THE OCEAN IS A FLUSH AWAY

A NEW JERSEY CITIZEN'S GUIDE TO WASTEWATER MANAGEMENT

A Special Publication by

Clean Ocean Action
Summer 2001

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For copies of "The Ocean is a Flush Away" ($5.00) and/or "Wasting Our Waters Away: Wastewater Discharges into the Atlantic Ocean from New Jersey, A Technical Report" ($10.00), send a check to: Clean Ocean Action, Publications, PO Box 505, Sandy Hook, NJ 07732. Or, contact COA by telephone: (732) 872-0111, facsimile: (732) 872-8041, or email: SandyHook@CleanOceanAction.org. To obtain these documents free-of-charge, visit www.CleanOceanAction.org/wastewater/publications.

Editor's Note: The online version (written in Adobe Acrobat® pdf file format) differs from the version that can be ordered from Clean Ocean Action. The online version has been formatted to fit on 8½ x 11" paper, and the COA printed version is 5½ x 8½".

ABOUT CLEAN OCEAN ACTION

Clean Ocean Action (COA) is a broad-based coalition of over 180 conservation, fishing, boating, diving, women's, business, service, and community groups. COA's mission is: *"to improve the degraded water quality of the waters off the New Jersey/New York coast. COA will identify the sources of pollution and mount an attack on each source by using research, public education, and citizen action to convince our public officials to enact and enforce measures which will clean up and protect our ocean."*

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The Ocean is a Flush Away:
A NJ Coastal Citizen's Guide to Wastewater Management

LIST OF FIGURES

LIST OF INFORMATION BOXES

INTRODUCTION

Ever wonder where the water coming out of your tap comes from? Or where the water goes when it spirals down the drain in your shower, bathtub, sink, or toilet bowl? How many gallons of water does the average citizen use in one day? Fifty gallons? One hundred gallons? The truth is that according to the **US Environmental Protection Agency** (**USEPA**) the average citizen uses *120 gallons* of water per day. We obtain this water from underground sources, better known as **groundwater** or rivers and lakes and reservoirs, also known as **surface water**. Every drop of water that we use has been extracted or removed from these natural water supplies and brought to our homes for use in our bathrooms, kitchens, and gardens. Once this "used water" leaves our homes, it is called **wastewater**. But what happens to our water once it leaves our homes?

The topic of wastewater treatment is unfamiliar to most of us, even though we depend on it every day. Every time we wash water down a drain or sewer, we contribute to the volume of wastewater that must be treated. Our "used" water or **wastewater**, with all of its contaminants and toxins, is brought by underground pipes to a nearby treatment facility to be treated and discharged back into the natural system and is called **effluent**. The effluent is often discharged many miles from its original and natural source. In addition, semi-solid materials resulting from the treatment process, called **biosolids**, must be managed and disposed.

In sum, there are three concerns surrounding the use and disposal of household water:

1. Impacts from removing billions of gallons of water each year from natural sources and systems;
2. Effects of discharging or releasing treated wastewater, known as **effluent**, into area waterways, or in the case of coastal communities, directly into the ocean;
3. The management of biosolids from the treatment process.

The Purpose of This Guide

This citizen's guide will inform coastal residents about municipal wastewater facilities, the wastes that they receive, the treatment process (what is treated and what is not), and how to make more informed decisions about better wastewater treatment for the future. The focus is on the wastewater treatment facilities along New Jersey's coast. Following this guide is a list of contact information, a glossary, and information about local wastewater facilities.

Clean Ocean Action has also developed a technical report, "Wasting Our Waters Away: Wastewater Discharges into the Atlantic Ocean from New Jersey," which is the citizen's guide companion document. The technical report presents specific fact sheets, findings, and recommendations about discharging effluent directly into the ocean.

1: The Scoop about Poop

What is Wastewater?

By its simplest definition, **wastewater** is water used and then discarded into a sanitary sewer. At home, it includes water from sinks, showers, dishwashers, bathtubs, washing machines, and toilets.

Wastewater is separated into two categories, based on its sources: municipal or industrial. Municipal wastewater includes households, schools, offices, hospitals, and commercial facilities. Municipal wastewater is treated at either a **privately owned treatment facility** (for example, a facility within a hospital or housing complex) or at a **publicly owned treatment work** (**POTW**). Industrial wastewater includes the water that industries discard after using it in their production and processes. Often, however, industrial and municipal sources are not always separately treated. Some industries have their own wastewater treatment facilities, but many industries contribute wastewater to POTWs. Some of the industries that do contribute to POTWs must pre-treat their wastewater to reduce pollutant concentrations. All ocean dischargers in New Jersey are POTWs and some of the discharges from these facilities include pretreated industrial wastewater.

Do You Know Where *Your* Wastewater Flows?

New Jersey has a total of 207 municipal wastewater **dischargers**. New Jersey has seventeen municipal wastewater treatment plants along the coast, and there are fourteen ocean discharge locations—meaning fourteen discharge pipelines into the ocean.

☑ NJ WASTEWATER (1998)
Total NJ Population = 8,036,733
Total Treatment Plants = 207
Total Coastal* Population = 1,446,612
Number of Coastal Treatment Plants = 16
*Monmouth, Ocean, Atlantic, and Cape May Counties

☑ If all 65 billion gallons of effluent were poured into one-gallon milk jugs and lined up top to bottom, they would stretch 10,258,838 miles, and circle the Earth 412 times.

At least 18% of the total New Jersey population, or 1,446,612 people, live year-round in the coastal counties of Monmouth, Ocean, Atlantic, and Cape May. However, populations increase dramatically, often by orders of magnitude, during summer months. In 1998, 16 ocean dischargers in New Jersey released a total of approximately *170 million* gallons of treated wastewater or **effluent** per day into the Atlantic Ocean. This amounts to approximately *65 billion* gallons of effluent pumped into our ocean in 1998. The effluent is indeed mostly freshwater, which would have normally sustained groundwater, lakes rivers, and streams had it not been diverted for citizens' use.

This enormous amount of effluent entering the saltwater of the ocean also introduces its contaminants to marine life and poses unnecessary health risks to humans.

2: WASTEWATER: A CHUNKY CHOWDER

All coastal New Jersey communities send wastewater to treatment plants via a vast system of underground pipes called **sanitary sewers**. Every day, the waters we use flow through the infrastructure of underground pipes, collecting this "chunky chowder" of raw wastewater. This chowder contains treated liquids, solids, and special ingredients from municipalities and commercial sources. The chowder reaches the treatment plant, is treated, and is finally discharged into the ocean by way of the fourteen ocean discharge points along the NJ coast.

What Is the Chowder Made of?

The liquid portion of wastewater, or the chowder's "broth," is generated from all of the water poured down sinks, drained from washing machines or showers, flushed down toilets, or discarded in any other like manner, including the flushing of human and animal waste and body fluids from hospitals, slaughter houses, and morgues. Also included in the broth is the pretreated water that enters the municipal system from a private industrial plant, for example, a factory.

Solids in wastewater, or the chowder's "chunks," come in the forms of a wide variety of substances. Human waste and fecal matter, mashed-up food waste from garbage disposals, soil and sand, and plastics and floatables are all solids found in wastewater.

Special Ingredients: Nutrients, Pathogens, Toxins, and Solids

The ingredients in the chunky chowder can pose serious problems to both marine and human health. The liquid and solid wastes contain an assortment of contaminants, toxins, nutrients, and pathogens, which can certainly give humans and wildlife that are exposed to this chowder more than indigestion, which is why treatment is so important.

Nutrients

The origins of nutrients in wastewater cover a wide range of sources, from human waste to agricultural runoff. Certain nutrients naturally occur in and are a necessary part of an **ecosystem**. For example, in normal levels nitrogen and phosphorous provide the basis for plant life that sustains the food web. However, high levels of these nutrients can lead to unhealthy algal blooms and **eutrophication**, which is the condition of oxygen depletion caused by excessive growth of **algae**, plants, and bacteria. The effects of excess nutrients in water are fish kills and brown tides.

Microorganisms and Pathogens

Wastewater contains **microorganisms** and **pathogens**, which, if present, can cause serious problems and illnesses in our coastal areas. **Microorganisms** are organisms of microscopic or ultra-microscopic size. **Pathogens** are microorganisms, ranging from single-celled **bacteria** to multi-cellular parasites, which come from fecal contamination. These microorganisms produce disease in host organisms, including humans, such as *Salmonella*, Hepatitis A and E viruses, and other gastro-intestinal illnesses. Other microorganisms, such as **protozoans** and **amoebas**, can cause illnesses such as dysentery, skin rashes, or pink eye in humans.

