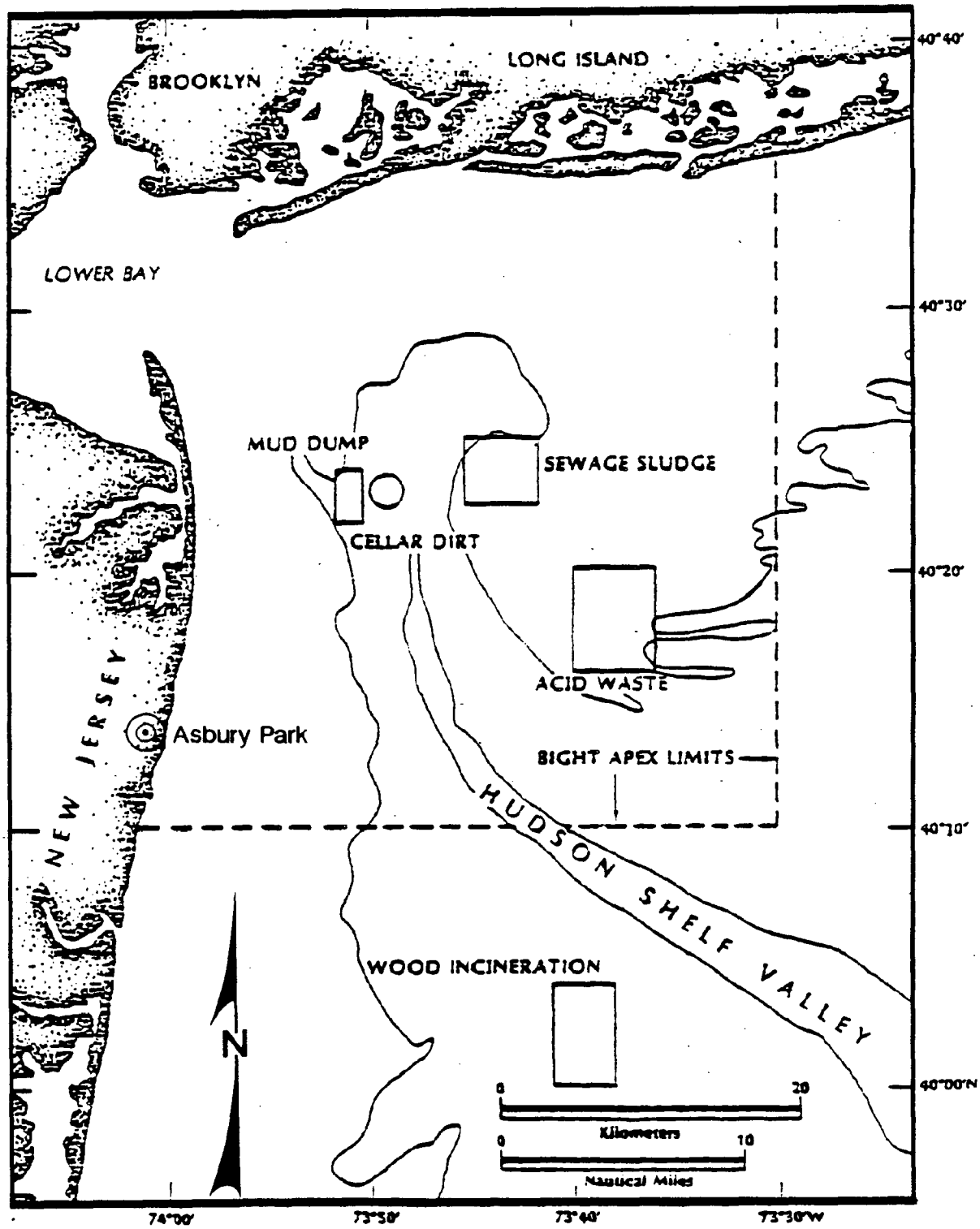
NEW YORK / NEW JERSEY HARBOR
DREDGED MATERIAL DISPOSAL : MUD DUMP
1970 THROUGH 1986





Distribution of New York Bight suspended solids and organic carbon loads.

