OUR WATERS OUR HEALTH

A CITIZEN'S GUIDE TO SEWAGE POLLUTION

GULF RESTORATION NETWORK

OUR WATER, OUR HEALTH

A CITIZEN'S GUIDE TO SEWAGE POLLUTION

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a citizen's guide to sewage pollution

CHAPTER 1
an introduction

Water is the lifeline of the earth's ecosystems and the most precious natural resource we have. Not only do humans drink water, we use it for cooking and cleaning, for recreation, for fishing, and for transportation and commerce. All of these uses, however, are jeopardized when water is polluted by sewage. This manual focuses on how sewage discharges continue to cause pollution problems throughout the country, and specifically, in the Gulf of Mexico region.

HISTORY history

In the early 1800s, not much thought was given to the disposal of sewage in the United States. Individual homes used personal privies and cesspools to dispose of their sewage so they wouldn't contaminate their private wells. In cities, the main purpose for drainage systems was to funnel stormwater into local lakes and streams. Over time, residents from these cities started disposing of their sewage into these stormwater systems, with the basic reasoning of "out-of-sight, out-of-mind."

By the mid-1800's cities like Philadelphia, Boston, and Chicago realized that using stormwater drains for human waste disposal was not desirable. The increasing pollution and disease caused by privies and cesspools from a growing population necessitated the development of an appropriate sewage system for the disposal of household human waste. Growing cities had two options – continue using the existing stormwater drains to convey household waste or build a separate sewage system. The sewage systems that were subsequently built are, surprisingly, still in use today in some of the larger cities in the U.S.[1] Unfortunately, many residents in large and small towns still have the mindset of "out-of-sight, out-of-mind" when flushing the toilet, and so many of our sewage problems persist.

Most of us would probably prefer to not think about sewage. What happens to water after it exits our homes through toilets, sinks, and showers is not often discussed, but has important ramifications for water quality. While technologies to treat sewage have greatly improved since the cesspools of the 1800's, the water we drink, fish in, and swim in remains threatened by untreated or poorly treated sewage.

Sewage spills or inadequately treated discharges eventually reach our lakes, rivers, and beaches, consequently causing environmental risks to aquatic life living in waters and health risks to humans who swim, boat, and fish in those waters. Where problems occur, sewage can exact a substantial toll on ecosystems and unsuspecting recreational users of rivers, beachgoers, and those who may drink water that is contaminated by sewage. These problems can range from beach closures to fish-kills to unknown exposure to pathogens and other disease causing agents.

The **purpose** of this manual is to help citizens in the Gulf of Mexico region **advocate** for **better** sewage treatment policies and infrastructure in their **community**.

This manual should give you a better understanding of:

- the problems associated with poor or improper sewage treatment
- how sewage treatment plants and collection systems work
- laws that apply to the discharge of sewage effluent into waters
- effective ways to advocate for change to improve the health of your local waters

MORE information

Severe storms and hurricanes are a fact of life for the Gulf Coast, and with these storms come some potentially severe sewage pollution issues. In 2005, Hurricane Katrina caused extensive damage to 118 sewage treatment facilities in Louisiana, Mississippi, and Alabama,[2] which led to sewage collection system failure and raw sewage spills.

Untreated sewage was dumped from the main New Orleans treatment plant into the Mississippi River from August 29th, the day of the storm, through October 15th, when the city began to partially treat and disinfect the sewage.[3] Dozens of sewage treatment plants in Mississippi contributed to massive fish kills, including endangered gulf sturgeon, by discharging untreated sewage directly into the Pascagoula River.

The vulnerability of municipal and private sewage treatment facilities was also exposed during the Florida hurricane season in 2004. As four back-to-back hurricanes hit Florida, numerous systems failed because facilities and pumping stations did not have adequate secondary power sources. When generators ceased functioning, systems backed up and exposed surrounding communities and waterbodies to pollution and public health issues.