Likewise, **enteric pathogens**, those microorganisms that live in warm-blooded animals (i.e., the *Escherichia coli bacterium (E. coli))*, cause several infectious diseases and are spread when swimmers ingest sewage-polluted water. Exposure to all pathogens occurs either from contact with water that has been contaminated with pathogens (such as poorly treated wastewater) or from the consumption of shellfish that have ingested the pathogens directly.

Toxins

Toxins join nutrients and pathogens as dangerous ingredients in the chowder of wastewater. **Toxins** include those **pollutants** such as metals, **organic chemicals**, and other substances that present an unreasonable health risk to humans and the environment. Toxins, including chlorinated **dioxins** (chemicals that are stored by the body of animals and fish in fatty deposits), petroleum products, metals, and other solvents (*see* Boxes 2.1 and 2.2), enter the wastewater system from a variety of sources.

Many of these chemicals are **carcinogenic** or cancer causing and can cause serious effects on marine life by potentially accumulating in the tissues of fish and shellfish, if these chemicals are not properly treated when discharged.

Box 2.1 Classes of Chemicals

Two major classes of chemicals exist:

- **Inorganic Chemicals**: chemicals that contain no carbon atoms (except CO_2). As an example, metals in wastewater originating from factories and other industrial entities are inorganic chemicals.
- **Organic Chemicals**: chemicals that contain carbon atoms (except CO_2). Millions of organic chemicals exist, some natural and some man-made. Industrial organic chemicals such as polychlorinated biphenyls (PCBs) and dioxins are man-made and are carcinogenic and harmful to humans and marine life.

Box 2.2 Categories of Pollutants

The federal **Clean Water Act** categorizes pollutants into three groups:

- **Conventional Pollutants**: include solid material remaining suspended in water (i.e., like litter), oxygen demanding materials (i.e., algae), acids and bases, bacteria and viruses, and other substances, such as oil and grease.
- **Toxic Pollutants**: include metals, organic chemicals, and other substances that pose unreasonable risks to human health or the environment. Most of these chemicals are persistent—meaning they do not readily break down.
- **Nonconventional Pollutants**: substances such as nutrients, including nitrogen and phosphate, and several other chemicals, including chlorine and fluoride.

Biological Oxygen Demand and the Solids Connection

The combined effect of all of the **organic substances** (those carbon-containing compounds, excluding CO_2) and solids (measured as **total suspended solids** (**TSS**)) found in wastewater require bacteria depend on oxygen to be broken down and degraded. The amount of these substances yields the **Biological Oxygen Demand** (**BOD**), which is a measure of how much oxygen these organic substances demand.

In high concentrations in the aquatic environment, these organic substances deplete the oxygen supply in the system and deprive marine life of needed oxygen, thereby harming them. As a result, marine animals and plants can then become oxygen-limited because they cannot acquire levels of oxygen that are necessary for healthy growth. Also, increased solids can cause **turbidity**, **sedimentation**, and shading of aquatic plant life, leaving marine life starving for sunlight, their main food source.

3: HOW IS WASTEWATER TREATED?

The "chunky chowder," the raw mixture of wastewater from municipal, commercial, and industrial sources, flows to the 17 regional and local treatment plants along the NJ coast. At these plants, wastewater begins a step-by-step process of treatment before it is released into the ocean as effluent or treated wastewater. POTWs work to improve wastewater to reduce impacts to the ocean from raw wastewater. In a way, treatment plant managers work as "reverse" chefs to remove the ingredients from the wastewater chowder.

The Treatment Train Begins

As used water leaves the different sources of wastewater along the New Jersey shore, it is pumped through a vast infrastructure of underground pipes to a Publicly Owned Treatment Works (POTW) where it undergoes a purification process called a **treatment train**. In coastal areas, nearly all municipally generated wastewater is sent to and treated at these plants. Some POTWs also receive wastewater from industries in coastal areas. Industries that contribute over 25,000 gallons per day of wastewater to POTWs are called **significant indirect users** (**SIUs**). These SIUs may be required to **pre-treat** their wastewater, depending on the type and strength of their wastewater, prior to arrival at a POTW. The industrial pre-treated wastewater is then included in the treatment process with municipally generated wastewater for further treatment.

The treatment train involves a multiple step system, called **primary** and **secondary treatments** (*see* Figure 3.1). **Primary treatment** removes large particles from wastewater with a series of screens and settlement tanks. Following primary treatment, solids are further separated from wastewater and **biological oxygen demand** substances are reduced in wastewater during **secondary treatment**. Other advanced technologies that are available, such as tertiary treatment and disinfection, offer further treatment and the removal of nutrients.

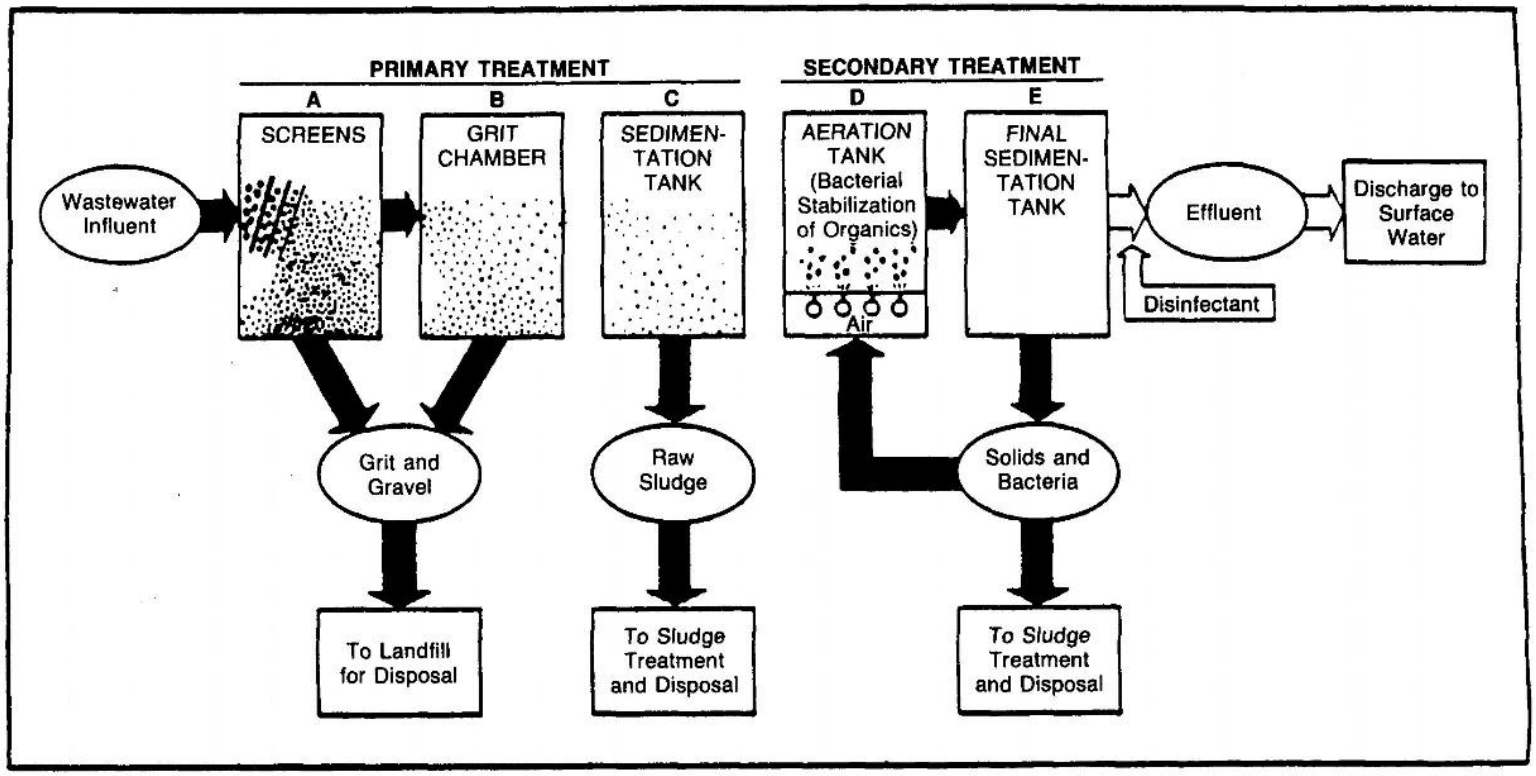
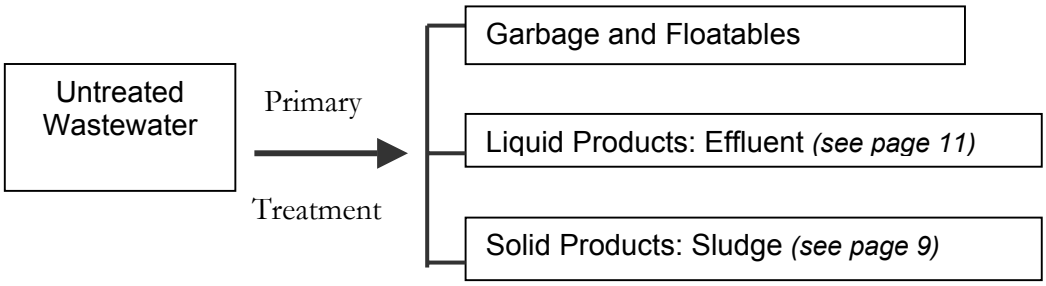