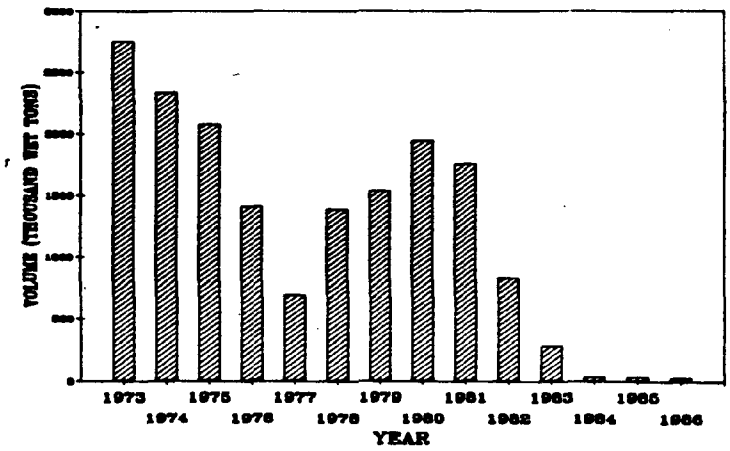
Source: Contaninant Inputs to the New York Bight; NOAA Technical Memorandum ERL MESA-6, U.S. Dept. of Commerce, April 1976


LONG ISLAND
BROOKLYN
LOWER BAY
MUD DUMP
SEWAGE SLUDGE
CELLAR DIRT
ACID WASTE
Asbury Park
NEW JERSEY
BIGHT APEX LIMITS
HUDSON SHELF VALLEY
WOOD INCINERATION
N
0
20
Kilometers
0
10
Nautical Miles
40°40'
40°30'
40°20'
40°10'
40°00'N
74°00'
73°50'
73°40'
73°30'W

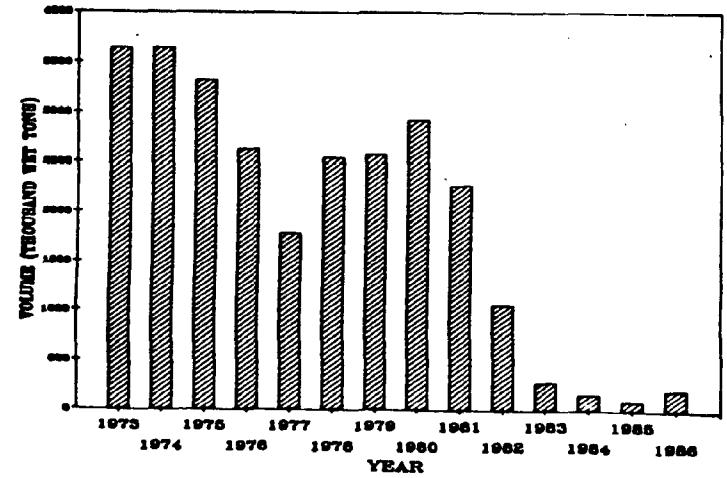
C. Industrial Waste - Most industries have phased-out of ocean disposal. Only two chemical companies -- one in New Jersey and one in Delaware, continue to dispose of a portion of their wastes in the ocean under permit authority of the U.S. EPA. The New Jersey company (Allied) disposes of dilute hydrochloric acid at a site approximately 20 miles east of Asbury Park. The Delaware company (DuPont) disposes of dilute iron-acid waste at the 106-mile Site. Extensive testing and past monitoring have demonstrated that neither of the two disposal activities result in harm to the ocean environment. The total amount of industrial waste disposed of in the ocean is less than 175,000 wet tons per year, enough to fill one-tenth of one tower of the World Trade Center.

EPA's regulations state that ocean disposal can only be considered if feasible land based alternatives do not exist. Both of the industries have options and the long term capability of developing land based disposal alternatives. It appears likely that all ocean disposal of industrial wastes will be phased-out in the near future.

VOLUME OF WASTE DISPOSAL AT THE ACID DUMP: N.Y. BIGHT APEX



VOLUME OF INDUSTRIAL WASTE DISPOSAL AT THE 106-MILE SITE



D. Wood Burning - The U.S. EPA regulates by permit the incineration of wooden debris from the New York - New Jersey harbor area. The material is burned in special steel barges at a site approximately 20 miles east of Point Pleasant, New Jersey. Current or pending permits will allow up to 120,000 tons of material (12-15 barge loads) to be burned in the next year.

The wooden debris comes from the Corps of Engineers harbor drift removal program and the New Jersey/New York "Harbor Clean-up Program". Both programs capture wooden debris and charred timbers before the material washes out of the harbor and into the ocean. The drifting wood in the harbor is a hazard to navigation and could damage ships. The Corps operates several vessels which routinely patrol the harbor and pick-up floating wood. The wooden debris used to be taken to a land based incinerator. However, air pollution problems forced the closing of the incinerator several years ago. The material is now burned at sea.