Severe Storms and Sewage

Harmful algal blooms are another dangerous outcome from hurricanes. According to the American Geophysical Union, nitrogen and phosphorus pollution on the West Florida shelf was up by ten times after Hurricanes Charley (2004) and Wilma (2005). Nutrient bioassays taken at the mouths of bays and rivers indicated that nitrogen was the primary pollutant. [4]

We can expect more damage to sewage facilities due to increasingly powerful hurricanes. This health hazard is especially dangerous for individuals who come into direct contact with raw sewage by wading through tainted flood water, drinking contaminated water, and consuming shellfish harvested from affected areas.

As cities rebuild from destructive hurricanes, they must plan for future hurricanes by moving vulnerable sewage infrastructure out of the storm surge zone, and by installing backup systems that ensure untreated sewage will not flow into public waterways after a storm. We must learn from the damage caused by past hurricanes, and make the best of this opportunity to improve the Gulf's sewage treatment systems.

the effects of SEWAGE

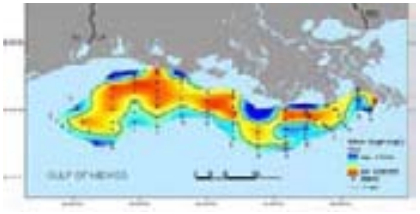
defining the problem

CHAPTER 2

What gets dumped into sewage systems eventually makes its way into our public waters, directly affecting our health and environment. Thousands of Americans become sick every year due to waterborne diseases associated with drinking water and water recreation. According to a 2003 report by the Centers for Disease Control and Prevention (CDC), more than 4,000 people fell ill between 1999 and 2000 due to contaminated drinking and recreation waters.[5]

Every year, beaches in the U.S. are closed or put under advisories for recreational use due to contamination, resulting in lost recreation opportunities and lost revenue for businesses that depend on healthy beaches. Contaminated stormwater discharges and sewage pollution are the two largest known causes of beach closures. In 2004, 4,144 days of beach closures in the United States were attributed to storm runoff and 1,319 were attributed to sewage spills and overflows, malfunctioning sewage plants and pump stations, and sewer line breaks. During the 2005 swimming season, the EPA determined that out of 4,025 monitored beaches, 1,109 or 28% had at least one advisory or closing.[6]

The Gulf Coast region has experienced tremendous population growth and development in recent years and these citizens are particularly susceptible to pollution and sewage problems since Gulf States are downstream of much of the nation and the region. In fact, the Gulf of Mexico is at the bottom of a drainage system that encompasses approximately half of the United States. The Dead Zone is a prime example how the Gulf suffers from the pollution of the entire country. Each year, pollution from the Mississippi River causes an area of roughly the size of New Jersey to become so devoid of fish, shrimp, crabs, and other marine life that it is known as the Dead Zone. This pollution comes largely from man-made sources such as fertilizers, farm an animal waste, and domestic sewage.[7]



Map of the Dead Zone in 2007

Stormwater runoff and sewage can also inflict damage on other Gulf ecosystems, such as coral reefs. The Florida Keys are home to the third largest shallow-water coral reef in the world extending 220 miles with an estimated value of $ 7.6 Billion.[8] These Florida reefs are under severe stress due to nitrogen and phosphorous pollution. Sewage treatment plants are significant sources of this pollution. Scientists have also linked bacteria in raw sewage to black band and white pox, two diseases that have devastated coral reefs.[9]

MORE information

The Dead Zone also known as the hypoxic zone is an area in the Gulf of Mexico where oxygen levels in the water drop too low to support most aquatic life. It forms each summer off the coast of Louisiana and Texas. Since 1993, the size of the Dead Zone, also known as the hypoxic zone, in the Gulf of Mexico has averaged 16,000 square kilometers and is one of the largest dead zones in the world. The lack of oxygen there poses a serious threat to species diversity in the Gulf and to the $2.8 billion commercial and recreational fishing industry.