Figure 3.1: A Basic Treatment Train. Once wastewater leaves our homes, it enters the treatment system where it undergoes various levels of cleansing. All wastewater in New Jersey is treated at the secondary level. Source: US Environmental Protection Agency

☑**General History of National Wastewater Legislation**
Since the 1972 amendments to the Federal Water Pollution Control Act, now called the **Clean Water Act**, all municipal POTWs were required to treat water at the secondary level (e.g. the process that removes solids and biosolids). Almost 30 years later all facilities should meet this standard. But, are they? The truth is that as of 1977, several coastal dischargers in the US were allowed to apply for waivers for this regulation. According to the National Research Council, as of 1993, 40 ocean dischargers in the US were still operating under these waivers. This means they are discharging all the wastewater that enters a treatment plant, including human wastes, into the marine environment with treatment that only uses screens and settling tanks, which is called primary treatment. Fortunately, all wastewater in New Jersey receives the more advanced secondary treatment before it is discharged.

Primary Treatment

The simplest form of treatment is **primary treatment**, which targets the physical removal of solids. The first step of primary treatment, skimming, removes plastics and other floatables, which are then sent to landfills. Removing additional solids occurs by passing water through a series of screens, grit removal, and settlement, where wastewater is held in a **clarifier** tank for several hours during which time the more dense solids settle to the bottom of the tank and the lighter ones float to the top.



The solids that are removed during primary treatment are known as **biosolids** or **sludge,** and the remaining wastewater is called **effluent**.

Secondary Treatment

Secondary treatment follows primary treatment and further separates solids from wastewater and reduces biological oxygen demand in the wastewater by using **microorganisms**. Microorganisms are stimulated by bubbling oxygen into wastewater to break down organic matter in a process called "**activated sludge treatment**". This treatment is followed by a settling period to separate solids (including microorganisms) from the wastewater.

After secondary treatment, at least 85% of the **total suspended solids** (**TSS**) and at least 85% of the **biological oxygen demand** (**BODs**) are removed. In addition, because other chemicals have a tendency to bind to solids, this process also removes certain amounts of other pollutants as well, such as metals and other contaminants. Yet, the small particles that remain in effluent can cause problems due to the affinity or likeness that **toxins**, **organic materials**, and **pathogens** have

toward binding to solid particles. In New Jersey, all ocean wastewater dischargers receive wastewater from secondary treatment plants.

Now that the chunky chowder has been sieved, strained, bubbled, and mixed to remove 85 percent of the wastes (garbage, liquids, and solids), the remaining broth, mostly liquid, gets a last fix from the reverse chefs.

Disinfection

The final step in treating the liquid portion of wastewater is **disinfection** or the selective destruction of pathogenic organisms in wastewater to protect the health of people and other animal life. Disinfection is considered an advanced treatment technology that compliments conventional treatment methods at the primary, secondary, or tertiary levels of treatment. Several types of disinfection are available—the addition of chemicals, especially chlorine, is the most widely used type.

Chlorination—The Most Widely Used Method
Chlorine (Cl_2) and several other chlorine-based compounds are the most widely used disinfectants. Their popularity is directly related to their availability and cost effectiveness. Despite its appeal for disinfecting purposes, chlorine has detrimental effects on marine life.

☑**Tertiary Treatment: An Additional, Optional Process**
The most advanced form of treatment is tertiary treatment, which removes excess nutrients from wastewater, such as nitrogen and phosphorous, but can also include processes to eliminate other pollutants of concern. This advanced treatment involves several sophisticated processes that utilize many types of treatment, including chemical and biological processes. Unfortunately, tertiary treatment is not used or currently required by law in New Jersey. However, tertiary treatment is used in areas where techniques are used to reuse wastewater after treatment for various purposes (*see* Sludge Management section, page 9).

Different forms of chlorine will react differently with wastewater constituents. For example, according to the National Research Council, organic compounds typically present in wastewater can combine with chlorine to form toxic chloro-organic compounds, some of which are potential **carcinogens**, **mutagens**, and toxins. **Chlorine Produced Oxidants** (CPO) are highly reactive compounds that contain chlorine and are the sum of the total amount of chlorine and bromine (Br_2) in the water. In New Jersey, after the treatment process has completed, all treatment plants that discharge effluent into the ocean must test for CPO in their treated effluent. However, currently there are no limits on allowable concentrations of CPO in effluent.

☑Wastewater treatment plants in coastal areas of New Jersey use chlorination along with secondary treatment.

Chlorine and its residuals are toxins and it is important to limit the use of chlorine in wastewater treatment techniques because of the adverse effects that chlorine has on humans and wildlife. Some of the known effects from exposure of marine life to chlorine are reduced growth and **acute toxicity**; effects will depend on the organism and the concentration of chlorine. The challenge in using chlorine for disinfection is to protect human health from pathogens and to not use excessive amounts of it for the disinfection process.

Dechlorination is a process that must be considered in the near future to address the toxic effects of excessive chlorine. Dechlorination involves the removal of chlorine after the chlorination process, but before effluent reaches its **outfall** destination in the ocean. This process is done either by the addition of chemicals in an inexpensive and simple process or through a process that uses **granular activated carbon** (GAC). GAC systems are relatively expensive, but are more effective at removing chlorine residuals than more commonly used chemical processes.

Available Alternatives to Chlorine: Ozonation and Ultra Violet Irradiation

Ozonation of wastewater is an alternative method for disinfection. The byproducts and aspects of ozonation are safer than chlorination. As a result of the strength of ozonation, smaller amounts of ozone and a shorter time period of disinfection are needed, as compared to chlorination.

☑ Ozonation and Ultra-Violet Irradiation are not currently used in the treatment of wastewater in New Jersey.

Despite the advantages to ozonation, it does have a high cost, both in its configuration and operation. According to the National Research Council, ozonation is also energy intensive, requiring 16-24 kilowatt hours of electricity per kilogram of ozone. Another drawback of ozonation is that, unlike the residual chlorine, a mode to prevent the regrowth of microorganisms after disinfection using ozonation does not exist.

Disinfection using **Ultra Violet (UV) irradiation** is an up-and-coming technology and is receiving attention as a result of its effectiveness and safe residues. It is relatively inexpensive and is relatively easy to maintain and operate. However, like ozonation, UV irradiation does not prevent regrowth of microorganisms after disinfection. In addition, its efficiency is sometimes reduced by the presence of certain chemicals in the effluent.

Sludge Management—The End of the Treatment Train for Solids

The **sludge** or solids that have been removed from wastewater by either primary or secondary treatment must also be processed before it can be disposed or reused. The management of sludge or biosolids has been a constant challenge for communities. Since 1991, the United States federal government has outlawed the ocean dumping of sewage sludge.

Several options for sludge disposal currently being applied include disposal in a **landfill**, **composting**, **incineration**, and **land application**. Landfill disposal includes dewatering sludge to remove water to reduce costs of transport and disposal and the use of the remaining substance to cover or add to a landfill. Composting sludge is similar to garden composting with grass clippings, but involves allowing sludge to lie in a static pile with wood chips or mulch. In sludge incineration, sludge is burned and the ashes are transported to a landfill for disposal. Land application

☑ Sludge management is a controversial topic of great discussion and further information can be obtained from:

United States Environmental Protection Agency (USEPA), www.epa.gov/owm.bio.html

Cornell Waste Management Institute, www.cfe.cornell.edu/wmi/sludge.html

Environmental Working Group, www.ewg.org/pub/home/reports/sludgememo/sludge.html

National Research Council, www4.nationalacademics.org/cp.nsf

involves transporting the sludge to a specific site, such as a farm or an agricultural entity, where it is spread onto the soil and used for its nutrient value, the same way that fertilizer is utilized.

Reusing sludge that is clean and treated is a way of recycling nutrients back to land. Groups and various organizations around the country are developing safe standards for land application of processed sewage sludge.