The New Jersey/New York Harbor Clean-up Program is a cooperative program with the Corps of Engineers designed to remove shoreline blight and potential sources of wooden drift before it breaks loose and floats out into the harbor. New Jersey's harbor clean-up has been a massive undertaking with over $50 million being spent over the last ten years to remove old piers, pilings, bulkheads, and abandoned vessels. Much of that material has been burned at the woodburning site. The State of New Jersey views the harbor clean-up as a vital element and a catalyst to the economic rebirth of the State's urban waterfronts.

The public concern centers around the poor record of sloppy operations by certain burn barge contractors. In previous years timbers have fallen overboard in transit to the site or during the burn. The result has been timbers washing onto bathing beaches or floating timbers causing hazards to fishing boats and recreational craft. In 1986 and 1987 EPA imposed strict conditions on the operation of the burn barges. The conditions include fewer burns, no overloading of barges, requiring a trailing vessel to accompany the barge to pick-up any material which falls overboard and increased monitoring. The New Jersey Department of Environmental Protection has been authorized by EPA to monitor all burn operations involving New Jersey originated material.

The real issue is all of the wooden debris in the ocean and on the beaches that is not associated with the burn barge operation. Based on the monitoring of the burns this past summer, the DEP is confident that the wooden debris on the beaches comes from the New York harbor areas, New Jersey's rivers and bays, offshore merchant vessels, and the coastal area itself. The solution to the problem is to

step-up programs to remove or intercept the wooden debris before it becomes a hazard. Positive steps could include an expansion of the program in the New York Harbor to the coastal communities, greater enforcement and public awareness.

E. Enforcement of Illegal Activities - A federal law enacted over 50 years ago prohibits the dumping of municipal solid waste (garbage) in the ocean. Garbage dumping is not a regulated activity. If it is dumped from a barge, it is illegal. Anyone caught dumping municipal garbage in the ocean will be prosecuted to the fullest extent of the law.

There is some misunderstanding about garbage barges in general. The City of New York uses barges to transport garbage from various points in the City to the Fresh Kills Landfill on Staten Island. Although the City's barges are not used for ocean dumping, it is generally accepted that garbage falls overboard during loading and unloading operations. Garbage also blows off the barge while in transit to Fresh Kills. The State of New Jersey has recently joined a lawsuit initiated by the Township of Woodbridge against the New York City Department of Sanitation for sloppy operations at Fresh Kills. The suit seeks to stop garbage from falling into the waterways and eventually washing up on the shores of New Jersey.

Another area which requires enforcement of federal laws and international agreements is pollution from ships on the high seas. Most commercial ship owners and captains obey laws which prohibit the discharge of oil or oily substances in the ocean. However, every once in a while beaches become fouled with tarballs as a result of discharges of oil from a ship or from an oil tanker cleaning out its tanks with seawater. The Coast Guard has responsibility for ensuring that merchant marine laws are enforced. The Coast Guard also has primary responsibility for prevention, containment and clean-up of oil spills both from vessels and from facilities on land.

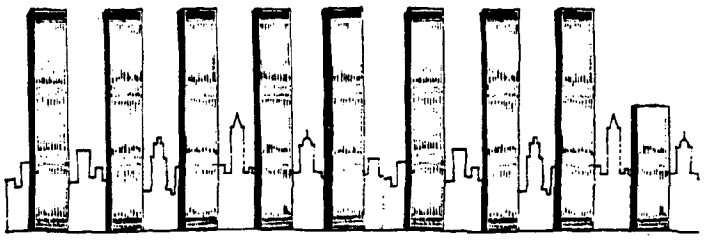
At the present time, commercial vessels can legally dispose of garbage generated aboard ship in the ocean beyond three miles from shore. This practice has become a major issue on a national level. A recent DEP study concluded that there is a significant potential for wash up of garbage (including plastics and floatables) from offshore vessels including recreational craft, fishing boats, and merchant marine vessels.

The problem of plastics and marine garbage is being addressed by an international agreement known as MARPOL, Annex V. The United States will soon become a party to that agreement. When it becomes operational, ships will no longer be able to dispose of plastic wastes overboard and other types of solid waste disposal will be strictly regulated.