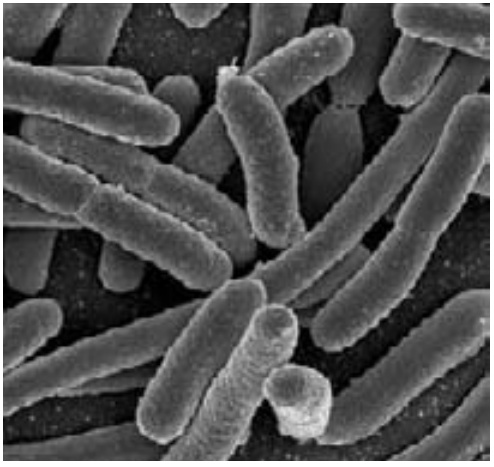
The Mississippi River flows into the Gulf of Mexico bringing along water laden with nitrogen and phosphorous pollution. This polluted water causes rapid algae growth. When the algae die, they decompose and utilize already low oxygen in the deeper water resulting in a large Dead Zone in the lower depths. The actual size of the dead zone varies each year due to climate and ocean dynamics, though nitrogen and phosphorus remains the prime factors in causing the Dead Zone. The largest source of this pollution is commercial fertilizers used throughout the Mississippi River basin – one of the agricultural centers of the United States. Other sources include animal waste, sewage treatment plants, and nitrogen in the atmosphere from fossil fuel combustion.

Though sewage treatment plants are not the largest source of pollution that causes the Dead Zone, they are an important one. Generally, the EPA lacks the authority to regulate fertilizer runoff from farms, but it does have the power to require sewage treatment plants to reduce nitrogen and phosphorous pollution in their discharge.

Recreational Water Illnesses

Waters affected by sewage and stormwater discharges can contain various biological disease agents, known as pathogens, which are harmful to human health. Thousands of Americans are exposed to pathogens through recreational water activities or drinking tainted tap water every year. Contaminated wells, malfunctioning water treatment facilities, heavy rains, and aging sewer treatment plants are some ways our rivers, lakes, and beaches become unsafe for drinking, fishing, and recreation.

Bacteria



Bacteria are microscopic organisms made up of a single cell. Pathogenic bacteria are those capable of causing disease. Campylobacter, Salmonella, Shigella, Vibrio cholerae, and the diarrhea-causing E. coli are the pathogenic bacteria most commonly associated with untreated or improperly treated sewage.

To determine if recreational water has the potential to cause disease, the EPA recommends using indicator bacteria, such as E. coli and enterococci for fresh water and enterococci for salt water. Studies conducted by the EPA have determined that fecal coliforms as a group are a poor indicator of risk associated with digestive system illness because fecal coliform bacteria may be the result of plant material, pulp, paper mill effluent, and droppings from wildlife. Unfortunately, many states continue to use them as their primary indicator for health risk.

Viruses

Viruses are sub-microscopic agents that infect the cells of plants or animals. According to the National Academies of Science, there are more than 120 intestinal viruses that can be found in sewage.[10] Examples of viruses associated with untreated sewage include polio and hepatitis A. The concentrations of viruses in wastewater depend on the presence and infection rate of the population served by a sewer system and season of year. Viruses are believed to be the major cause of swimming-associated diseases like gastroenteritis, respiratory illness, and ear, nose, and throat problems.[11]

MORE information

Disease Causing Pathogens

* *Duration and onset times are estimated for healthy adults.*

** *This chart is not intended for use in diagnosing sewage-related illness, however, if you have any of the symptoms listed below please see your healthcare provider.*

PATHOGEN	DISEASE	SYMPTOM	DURATION
BACTERIA:			
Campylobacter	Campylobacteriosis	Cramping, fever, abdominal pain, diarrhea	Onset within 2-5 days of exposure, lasts up to 7 days
Salmonella	Salmonella gastroenteritis or Salmonellosis	Nausea, abdominal cramping, bloody diarrhea with mucous, vomiting	Onset 6-72 hour, lasts 5-7 days
Shigella	Shigellosis	Diarrhea, fever, abdominal cramps	Onset 1-2 days, lasts 5-7 days
Vibrio cholerae	Cholera	Mild to severe vomiting, profuse watery diarrhea, and leg cramps	Highly variable
VIRUSES:			
Hepatitis	Hepatitis A	Fever, malaise, nausea, anorexia, abdominal discomfort, and jaundice	Mild case lasts between 1-2 weeks, severe case can last a few months
PROTAZOA:			
Giardia intestinalis	Giardiasis	Diarrhea, severe gas, greasy stools, stomach cramps, upset stomach, and nausea	Onset 1-2 week, lasts 2 to 6 weeks or longer
Cryptosporidium	Cryptosporidiosis	Watery diarrhea, intestinal distress, coughing, and low-grade fever	1 to 2 weeks
WORMS:			
Enterobius vermicularis	Pinworms	Itching around anus, loss of appetite, difficulty sleeping	Onset a few hours; indefinite without treatment; with treatment 1 month
Trichinella	Trichinellosis or Trichinosis	Nausea, diarrhea, vomiting, fatigue, fever, abdominal discomfort, headaches, fevers, chills, cough, eye swelling, aching joints and muscle pains, itchy skin, diarrhea, or constipation	Onset 1-2 days; must be treated
Ascaris	Ascariasis	Coughing, wheezing, fever, abdominal distress	Indefinite without treatment; with treatment, a few days to weeks
Trichuris trichiura	Whipworms, Roundworms, or Trichuriasis	Abdominal pain, diarrhea, growth retardation	Onset 15-30 days; indefinite without treatment; with treatment, a few days to weeks