☑ **Stormwater: Another soup, but a la carte**

Stormwater runoff is not treated in coastal areas of New Jersey. Instead, all stormwater runoff enters a separate underground infrastructure of pipes that lead *directly* to local waterways. In some areas, underground systems of stormwater and sewers are close together and if pipes are cracked or old, infiltration (water seeps both in and out of pipelines) can occur. The mixing of stormwater into sanitary sewers cause treatment plants to plants to spend money and effort treating stormwater; however, the reverse is worse. Sanitary sewers entering stormwater pipes will result in raw sewage being discharged into waterways. Neither scenario is good and must be controlled. Several other states and Northern New Jersey, use **Combined Sewer Systems** where sanitary sewage and stormwater are stored in the same pipe and are both treated at a wastewater treatment plant. However, when municipalities with Combined Sewers experience wet weather, the excess volume of water cannot be handled or properly treated at the treatment plant. Instead of letting water back up into the homes of residents, municipalities have **Combined Sewer Outfalls** (CSOs) to release the overflow from the Combined Sewers without any treatment into adjacent waters. The release of this raw sewage into adjacent waters is a major source of **non-point source pollution**.

4: OCEAN DISCHARGE OF EFFLUENT

After the wastewater that is generated by households, municipalities, and industries has undergone treatment at coastal New Jersey's seventeen wastewater facilities, the remaining liquid product is discharged into the ocean.

What is Effluent?

After water has proceeded through the treatment train of primary, secondary, disinfection, and in some cases tertiary treatments, and is to be discharged, the treated wastewater is called **effluent**. Effluent is the liquid outflow from a wastewater treatment plant. Although it has been treated, the excessive volume of effluent and the low levels of indicator pathogens, toxins, nutrients, and substantial levels of chlorine disinfectants in the effluent can harm the ecosystem to which the effluent is discharged (s*ee* Box 4.1).

It is interesting to note that prior to the 1970s, many wastewater treatment plants were smaller and discharged directly into rivers and back-bays, causing several water quality problems in the late 1970s. The New Jersey Department of Environmental Protection (NJ DEP) made a policy shift to crate huge wastewater facilities, which discharged treated wastewater in the ocean, instead.

Box 4.1: What is in Effluent?			
Pathogens	**Toxins**	**Nutrients**	**Chlorine**
Microorganisms responsible for viral and bacterial infections such as *Salmonella* and Hepatitis A and E, but also includes several **protozoan species** (s*ee* Chapter 2).	Includes organic and inorganic chemicals such as **metals**, petroleum products, pesticides, and industrial chemicals (s*ee* Boxes 2.1 and 2.2. on page 4).	Naturally occurring nutrients, but in elevated levels that may cause detrimental results, such as algal blooms (*see* Chapter 2).	Widely used as a disinfectant in different forms and is pumped into the aquatic environment in large quantities as by-products of the disinfection process (*see* Chapter 3).

What Are the Risks Associated with Effluent?

Some risks are associated with effluent depending on the magnitude and extent of the contamination by pathogens, toxins, and nutrients. Specifically, *the solution to pollution is not dilution.*

Pathogens

There are risks from pathogens. New Jersey monitoring only tests for indicators of bacterial pathogens, not all types of pathogens. Currently, the pathogen indicators used to protect human health are limited to bacterial pathogens and do not protect against viral pathogens that are common causes of bathing-related illnesses, such as respiratory infections. Elevated levels of bacterial pathogen indicators are used as the basis for closing bathing beaches and shellfish beds (*see* Section below, "Do You Know What You are Swimming In?).

Toxins

Toxins that remain in effluent after the treatment process also threaten the health of humans and marine life. Many of the toxins that enter the wastewater system have no permitted discharge limits, including chlorine and its by-products that result from disinfection processes. This may allow toxins to build up in sediments and the tissues of marine organisms, having detrimental, if not lethal effects on marine organisms and placing human consumers of seafood at risk. The extent and magnitude of risks are unknown because, to date, there have not been surveys of toxin contamination in sediments and tissues around outfalls.

☑ **NJ Fact:**
According to the National Resources Defense Council, New Jersey is one of only two states to close beaches when bacteria levels are violated. For more information about beach closures, visit www.nrdc.org or www.NJBeaches.org.

Do You Know What You are Swimming In?

Currently, monitoring for pathogens is done using indicators, such as fecal coliform and enterococci. Indicator bacteria such as these are not directly harmful to humans, but are typically found in the presence of other harmful viruses and bacteria. These indicator pathogens are easy to test for and make the monitoring process more clear, although many pathogens, like viruses, still are not monitored. The rationale for this is that several conclusive studies have proven that the incidence of disease contracted by swimmers is in a direct relation to the amount of indicator bacteria. Basically, swimming in polluted water *can* make you sick. It is important to recognize that this pathogen pollution can happen because of discharges from wastewater plants, as well as from runoff from the land along the New Jersey shore. In recent years, runoff has been the primary reason for elevated bacteria levels detected at New Jersey ocean beaches.

Where Does Effluent Go?

Fourteen permitted ocean dischargers along the New Jersey shoreline, ranging from Cape May County to Monmouth County, pump our treated wastewater into the Atlantic Ocean (*see* Box 4.2 for locations of outfall pipes; *see* Figure 4.1 for a map of ocean dischargers; *see* Appendix A for treatment facilities contributing to dischargers and the towns serviced by each of the treatment facilities). Most of the effluent is freshwater that has been taken from nearby sources to use during the treatment process. This discharged freshwater is destroyed in the ocean and becomes saltwater, depleting our natural freshwater supply. In 1998 alone, *65 billion gallons* of freshwater effluent was pumped into the ocean. If all 65 billion gallons were poured into milk gallon jugs and lined up end to end, they would stretch *10,258,838 miles*, and circle the Earth *412 times*.

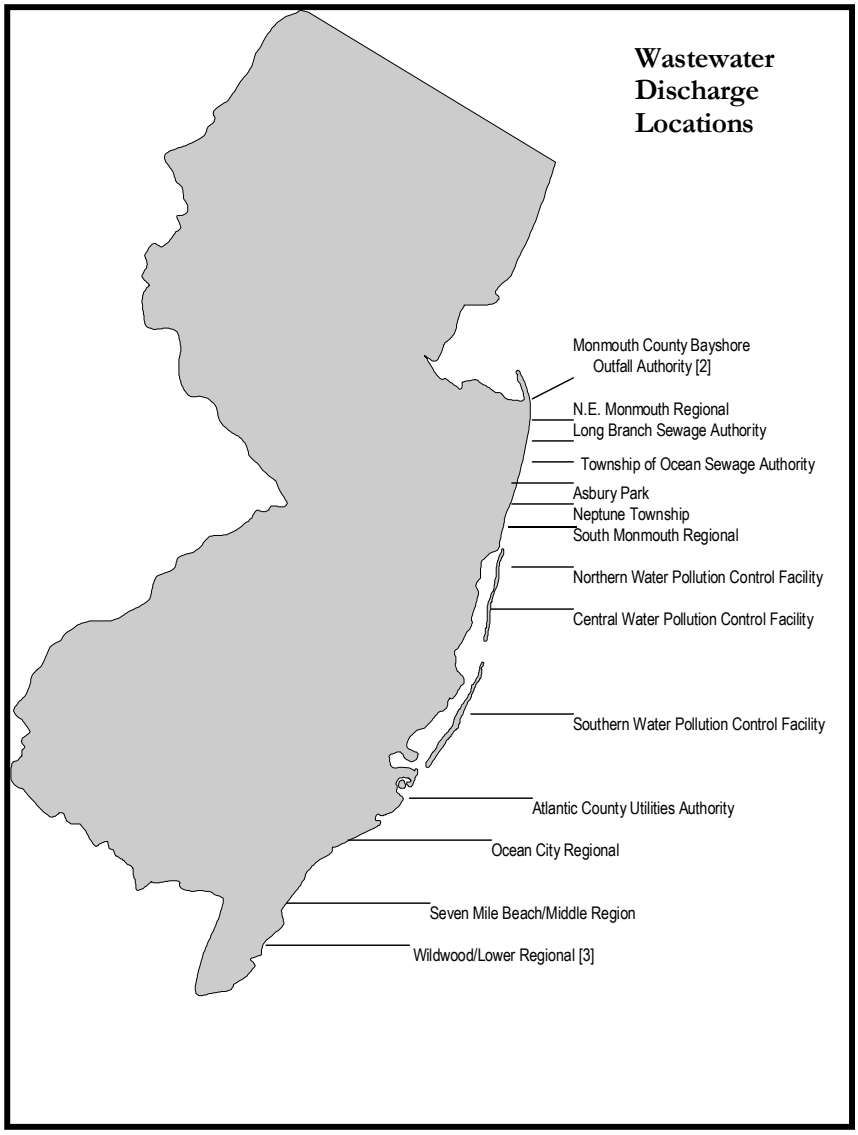


Figure 4.1. New Jersey's Fourteen Ocean Outfall Pipes. Note: This diagram is intended to illustrate the approximate location of each ocean discharger pipeline. Lines are not drawn to scale and have no relation to the length of the individual outfall pipeline.