Waste Loadings into New Jersey's Coastal Ocean:

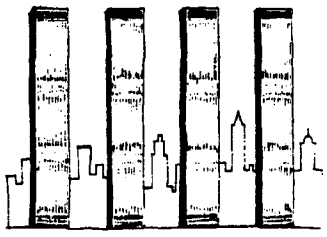
A Comparison of Volumes
Using a Tower of the World Trade Center as the Common Denominator

Sewage Sludge



8½ Towers per year

Dredged Material

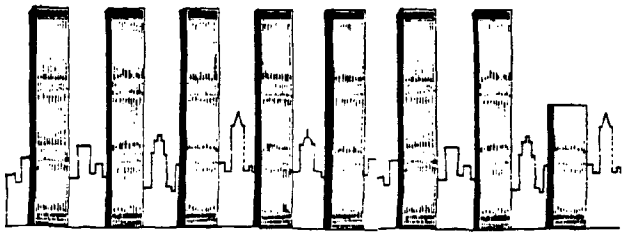


4 Towers per year

Industrial Waste

1/10 of one Tower per year

Wastewater Discharge



7½ Towers per *DAY*

(OVER 27,000 PER YEAR)

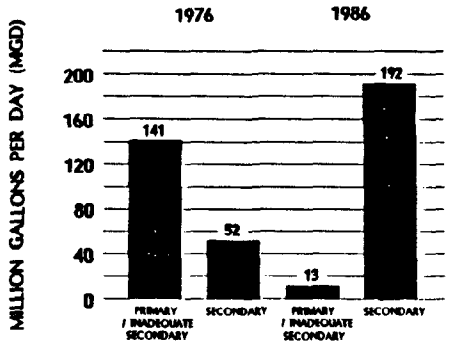
V. Ocean Inputs Directly or Indirectly Regulated by the States

The following sections describe the many small ways that we indirectly pollute the ocean and what we can do about it. The principles of indirect pollution are simple; rivers run downhill to the ocean and our prevailing winds blow west to east across the State and out over the ocean. Therefore, every time someone flushes a toilet or drives a car around the block, a small amount of pollution is generated and some of that pollution will eventually reach the ocean. The problem is not with our individual actions, but rather its with all of our small actions put together. There are approximately 20 million people who indirectly impact on New Jersey's coastal ocean. Everything we do which causes pollution has to be multiplied by 20 million.

A. Wastewater - In most developed areas of the New York/New Jersey region human wastes are processed at sewage treatment plants (septic systems prevail in rural areas). The States of New Jersey and New York and the federal government require the plants to be run properly and provide at least a secondary level of sewage treatment. Secondary generally means settling out of the solids, biological processing (action by good bacteria), and disinfection. Many of the sewage treatment plants in the region's older urban areas are just now upgrading to the secondary level or joining with existing secondary plants with available capacity.

The State of New Jersey and the EPA have invested several billion dollars in upgrading sewage treatment plants throughout the State. Almost all of the older primary level plants along the coast have been improved or replaced with new secondary plants over the past ten years. The upgrading will be completed within a year or so when new plants serving Asbury Park and the Wildwoods come on line.

MUNICIPAL SEWERAGE TREATMENT EFFICIENCY FOR NEW JERSEY'S COASTAL REGION, 1976-1986
RARITAN BAY TO DELAWARE BAY
(CAPE MAY COUNTY)



Sewage treatment generally removes 85-90% of the pollutants so it is not pure water that is discharged into the receiving waterway. The effluent is discharged to rivers, bays or the ocean directly. Ultimately all of the effluent from sewage treatment plants reach the ocean. The combined volume of treated wastewater from New York City and Northern New Jersey is staggering. Each day the coastal ocean receives approximately three billion gallons of waterwater. This volume currently includes primary treated wastewater, secondary treated wastewater, industrially treated wastewater, and varying amounts of raw sewage and combined sewer overflows. The volume is sufficient to fill 7 1/2 towers of the World Trade Center each day (over 27,000 towers per year). The cumulative impact of the wastewater discharges has a major impact on pollutant loading in the coastal ocean.

B. Non-point Sources of Pollution - Every time it rains massive amounts of pollutants are washed into streams, rivers, bays, and directly into the ocean. Non-point pollution means sources other than what comes out the end of an outfall pipe from a regulated treatment plant. The pollutants can enter the waterway directly from stormwater runoff or through storm sewer systems. Urban runoff contains oil, grease, heavy metals, chemicals, and litter. Agricultural runoff contains excessive nutrients (fertilizers), pesticides, and soil particles. Suburban areas contain combinations of both urban and agricultural pollutants.