Parasites and Worms

A parasite is an organism that grows, feeds, and is sheltered on or in the system of a larger host organism, causing disease by depleting the host of basic nutrients. Types of parasites include giardia, cryptosporidium, roundworms, and pinworms. Parasites can be transmitted through contaminated drinking water or exposure to untreated sewage and sewage sludge.[12]

Toxics

Toxics are metals, hydrocarbons, and synthetic organic chemicals that can imperil human and ecological health. Toxics come from lawns, cars, industry, construction sites, farms, underground storage tanks, paved surfaces, and atmospheric deposition from air pollution. These metals and organic contaminants adhere to soil and water particles and when it rains, are washed into streams, rivers, storm drains, and ultimately, sewage treatment plants. Treatment plants are designed to remove large debris and harmful biological organisms and may also remove some toxic chemicals. As a result of this treatment, the level of pollutants in effluent may meet state guidelines for water quality; unfortunately, these small amounts of pollutants accumulate in the sediments over time and become an increasing problem for ecosystems.

Metals such as lead, cadmium, arsenic, zinc, silver, and mercury, as well as other toxic chemicals, may be present in sewage and sewage sludge because businesses and homes that produce industrial and medical waste may be discharging contaminated water to a sewage treatment plant. Frequently those treatment plants are not designed to remove metals and other toxics. Metals are a human health concern because they accumulate in the environment and eventually enter the food chain. Once metals enter the human body, it is difficult to excrete them because they build up in the brain, liver, kidneys, and fat tissue. Exposure to heavy metals can cause numerous developmental and nervous system problems, bone disease, gastrointestinal problems, and hair loss. Heavy metals are especially dangerous for children and women of child-bearing age. Heavy metals can also have an impact on wildlife. Larger animals store heavy metals in their bodies when eating scores of contaminated prey animals. As an example, when Atlantic salmon have been exposed to mercury through their diets, they were shown to suffer neurological damage.[13]

Synthetic organic chemicals can also be found in sewage. The most common organic chemicals found include polychlorinated biphenyls (PCBs), pesticides, and hydrocarbons. Synthetic organic chemicals can be absorbed through the skin or ingested by drinking contaminated water or eating contaminated fish. Toxic effects range from skin rash to more serious illnesses such as anemia, nervous system and blood problems, liver and kidney problems, reproductive difficulties, and increased risk of cancer.

Hydrocarbons are organic compounds consisting of mostly carbon and hydrogen and are the main source of the world's energy, i.e. coal, petroleum, and natural gas. Unfortunately, burning hydrocarbons releases waste byproducts such as mercury and polycyclic aromatic hydrocarbons (PAHs). PAHs enter our water through wet atmospheric deposition via rain or when oil is spilled on roadways or into waterways. Research has shown that PAHs may alter egg development and cause tumors in fish.[14,15]

Toxics not only pose a threat to humans, but also to ecosystems. In the environment, chronic, or long-term, exposure to toxics can cause reduced growth, lower reproductive success, and a loss to biological diversity and abundance. Acute, or short-term, exposure at higher concentrations can cause a spike in mortality rates, such as fish kills.