Box 4.2: Is There an Outfall Pipe Near You?

Town/Street *(All pipes discharge east into the Atlantic Ocean)*	***Distance Offshore***	***Town/Street*** *(All pipes discharge east into the Atlantic Ocean)*	***Distance Offshore***
Ventnor City (S. Delancy Place)	8,000 feet	Monmouth Beach (~ Cottage Road)	1,762 feet
Southern Wildwood Crest (Jefferson Avenue)	4,800 feet	Belmar & Spring Lake (North & South Blvds. (Twin Arches))	4,480 feet
Southern Ocean City (46th Street)	6,000 feet	Avon-by-the-Sea & Bradley Beach (Sylvan Lake)	5,800 feet
Avalon (30th Street)	5,530 feet	Deal (~ Roosevelt Avenue)	1,800 feet
Northern Asbury Park (~ 7th & 8th Streets)	1,600 feet	South-end of South Seaside Park (23rd Avenue)	5,000 feet
Southern Sandy Hook (near Highlands Bridge)	4,000 feet	Mantoloking (~ Princeton Avenue)	5,000 feet
Seven Presidents Park (south end)	1,920 feet	Ship Bottom Borough (5th Street)	5,000 feet
Note: 5,280 feet = 1 mile			

The Outfall System

Effluent flows from wastewater treatment plants via long pipelines called **outfalls** (*see* Figure 4.2). Outfalls or dischargers can range from an open-ended pipe to a multiple port diffuser. The outfalls lie between 1,600 feet (in Monmouth Beach) and 8,000 feet (in Atlantic City) from the shore. The outfall is either a long concrete or steel pipeline, which runs along the ocean floor, from the treatment plant directly to the **diffuser** (*see* Figure 4.2). A diffuser is like a sieve with up to several hundred holes, which release the effluent into the ocean over the distance of the diffuser (*see* Figure 4.3).

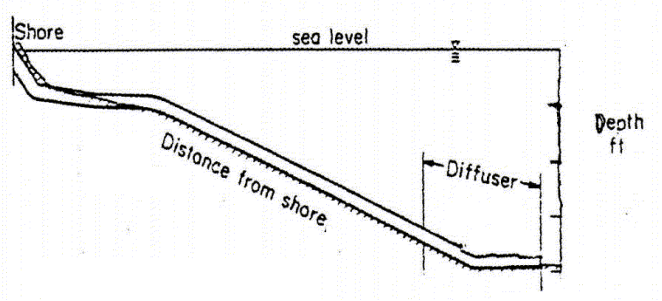


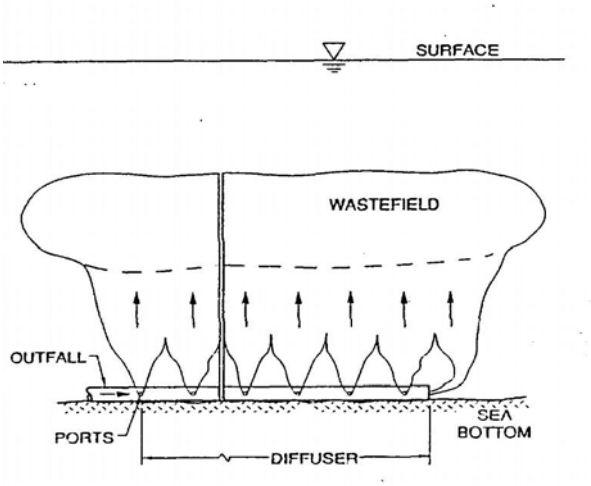
Figure 4.2. An Ocean Outfall. An outfall consists of a long steel pipeline that runs along the ocean floor. The diffuser region has many small ports from which the effluent is discharged. Source: National Research Council. 1993.

The Diffusion Zone

Once freshwater effluent has been discharged into the saltwater environment, dilution begins. The effluent rises from the diffuser where it mixes with ocean water (*see* Figure 4.3). The rising brew of freshwater and saltwater mixing is a **mixing zone** and **wastefield**. At some distance from the outfall, the effluent plume is undetectable because of complete mixing and dilution. The distance that a plume travels depends on many conditions in the ocean, including tides, currents, winds, and salinity.

The mixing zone can contain significantly high levels of toxins since statewide water quality standards and regulations *do not* have to be met until the water reaches the boundary of the mixing zone. This means that effluent and marine waters in the mixing zone do not necessarily meet the standards and regulations for clean water.

Figure 4.3. A Rising Wastefield. The wastefield includes the zone where freshwater effluent has been diffused from the ports in the outfall pipe into the ocean and mixes with salfwater. Source: National Research Council. 1993.



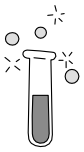
Who Regulates the Effluent Discharge?—Permits & NJDEP

Every facility in the United States that discharges effluent into the ocean must operate under either a state or federally issued permit. In New Jersey, the New Jersey Department of Environmental Protection (NJDEP) issues **New Jersey Pollutant Discharge Elimination System** (**NJPDES**) discharge **permits** which designate the locations of outfalls, limit the volume of effluent that may be discharged, and specify allowable levels of pollutants in effluent. These permits, issued under Section 403 of the Clean Water Act, require compliance with seven criteria to protect ocean waters from degradation. These include impacts of the disposal of pollutants on human health, marine life, and ecosystem. NJDEP is also responsible for establishing and enforcing treatment facilities' monitoring systems, regulating the condition of discharging facilities, and determining if modifications (such as monitoring or plant capacity expansion) are necessary.

☑ *Seven* treatment facilities will be seeking permit renewals in mid-late 2001. Another *seven* facilities are expected to be issued permit renewals by summer 2001.

Most permits are issued for either three or five years. When permits expire, the state is responsible for examining facilities to ensure that facilities operate according to the permits. Before every permit renewal, a public comment period, usually 30 days, is required. During this time, citizens can voice their concerns about the permit renewal and facility operations. Announcements for public comment periods are printed in local newspapers and can also be requested directly from the NJDEP Division of Water Quality. Appendix A lists the towns and the ocean discharging treatment facilities serving these towns. A list of all permit expirations is provided in Appendix B and a list of contacts for the treatment facilities is presented in Appendix C.

Is the Effluent Monitored and Tested?



Frequency of effluent testing is highly variable depending on the substance under investigation. In New Jersey, testing for toxins in effluent is performed quarterly (every 3 months) to once per permit cycle (every 4-5 years). For most **priority pollutants,** no regulations or limits exist for testing and monitoring. The only toxins that facilities test for each month are chlorine residuals or CPOs, but facilities do not have strict limits to follow. In addition, facilities test for the pathogen indicators **fecal coliform** and **enterococci**, yet only limits for fecal coliform exist. This is alarming, since the United States Environmental Protection Agency will require all states to monitor bathing beaches for enterococci. In addition, there are no limits for enterococci in wastewater, causing high levels of enterococci in some states' effluent.

Although no discharge limitations exist for toxins and nutrients dumped into the ocean, New Jersey does provide Recommended Quantitation Levels (RQLs), which are merely recommended detection levels based on laboratory determinations. By no means are these levels designed to meet Water Quality Standards (WQSs), which are established to assure the quality of surface water is safe for human health and aquatic life. For example, for the toxin Benzidine, the RQL is 50 parts per billion, while the WQS is 0.000118 parts per billion. The obvious discrepancy demonstrates the need for a standard monitoring system for discharged toxins that can detect elevated levels of toxins in discharge zones and that establish limits that are designed to meet WQS.

Wasting Our Waters Away

According to research that is presented in Clean Ocean Action's technical guide, which is a companion guide to this citizen's guide, several actions must be implemented to improve the quality of effluent as well as address the excessive amount of effluent released into the ocean (*see* "Wasting Our Waters Away: Wastewater Discharges into the Atlantic Ocean from New Jersey").

One good way to improve wastewater treatment would be to reuse the water currently discharged into the ocean. By dumping water into the ocean, there is no real incentive to improve treatment—the ocean becomes the wastefield. However, if the water were to be recycled and reused—putting it back into the natural system or watershed—the standards for treatment would be higher and the water starved areas in the watershed would be replenished.