Once these pollutants get to the ocean a number of things can happen. Eighty to ninety percent of the coastal beach closings are attributable to localized sources of elevated bacterial pollution from stormwater runoff. During the past two summers there have been no pollution incidents resulting from sewage treatment plants along the coast. The bacteria comes from leaky sanitary sewer lines, cross connections of sanitary lines into storm sewers and pet droppings. Agricultural bacterial loadings from upstream manure piles have resulted in shellfish contamination and closure of shellfish harvesting in back bay areas. Excess fertilizer runoff from agricultural lands and suburban lawns contribute the nutrients that sometimes trigger blooms of algae in the ocean (the so-called red tides, green tides, and brown tides). The majority of floating litter and debris that has plagued the beaches of New Jersey comes from stormwater runoff and flushing of storm water pipes after heavy rainfalls.

Much can be done to improve our coastal ocean by controlling non-point sources of pollution. Inexpensive management practices include: 1) regular street sweeping and maintenance of catch basins, 2) pooper scooper laws to

control pet droppings, 3) sensible fertilizing of suburban lawns, 4) litter control and public awareness of littering, 5) best management practices for farmers, 6) stormwater detention provisions in local laws.

A much more costly task will be the rehabilitation of thousands of local storm sewer systems and combined sewers in order to reduce sanitary waste (sewage) from entering the systems. This aspect of pollution control could cost billions of dollars and take 10-20 years. Current ongoing efforts are small and inadequate to address the largest single problem facing our coastal ocean.

C. Beach Litter - A substantial portion of the mess on our bathing beaches comes from the people who use the beaches. It is sad to see miles of white sand strewn with beer cans, candy and potato chip wrappers, disposable diapers and styrofoam cups. This material did not wash in from New York City. Everyone who enjoys the beach has a responsibility to not litter. The DEP has initiated an anti-litter campaign entitled "New Jersey Shore - Keep It Perfect". Public awareness and a commitment by local communities to continue to clean their beaches are necessary ingredients to solve a significant part of the overall problem.

The other portion of the problem involves floatable litter, household garbage, and medical wastes washing up on the beaches. The events that occurred during the summer of 1987 resulted in significant public outrage. The State of New Jersey responded with an all out effort to track down the source of pollution. The State now believes that the majority of the household garbage and medical waste in the 50 mile offshore slick came from the City of New York. State and federal law enforcement agencies will seek appropriate penalties, consent agreements (commitments to resolve the situation so it won't happen again) and criminal prosecutions if warranted.

Even if the deliberate acts of garbage dumping never occurs again, there are chronic sources of floatables which must be continued to be addressed. The non-point pollution from urban runoff and storm sewers, the garbage management problems with Fresh Kills Landfill and transfer facilities in New York City, and vessel pollution are all sources which will require constant effort to keep in check.

D. Air Pollution - There has been very little scientific research or monitoring of air pollutants falling from the atmosphere into the ocean. However there are two factors which would indicate that the air pollution generated by New Jersey's industries, power plants, cars, and trucks eventually reach the coastal ocean. Winds generally blow from west to east and carry some of the air pollutants out

over the ocean. The other factor is simple -- what goes up, must come down.

Air pollutants are measured and regulated to protect human health. Some pollutants such as carbon monoxide and particulates are only localized problems when concentrations remain above the air quality health standard. Other pollutants such as toxic organic substances and heavy metals are only now being detected at very low concentrations and air pollution control standards are just being developed. These pollutants can be transported great distances in the atmosphere. It is speculated that rainfall and/or atmospheric fallout deposit the pollutants on the surface of the ocean. Scientists have yet to determine what effect this widespread pollution loading has on the ocean and living marine organisms.

VI. Other Issues Worth Considering

A. Beach Monitoring - Nowhere in the United States is there a program that can match New Jersey's Cooperative Coastal Water Quality Monitoring Program. The DEP along with the U.S. EPA and county and local health departments have set up a network of over 300 sampling stations from Raritan Bay to Cape May. Each week from the Memorial Day weekend to Labor Day, water samples are taken and analyzed to ensure that bathing waters are safe for swimmers. In addition, the general health of the ocean is monitored from boats and helicopters to predict potential trouble spots. The DEP and the EPA are concerned with summertime incidents of massive blooms of algae or depletion of oxygen levels in the ocean waters (see section VI D. for more information on these issues).