Beneficial Reuse Programs

Many communities throughout New Jersey are reaching water capacity limits. With reoccurring droughts and ever-increasing populations, the option of water reuse is becoming all the more important. Several environmentally sound reuse programs have been developed in other states in which wastewater can be treated and reused to address the large quantity of water that is "wasted away."

With new technologies, the quality of wastewater can be restored to certain levels and reused for irrigating agricultural crops and landscapes (such as golf courses), cooling of power plants, motors, and air conditioners, fire protection (for use in hydrants and by fire trucks), and even our homes. Although these reuse procedures are currently being developed in New Jersey, these programs have been used and proven to be very effective in other states, such as Colorado and California. New Jersey does not have a public renewal policy or regulation for the beneficial reuse of wastewater. For example, in San Jose, California, an IBM facility that uses **reclaimed water** saves approximately *100 million gallons* of freshwater every year. Through programs such as these, wastewater effluent can be treated and reused for non-drinkable functions.

5. RECOMMENDATIONS TO IMPROVE EFFLUENT: QUANTITY AND QUALITY

An effective treatment method or system for managing wastewater must include a balance of treatment technologies, reduction of pollution, and education. Reduction of pollution at the source is the responsibility of homeowners and industry, alike. Citizens can cut down on the volume of wastewater by reducing their water consumption and can improve the quality of wastewater by decreasing the amount of toxins they use in their households.

Improve the Quantity Used: Conservation and Reuse

According to the United States Environmental Protection Agency (USEPA), the average citizen uses 120 gallons of water a day. In 1998 alone, 65 billion gallons of effluent were generated and pumped into the Atlantic Ocean off of the New Jersey shore. This number takes its toll on our **ecosystem**.

Water Conservation

Citizens are using excessive amounts of water for their everyday activities, which greatly contributes to the increasing amount of water entering the wastewater treatment process (*see* Box 5.1). Water conservation can have huge benefits for coastal communities by reducing stress on near-capacity facilities and by delaying the need for the construction of new treatment facilities and reducing the need for finding and using new water supplies. In addition, building new and expanding existing facilities encourages suburban sprawl and development and adds pressure on already stressed freshwater supplies. By preventing the development of new facilities, conservation helps to safeguard natural freshwater flows and prevent further use and abuse of our waters.

An excessive amount of freshwater is removed from freshwater systems, subjected to the treatment train, and released and converted into saltwater. All of the wastewater that people generate every day destroys billions of gallons of freshwater, which can be avoided with simple conservation practices (*see* Chapter 6).

Box 5.1: **How Do We Use Our Water?*** Percent of Total Typical Household Usage	
Toilet Flushing	40%
Bathing	35%
Laundry	12%
Kitchen	10%
Outdoors	3%

*Adapted from Save the Sound Education Programs.

Improve the Quality: Reduction of Toxins

The only way to truly reduce toxins in the wastewater treatment process is to reduce toxin entry into wastewater facilities by **source reduction**. Sources of wastewater are both industrial and municipal and source reduction can be adequately addressed at each of these wastewater sources. As explained in Chapter 3, secondary treatment of wastewater, the level of treatment that New Jersey's ocean dischargers use, is not designed to ensure that all toxins are removed from wastewater before it is discharged. Toxin removal is an incidental occurrence—toxins tend to attach to solid particles and when solid particles are removed, their associated toxins are as well. However, because toxins are associated with solids, this means that toxins remain and are concentrated in sludge, which must be managed by separate processes (*see* Chapter 3).

6: HOW YOU CAN GET INVOLVED

Each person can help reduce the amount of wastewater and reduce toxic contaminants in it. Listed below are several simple ways to conserve water and to practice source reduction in homes and communities.

Simple Household Solutions

- Take quicker showers. The average shower uses *25 to 50 gallons* of water. Be conscious of the time you spend in the shower and the water you could be saving if you took a quicker shower.
- Every time you flush the toilet in your home, *4 to 6 gallons* of water enter the wastewater system. Eliminate excess volume by only flushing when necessary—not when cleaning hairbrushes, killing insects, or any other non-traditional function. Most new toilets have settings for water level—make sure your toilet is set on a low level. In older commodes, place a plastic container (about 1 liter) already filled with water and tightly capped in the tank to reduce the volume of water filling the tank.

- Each load of laundry done in the average domestic washing machine expends *30 to 50 gallons* of water. Wash only full loads to prevent multiple washings and further water usage. When shopping for new appliances look for "water efficient" models.
- Even though it is a time-saver, each cycle of the dishwasher still uses *4 to 8 gallons* of water. Even worse, washing dishes by hand uses about *20 gallons* of water.
- Washing your hands or brushing your teeth can use from *3 to 6 gallons* of water. Up to *one gallon* of water can run out of a faucet in only *60 seconds*. Make sure to turn off the water, except when directly using it.
- Install water conservation devices on showerheads and faucets. Also use nozzles for hoses to prevent wasting water. Devices such as these can significantly cut down on water waste, without impeding your usage.

Reducing Toxins and Chemicals in Your Household

The average household contains *10 gallons* of hazardous waste stored under kitchen sinks, in bathrooms, in garages, and in workshops in the form of cleaners, disinfectants, batteries, paints, solvents, pesticides, and other chemicals. Be conscious of the chemicals in your home and try using safer alternatives.

- Excessive use of bleaches can be toxic. Try using full strength Borax or safe non-chlorine bleach. If you must use bleach, do so sparingly.
- Some detergents use an extraordinary amount of phosphates, which lead to algal blooms that harm marine life in the bodies of water that receive effluent carrying these phosphates. Try using laundry soaps like Borax or other non-phosphate detergents. For dishwashers, try using 50% washing soda and 50% Borax.
- Drain cleaners are highly toxic. Try using alternatives like ½ cup of baking soda followed by ¼ cup of vinegar. Cover and flush with boiling water.
- For general cleaning, try using Bon Ami or ½ cup of Borax dissolved in 1 gallon of warm water. For tough stains, use half of a lemon dipped in Borax and rub.
- One quart of vinegar and one quart of warm water makes a great and safe glass cleaner (vinegar concentrations can be altered to vary strength of cleaner).

Get Involved in Your Community

Appendix A lists towns and the ocean discharging treatment facilities serving these towns. Find out when your treatment facility is seeking a permit renewal (*see* Appendix B) and contact the facility for up-to-date information (*see* Appendix C). *Seven* treatment facilities will be seeking permit renewals in mid-late 2001. Another *seven* facilities expect to be issued permit renewals by summer 2001.

Below are suggestions about how to get involved in the permit renewal process.

- Ask questions and attend local hearings about expansions, new sources, and capacity levels. Support sewer maintenance programs and try to gather support for these issues.
- Attend town council meetings and voice your opinion. Organize citizens who are concerned about the issue and develop a plan of action.
- Join your local environmental commission and stay active and up to date with events and proceedings. Read local environmental newsletters or send in articles or letters to the editor to local newspapers to be published regarding an issue of concern.
- Obtain information about facility capacity and expansion by checking out the NJDEP website, specifically the Water Quality Division, under Capacity Assurance Plan (*see* Appendices C and D). Proactively scrutinize your local wastewater treatment plant to ensure your local waterways and beaches stay healthy and clean.
- Be vocal about the costs of suburban sprawl on our watershed; specifically, the effects of new and expanded wastewater treatment facilities on the dwindling supply of freshwater.

A list of contacts can be found in Appendix E, which highlights agencies, organizations, and sources that can provide further information about wastewater issues.

For more information about wastewater issues, visit www.CleanOceanAction.org and follow the links to wastewater. On our website, Clean Ocean Action also has information about other environmentally friendly tips to practice in your household and daily life. To contact COA directly, call Clean Ocean Action's Main Office at (732) 872-0111 or send electronic mail to SandyHook@CleanOceanAction.org.

7: GLOSSARY

Activated Sludge Treatment: the use of microorganisms stimulated by bubbling oxygen to break down organic manner. Activated sludge treatment is a component of secondary treatment.

Acute Toxicity: mortality after brief exposure to contaminants.

Algae: simple photosynthetic organisms with no true roots, stems, or leaves; usually found in water or damp areas. Examples are seaweed and pond scum.

Bacteria: a group of simple organisms that are typically one-celled, have no chlorophyll, and replicate by division.

Biological Oxygen Demand (BOD): the demand for oxygen produced by solids suspended in water necessary for the substances to break down.

Biosolids: the suspended solids screened out of municipal wastewater that can be processed for beneficial reuse.

Carcinogen: cancer-causing agent.

Chemically Enhanced Primary Treatment: a process by which primary treatment of wastewater is advanced via the addition of chemicals.