The cooperative monitoring program's main goal is to protect public health of ocean and back bay bathers. The program is systematic with all samples taken on the same day of the week, uniform laboratory procedures for analysis, and all sample results measured by the same water quality standard (200 fecal coliforms per 100 ml of water). Fecal coliforms are used as an indicator of bacterial pollution. If the standard is exceeded, a second sample is taken and analyzed. If warranted, beach closures are recommended. The public is make aware of weekly beach conditions through the news media and a toll free telephone line.

The Department of Environmental Protection also has a program to inspect sewage treatment plants along the coast to ensure that there are no problem areas which could result in elevated bacterial levels on the beach. The inspections are made weekly from Memorial Day to Labor Day.

Although there has been much adverse publicity over isolated beach closings, the monitoring results demonstrate

that our beaches have excellent overall water quality in terms of bacterial pollution. Without the monitoring program, no one could really be sure that the water is safe to swim in.

B. Health Study - The New Jersey Department of Health is conducting a one million dollar study to investigate the public health safety of New Jersey beaches. This study is being done in cooperation with the Department of Environmental Protection and the University of Medicine and Dentistry of New Jersey - Robert Wood Johnson School of Medicine.

Questions have been raised regarding the water quality at the shore. Standards used by the EPA and the World Health Organization measure water quality by bacterial levels using indicator organisms. Although the ocean along the New Jersey shore meets these standards, the Department of Health will be investigating whether illness is occurring at an unusually high rate in spite of the measured water quality and if other indicators should therefore be used.

Water associated infections are in general mild upper respiratory and gastrointestinal illnesses. Such illnesses often result from causes other than water, such as food or person-to-person contacts. It is difficult to determine the cause of a specific case of illness, so the study will be looking at disease patterns in large groups of people.

The study involves surveying beach visitors and at the same time testing the ocean for microbial indicators. The results are analyzed to determine if there is an increased illness rate. The illness rates and the quality of the water are compared to see if there is a relationship.

C. Dolphin Deaths - Several hundred bottle nosed dolphins died during this past summer as a result of an epidemic. Dead dolphins washed ashore from New Jersey to Virginia. Although there was much speculation that the dolphin deaths were the result of man's pollution of the ocean, there has been no scientific evidence to date that links the deaths with pollution. What is known is that the dolphins died of infections from usually non harmful bacteria commonly found in the dolphins. However, in this instance, the dolphins immune system which normally fights diseases was broken down by a virus.

The federal government brought together a team of scientists to determine the cause of the dolphin deaths. Thousands of samples of dolphin tissue have been analyzed for traces of toxic pollutants and so far, there is no evidence of chemical contamination. The scientists are still working and expect to release their findings and conclusions before the end of the year.

D. Algal Blooms - Algae is any of a group of very small non-vascular plants that live in water. Algae is the greenish material that grows on the inside glass of fish tanks. In the ocean there are many types of algae including phytoplankton (microscopic plants). This plant material when in balance provides a food source for a variety of fish and other marine organisms. However, under certain favorable conditions a population of algae experiences explosive growth. This is called an algal bloom or more commonly known as red-tide, brown tide, or green tide. The favorable conditions in the ocean include warm water, lots of sunshine, calm seas and the presence of excessive nutrients. When these conditions occur, an algal bloom could spring up over a large coastal area, sometimes measured in hundreds of square miles.

Algal blooms are very common worldwide. Off of the New England coast and western Florida some algal blooms are toxic to fish. In New Jersey we are fortunate not to have blooms of any toxic species of algae.

During the summer of 1984 and 1985, algal blooms (green-tides) were responsible for extensive areas of greenish colored water off of the southern New Jersey coastline. In 1976 a massive algal bloom caused a fish kill along the New Jersey coast. Algae is relatively short lived. In 1976, when the bloom died-off the material sank to the bottom of the ocean and began to decay. The decaying process sucked all the oxygen from the bottom water and without oxygen, bottom dwelling fish and shellfish died. The whole mess washed up on shore during the middle of the month of August.

Under more normal conditions small localized algal blooms occur each summer. The decaying material looks ugly and smells bad. Sometimes when it washes up on the beaches, people make the mistake of calling it sewage sludge. It is interesting to note that the green tides which were so prevalent in 1984 and 1985 have not reappeared during the past two summers.