Chlorine Produced Oxidants (CPO): highly reactive compounds that contain chlorine and are the sum of the total amount of chlorine and bromine in the water.

Clarifier: a tank where water and solids are separated. Suspended solids settle to the bottom and water remains at the top.

Clean Water Act: the reauthorized Federal Water Pollution Control Act.

Combined Sewer Outfall (CSO): an emergency overflow discharge system built in to a combined sewer system. When the water level in a combined sewer reaches capacity, it is discharged directly into open waters via the CSO.

Combined Sewer System: an infrastructure of pipeline where both sanitary sewage (municipal sewage) and storm runoff are stored before treatment at a public facility.

Conventional Pollutants: class of pollutants including solids remaining in water (litter), oxygen demanding substances (algae), acids and bases, bacteria and viruses (pathogens), and oil and grease.

Dechlorination: the removal of chlorine from effluent that was added for the purposes of disinfection before effluent reached its outfall destination.

Diffuser: a series of small ports or openings in an outfall pipe through which effluent is dispersed into the marine environment.

Dioxin: a class of chemicals proven to accumulate in body tissues that can become harmful to humans and wildlife.

Discharger: facility which pumps treated wastewater to the ocean or other body of water.

Disinfection: is the selective destruction of pathogens and other microorganisms in order to protect the health of people and other animal life.

Ecosystem: a system made up of the community of animals, plants, and bacteria living within a certain environment.

Effluent: remaining wastewater after primary and secondary treatment.

Enteric Pathogens: those pathogens residing in human intestines.

Eutrophication: a process by which surplus nutrients in a body of water causes excessive plant growth, which in turn depletes the water of necessary oxygen.

Fecal Coliform: a non-harmful bacteria which resides in the intestines of warm-blooded animals; serves as an indicator of other
harmful bacteria.

Granular Activated Carbon (GAC): an expensive, yet efficient means of dechlorination.

Groundwater: the water found below the Earth's surface, which supplies wells and springs and is often used for drinking water.

Influent: untreated wastewater that enters a sewage treatment plant.

Inorganic Chemicals: chemicals that do not contain carbon (excluding CO_2), such as metals from plants and factories.

Landfill: a land disposal site for solid wastes.

Metals: any one of a class of compounds characterized by ability to conduct heat and electricity, luster, malleability, and ductility.

Microorganisms: organisms of microscopic or ultra-microscopic size.

Mixing Zone: the area of dilution of effluent into seawater.

New Jersey Pollutant Discharge Elimination System: the permitting system for releasing pollutants into waterbodies in New Jersey. Each ocean discharge facility must apply for and operate under one of these permits. The permit regulates the volume of effluent discharged, the testing requirements, the toxin limits, and facility maintenance.

Nonconventional Pollutants: class of pollutants including nutrients such as nitrogen and phosphorus, and chemicals such as chlorine and fluoride.

Non-Point Source Pollution: contaminants with no defined point of entry (i.e. rainwater, snowmelt) that originate from many indirect sources, such as lawn herbicides, road pollution (litter and drippings from vehicles), and animal waste.

Nutrient: an element or compound needed by an organism for healthy growth. In excessive levels, these substances can have negative effects on the environment (i.e. alga blooms).

Organic Chemicals: carbon-containing compounds (excluding CO_2) that occur either naturally or are man-made. Some of the most toxic organics (dioxins and petroleum byproducts) are man-made.

Organism: a living thing with a system of functions working to maintain life.

Outfall: a pipeline that carries liquid effluent from treatment plants to a receiving water. Discharge types can range from an open-ended pipe to a multiple port diffuser.

Ozone (O_3): unstable pale blue gas used as a bleaching agent in the purification of water.

Parasites: an organism that attaches itself and lives on a host organism, usually bringing harm to the host.

Pathogens: disease-producing organisms, generally associated with viruses or bacteria.

Permit: a document issued by the USEPA or other state agency that designates specific regulations and monitoring requirements that each discharger is responsible to meet. Each Privately Owned Treatment Works (POTW) in NJ operates under one of these permits.

Pollutant: any substance that dirties the air, land, or water. An example is the organic and inorganic substances found in wastewater.

Point Source Pollution: pollution discharged directly from a specific site, such as a municipal sewage treatment plant or an industrial outfall pipe.

Pretreatment: a series of treatments for wastewater to reduce toxicity in water after it leaves a non-domestic source, but before it enters a municipal treatment plant.

Primary Treatment: the first level of wastewater treatment, which utilizes methods such as screening, settlement tanks, and the addition of chemicals.

Priority Pollutant: those pollutants that have long-reaching effects (e.g. to areas far beyond discharge points).

Privately Owned Treatment Facility: a wastewater treatment plant owned and operated by a private entity, such as a housing complex or hospital.

Protozoan: a group of microscopic animals made up of single cells or a group of cells. They can live in water or as parasites in a host organism.

Publicly Owned Treatment Works (POTW): those facilities where municipal wastewater is treated. All ocean discharges in NJ are POTWs.

Secondary Treatment: the second level of wastewater treatment, which includes the use of chemicals and the addition of microorganisms to remove at least 85% of solids and Biological Oxygen Demands (BODs).

Sedimentation: the depositing of suspended solids in water onto the bottom of a body of water.

Significant Indirect User (SIU): a facility that produces at least 25,000 gallons of wastewater per day and must apply for a NJ Pollutant Discharge Elimination System (NJPDES) permit. Many SIUs in NJ pretreat their wastewater and then hook up with a municipal POTW. In other states, many SIUs may discharge directly into surface waters.

Sludge: the solids removed from wastewater during treatment that must be disposed of through a separate special process.

Source Control: collective term used to describe all of the ways Publicly Owned Treatment Works (POTWs) regulate the input of toxic materials into sewer systems (e.g. effluent limits/charges).

Storm Drain: the system of pipelines that handles rainfall and directs it to a surface water body.

Surface Water: water found in streams, rivers, lakes, and the ocean.

Tertiary Treatment: an advanced form of wastewater treatment that utilizes many advanced techniques with the goal of eliminating nutrients such as nitrogen and phosphorous from effluent.

Total Suspended Solids (TSS): organic or inorganic particles either suspended in or carried by water.

Toxins: any group of poisonous compounds produced by some organism, which causes certain diseases.

Turbidity: cloudy or muddy waters caused by agitated or suspended sediment.

Urban Runoff: all of the waters and the debris (plastics, floatables, oil and grease) that are washed into local surface water by rain or snowmelt runoff from roadsides, parking lots, or other urban surfaces.

US Environmental Protection Agency: (EPA) the federal agency set up to "protect human health and safeguard the environment".

Wastefield: the region of mixing occurring at the end of an outfall pipe where effluent mixes with marine water.

Wastewater: water after man has used it; sewage.

Water Reclamation and Reuse: process by which wastewater is sanitized and cleansed for reuse.

Watershed: an area of land that drains into a river, stream, or other body of water.

Appendix A: Wastewater Treatment Facility and Your Town

Wastewater Treatment Facility	City/Town Serviced by Facility
Atlantic County:	
Atlantic County Utilities Authority	Absecon, Atlantic City, Brigantine, Egg Harbor City, Egg Harbor Township, Galloway Township, Hamilton Township, Linwood, Longport, Margate, Northfield, Pleasantville, Somers Point, Ventnor
Cape May County:	
Cape May Regional Wastewater Treatment Plant	Cape May, Cape May Point, West Cape May
Lower Township	*Not studied or included in this report. Call Clean Ocean Action for more information.
Seven Mile Beach/Middle Region Wastewater Treatment Facility	Avalon, Middle Township, Sea Isle City, Stone Harbor
Ocean City Regional Wastewater Treatment Facility	Ocean City
Wildwood/Lower Regional Wastewater Treatment Facility	Rio Grande, West Wildwood, Wildwood, Wildwood Crest
Monmouth County:	
Asbury Park Wastewater Treatment Facility	Asbury Park
Bayshore Regional Sewerage Authority	Aberdeen Township, Hazlet Township, Holmdel Township, Keansburg Borough, Keyport Borough, Marlboro Township, Matawan Borough, Union Beach Borough
Long Branch Sewerage Authority	Long Branch, Monmouth Beach (2 houses), West Long Branch (sections)
Monmouth County Bayshore Outfall Authority (MCBOA)	Bayshore Regional Sewerage Authority and Township of Middletown Sewerage Authority
Northeast Monmouth County Regional Sewerage Authority	Camp Charles Wood, Eatontown, Fair Haven, Fort Monmouth, Little Silver, Monmouth Beach, Oceanport, Red Bank, Rumson, Sea Bright, Shrewsbury, Shrewsbury Borough, Tinton Falls, West Long Branch (sections)
Northern Water Pollution Control Facility	Wall Township (sections)
South Monmouth Regional Sewerage Authority	Belmar, Brielle, Manasquan, Sea Girt, South Belmar, Spring Lake, Spring Lake Heights, Wall Township (sections)
Township of Middletown Sewerage Authority	Borough of Atlantic Highlands, Borough of Highlands, Township of Middletown
Township of Neptune Sewerage Authority	Avon, Bradley Beach, Neptune, Neptune City, Ocean Grove, Tinton Falls, Wall Township (sections)