Although algal blooms are largely a natural phenomenon, man-made pollution can affect the occurrence and the intensity of a bloom. Storm water runoff from the land provides the excess fertilizer (nitrogen and phosphorus) that could possibly trigger the bloom. Other causative factors may be equally or more important. The scientists are not really sure at this time how our non-point and point sources of pollution effects algal blooms.

E. Ciba Geigy - Ciba Geigy Corporation operates a chemical manufacturing plant in Toms River and discharges its treated industrial wastewater to the ocean one-half mile offshore through an outfall pipeline. The discharge is regulated

through a permit issued by the DEP. The U.S. EPA has recently characterized the DEP permit as one of the most thorough and stringent permits in the county. In the past two years Ciby Geigy has significantly reduced its discharge of pollutants and is in compliance with all effluent limits.

However, the Ciba Geigy ocean discharge has been very controversial and the subject of severe criticism. It is New Jersey's only industrial discharge directly into the ocean. One of the criticisms is that the ocean discharge poses a public health hazard to bathers in the vicinity of the outfall. The Department's Office of Science and Research provided direction and oversight on a number of required research studies. Dye studies were conducted to trace pollutants both offshore and nearshore. The conclusion reached by DEP in May of 1987 was that the ocean discharge does not, at this time, pose a meaningful health hazard to bathers.

F. Artificial Reefs - It has long been known that fish congregate around reefs. The creation of artificial reefs is a positive form of ocean dumping. The DEP maintains a number of artificial reefs twenty or so miles off of the coast. Construction debris (consisting of concrete and brick rubble, rock and steel) has been dumped at the reef sites. Old steel hulled ships have also been sunk at the reefs. Bundles of old tires are ocean dumped to make excellent fish habitat. The artificial reef program is one case where ocean dumping of waste materials can produce a beneficial use without public controversy.

G. Ocean Incineration of Hazardous Waste - For the past several years there have been proposals to incinerate liquid hazardous wastes onboard specially designed incinerator ships at sites in the ocean. One of the four nationwide sites proposed by the U.S. EPA is a North Atlantic site, approximately 140 miles east of Delaware. No research burns or operational burns will take place until the EPA develops detailed regulations. This is not expected until 1989.

The law today provides for the construction and operation of land based hazardous waste incinerators. There are currently several in the State and the New Jersey Hazardous Waste Facility Siting Commission is going through a public process to locate two or three more commercial incinerators. There is an acute need for new facilities with estimates indicating that over 552,000 tons of hazardous waste being produced by the State's industries and requiring commercial disposal. To meet this challenge New Jersey must consider a full range of disposal options including ocean incineration. Although many questions remain, DEP recognizes the potential nationwide benefits of ocean incineration and believes that it deserves further research and evaluation.