Township of Ocean Sewerage Authority	Allenhurst, Deal (sections), Interlaken, Loch Arbour, Oakhurst, Wanamassa, Wayside
Ocean County:	
Central Water Pollution Control Facility	Barnegat Township, Beachwood, Berkeley, Crestwood, Dover, Island Heights Borough, Lacy, Lakehurst, Lakewood, Lavallette, Manchester, Ocean Gate, Ocean Township, Seaside Heights, Seaside Park, South Toms River
Northern Water Pollution Control Facility	Brick Township, Farmingdale, Freehold, Freehold Borough, Jackson, Manasquan, Mantoloking Borough, Point Pleasant Beach, Point Pleasant Borough
Southern Water Pollution Control Facility	Barnegat Light, Beach Haven, Eagleswood, Harvey Cedar, Little Egg, Long Beach, Shipbottom, Stafford, Surf City Borough, Tuckerton

Appendix B: Wastewater Facilities Permit Renewal Dates*

Facility	Date Current Permit Expires
Asbury Park Wastewater Treatment Facility	08-31-00♦
Atlantic County Utilities Authority	08-31-00♦
Bayshore Regional Sewerage Authority	07-31-01
Cape May Regional Wastewater Treatment Facility	03/31/06
Long Branch Sewerage Authority	Expected 2006♦♦
Monmouth County Bayshore Outfall Authority (MCBOA)	03-31-04
Northeast Monmouth County Regional Sewerage Authority	07/31/06
Ocean City Regional Wastewater Treatment Facility	03/31/06
Central Water Pollution Control Facility	07-31-00♦
Northern Water Pollution Control Facility	08-31-00♦
Southern Water Pollution Control Facility	Expected 2006♦♦
Seven Mile Beach/Middle Region Wastewater Treatment Facility	03/31/06
South Monmouth Regional Sewerage Authority	Expected 2006♦♦
Township of Middletown Sewerage Authority	07-31-01♦
Township of Neptune Sewerage Authority	02-28-04
Township of Ocean Sewerage Authority	08-31-00♦
Wildwood/Lower Regional Wastewater Treatment Facility	03/31/06

* As of June 25, 2001.

♦ As of June 25, 2001, no permit renewal application has been issued for public review and comment.

♦♦ Permit renewal released for public review and comment; no final permit yet issued; expected expiration is 2006.

Appendix C: Treatment Facility Contacts

*When inquiring at a facility contact the Facility Supervisor		
Facility	**Address**	**Telephone**
Atlantic County		
Atlantic County Utility Authority	1701 Absecon Boulevard Atlantic City, NJ 08401	609-348-5500
Cape May County		
Cape May Water Treatment Facility	541 Sunset Boulevard Cape May Point, NJ 08212	609-465-9026
Ocean City Regional Wastewater Treatment Facility	West Avenue and 45th Street Ocean City, NJ 08226	609-465-9026
Seven Mile Beach/Middle Region Wastewater Treatment Facility	1306 Moore Road Crest Haven Complex Cape May Court House, NJ 08210	609-465-9026
Wildwood/Lower Regional Wastewater Treatment Facility	2701 East Route 47 Rio Grande, NJ 08242	609-465-9026
Monmouth County		
Asbury Park Treatment Facility	8th Ave and Ocean Avenue Asbury Park, NJ 07712	732-774-5131
Bayshore Regional Sewerage Authority	100 Oak Street Union Beach, NJ 07735	732-739-1095
Long Branch Sewerage Authority	150 Joline Avenue P.O. Box 700 Long Branch, NJ 07740	732-222-0500
Monmouth County Bayshore Outfall Authority (MCBOA)	200 Harbor Way P.O. Box 184 Belford, NJ 07718	732-495-2100
Northeast Monmouth County Regional Sewerage Authority	One Highland Avenue Monmouth Beach, NJ 07750	732-229-8578
Southern Water Pollution Control Facility	150 Cedar Run Dock Road Manahawkin, NJ 08050	732-269-4500 x8226
Township of Middletown Sewerage Authority	Center Avenue Belford, NJ 07718-0205	732-495-1010
Township of Neptune Sewerage Authority	634 Old Corlies Avenue Neptune, NJ 07754	732-922-3434
Township of Ocean Sewerage Authority	224 Roosevelt Avenue Oakhurst, NJ 07755	732-531-2213

Facility	**Address**	**Telephone**
Ocean County		
Central Water Pollution Control Facility	501 Hickory Lane Bayville, NJ 08721	732-269-4500 x8226
Northern Water Pollution Control Facility	255 Mantoloking Road Brick, NJ 08723	732-269-4500 x8226
South Monmouth Regional Sewerage Authority	1235 18th Avenue Wall Township, NJ 07719	732-681-0611

Appendix D: List of Contacts

Departments of Health	
The State of NJ	John Fitch Plaza PO Box 360 Trenton, NJ 08625 1-800-367-6543
Atlantic County	Atlantic City: 609-347-5663 1301 Bacharach Boulevard, 4th Floor Atlantic City, NJ 08401-4603 All other Atlantic County: 201 South Shore Road Northfield, NJ 08225 609-645-5935
Cape May County	4 Moore Road Cape May, NJ 08210 609-465-1187
Monmouth County	3435 Highway 9 Freehold, NJ 07728 732-431-7456
Ocean County	Northern: 175 Sunset Avenue PO Box 2191 Toms River, NJ 08754 732-341-9700 Long Beach Island: 601 Long Beach Boulevard Haven Beach, NJ 08008 609-492-1212
NJ DEP- Division of Water Quality	
www.state.nj.us/dep/dwq	
Program Director	609-292-4543
Municipal Finance	609-292-8961
Pretreatment and Residuals	609-633-3823
World Wide Web Links	
Environmental Protection Agency	www.epa.gov
NJ Department of Environmental Protection (NJ DEP)	www.state.nj.us/dep
NJ DEP Division of Water Quality	www.state.nj.us/dep/dwq
Reuse Alternatives	www.waterrecycling.com
Contaminated Fish Advisories	www.epa.gov/OST/fish
Envirofacts	www.epa.gov/envirofacts
NJ DEP - NJ Ocean Beach Information	www.NJBeaches.org

Organizations	
American Littoral Society	Building 18, Hartshorne Drive. Sandy Hook, Highlands, NJ 07732; (732)-291-0055 www.AmericanLittoralSociety.org
Audubon Society of NJ - WATERS Education Program	9 Hardscrabble Road, PO Box 126 Bernardsville, NJ 07924; (908)-204-8998 www.njaudubon.org
NY/NJ Baykeeper - Litigation about illegal discharges in New York/New Jersey Harbor	Building 18, Hartshorne Dr, Sandy Hook, Highlands, NJ 07732; (732)-291-0176 www.nynjbaykeeper.org
Clean Ocean Action	PO Box 505, Highlands, NJ 07732 (732)-872-0111 www.CleanOceanAction.org
Coast Alliance	215 Pennsylvania Avenue, SE, Third Floor Washington, DC 20003; (202)-546-9554 www.CoastAlliance.org
Jersey Coast Angler's Association	22 Cruiser Court, Toms River, NJ 08753 (732)-793-2427 www.jcaa.org
League of Women Voters - NJ Chapter	200 West State Street, Trenton, NJ 08608 www.lwvnj.org (609)-394-3303
National Resources Defense Council (NRDC) - Testing Our Waters	40 West 20th Street, New York, NY 10011 (212)-727-2700 www.nrdc.org
Project Wild - Educational Activities	PO Box 18060 Boulder, CO 80308-8060 (303)-444-2390
NJ Public Interest Research Group (NJ PIRG)	11 North Willow Street Trenton, NJ 08608 (609)-394-8155 www.pirg.org/njpirg
NJ Environmental Federation (NJEF)	1002 Ocean Avenue, Belmar, NJ 07719 (732) 280-8988 www.cleanwateraction.org/njef
Sierra Club - NJ Chapter	57 Mountain Avenue, Princeton, NJ 08540-2611 (609)-924-3141 www.envirolink.org/orgs/njsierra/

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