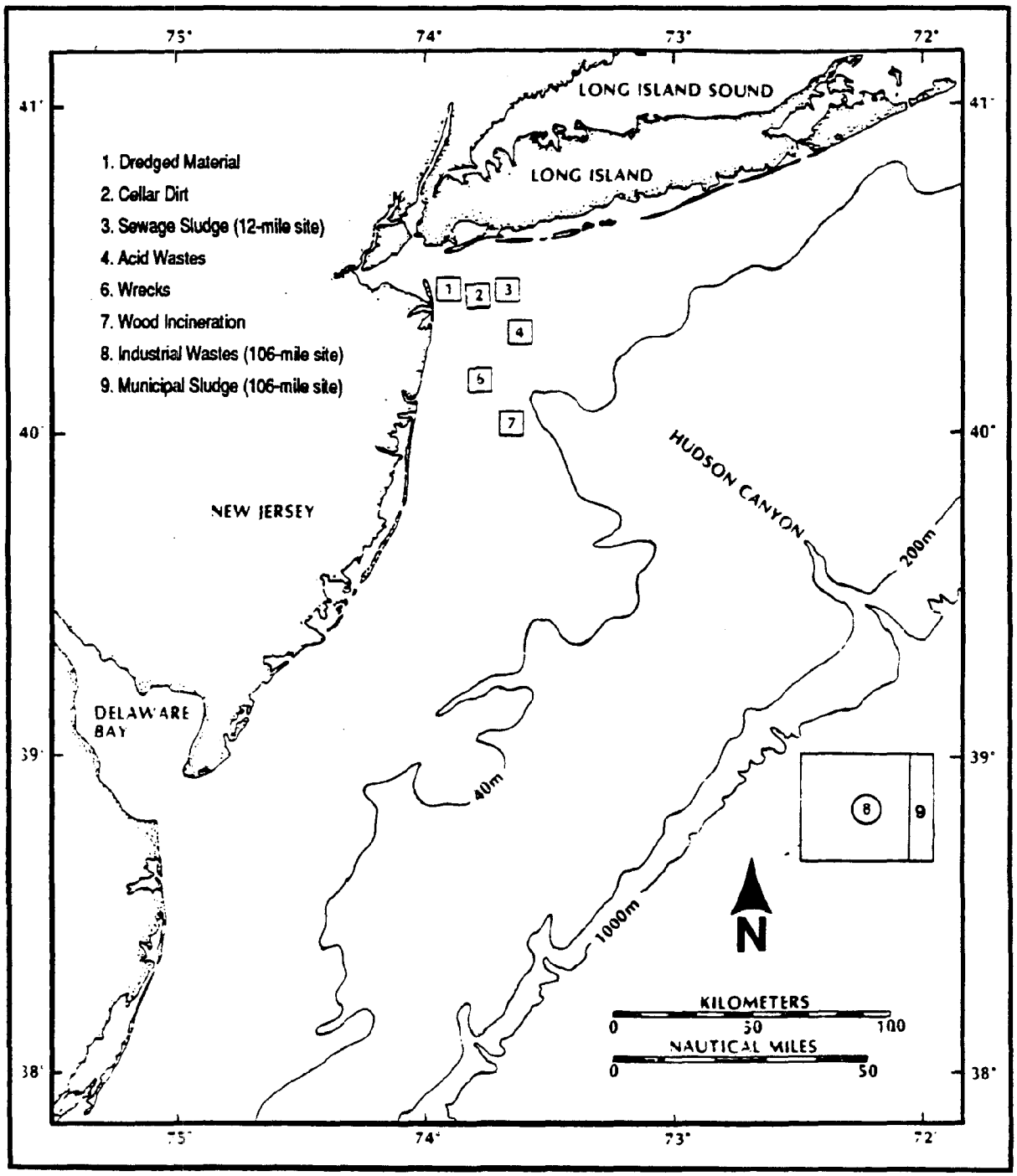
H. Offshore Oil and Gas - During the 1970's there was a lot of concern over the prospect of oil and gas companies drilling wells off the coast of New Jersey. The fear was that a major oil spill could destroy the beaches and the tourism industry. After much review and debate the oil companies came and drilled over thirty wells 50 to 100 miles off of our coast. There were no oil spills, but more importantly, there were no major finds of oil or gas. Over two billion dollars was spent on dry holes. The likelihood remains that there is oil and gas deposits on the Continental Shelf offshore of New Jersey. However it is unlikely that the oil companies will return until the world price of oil is increased to make exploration in a "frontier area" worthwhile. If the companies return, the chance of a major oil spill is extremely small. The industry over the last twenty years has had a very good record of preventing spills from offshore oil platforms.

VII. Suggested Reading

A. U.S. Congress, Office of Technology Assessment, Wastes in Marine Environment, OTA-0-334 (Washington, DC: U.S. Government Printing Office, April 1987)

B. Squires, Donald F, The Ocean Dumping Quandary; Waste Disposal in the New York Bight, State University of New York Press, Albany, NY 12246; 1983

C. Coalition For the Bight, Conference Proceedings, An Action Agenda for the Bi-State Bight, Coalition Offices, 101 E. 15th Street, New York, NY 10003, May, 1987


75°
74°
73°
72°
41°
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38°
LONG ISLAND SOUND
LONG ISLAND
1. Dredged Material
2. Cellar Dirt
3. Sewage Sludge (12-mile site)
4. Acid Wastes
6. Wrecks
7. Wood Incineration
8. Industrial Wastes (106-mile site)
9. Municipal Sludge (106-mile site)
1
2
3
4
5
7
NEW JERSEY
HUDSON CANYON
200m
DELAWARE BAY
40m
1000m
8
9
N
KILOMETERS
0
50
100
NAUTICAL MILES
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50

NOAA COASTAL SERVICES CTR LIBRARY
3 6668 14111574 3

NEW JERSEY SHORE

Keep it

PERFECT

Don't Litter

New Jersey Department of Environmental Protection