Nutrient Pollution

Sewage often contains significant amounts of nitrogen and phosphorous that comes from the break-down of human waste. While these nutrients are essential for the growth of plants and animals, too much nitrogen and phosphorus can cause rapid growth of algae and nuisance plants, which depletes the oxygen in water, thereby harming fish and other aquatic organisms.

Algal bloom caused by nutrient pollution

Oxygen Demanding Substances

Some compounds in wastewater decompose through chemical and biological processes that utilize oxygen. Microscopic bacteria use oxygen to breathe or respire as they feed on organic compounds and ammonia. This process is largely what takes place in sewage treatment plants. However, inadequately treated wastewater flowing into waterways can still contain oxygen demanding substances, causing depletion of dissolved oxygen in the receiving water, and harming or killing fish and other aquatic life that depend on adequate dissolved oxygen for survival. Such oxygen demanding wastes are found in sewage and industrial wastewater, coming from human and other animal waste, food processing, paper mills, and many other common processes. The amount or strength of oxygen demanding waste is measured as the rate at which dissolved oxygen is consumed in the decomposition process, which when done through biological activity is called BOD, or Biochemical Oxygen Demand.

Floatables

Trash, debris, and other visible material that literally floats when discharged during sewer and stormwater overflows are called floatables. Floatables from sewage overflows commonly include sanitary products and other wastes commonly flushed down a toilet. Stormwater runoff floatables include litter and detritus that accumulate on streets and other paved areas that wash into sewage systems or waterbodies when it rains. Floatables can cause problems for wildlife if they become entangled or ingest them. Floatables also reduce the aesthetics of recreational waters.

Suspended Solids

Suspended solids are particles that are suspended in the water for relatively long periods of time without settling – e.g. decaying plants, algae, animal matter, silt, and some industrial discharges. High concentrations of suspended solids can clog fish gills, reduce growth rates, decrease resistance to disease, and impair reproduction and larval development. Stream habitat can also be damaged as these suspended particles are deposited in the spaces between rocks that provide shelter and spawning grounds for aquatic organisms. Suspended solids can also clog water treatment facilities, making it more difficult and expensive to treat drinking water for communities.

Endocrine Disrupting Chemicals

Endocrine disruptors are chemicals that interfere with the production and transmission of hormones in the body. In some cases, endocrine disrupting chemicals have been shown to alter gender or cause sexual abnormalities in fish, reptiles, amphibians, and other animals.

Many pharmaceuticals, particularly hormone replacement medications and birth control pills, are considered to be endocrine disruptors. Hormonal medications pass, under-utilized, through the body, down the drain, to the treatment plant, and then are discharged in relatively the same chemical structure into a waterway. For this reason, pharmaceuticals should never be flushed down a drain. Other endocrine disruptors include pesticides, medical products, and industrial chemicals such as polychlorinated biphenols (PCBs) and dioxins.

Scientists are just beginning to learn about the impacts endocrine disruptors in sewage can have on aquatic life and human health. In tributaries of the Potomac River in West Virginia and Washington D.C., scientists have discovered a high rate of intersex (male fish exhibiting female characteristics) smallmouth bass that are thought to result from sewage discharged to the Potomac.[16]

SUCCESS *story*

Sewage Treatment in the Black Warrior River Watershed

Around 80 wastewater treatment plants have permits to discharge throughout the Black Warrior River watershed in Alabama. Over the past three years Black Warrior Riverkeeper has assessed operations at the majority of these facilities in order to determine whether or not they are in compliance with their National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act. They have found roughly 35-40% of them violating their permits.

The Alabama Department of Environmental Management (ADEM) is supposed to regulate these permits, since they are the agency that provides them. Unfortunately, ADEM is very lax when it comes to enforcement of permit violations. Often times a facility is allowed to violate its permit for years, discharging partially and untreated sewage without any fines. ADEM does not ensure that wastewater operators notify the public or health authorities when they spill raw sewage, even though permits they write require it.

Black Warrior Riverkeeper believes that raw sewage from collection line overflows and treatment plant bypasses, and improperly treated sewage from treatment plants and lagoons are a serious threat to public health that need to be addressed. That is why Black Warrior Riverkeeper works with operators to clean up their facilities and sometimes takes legal action against those who refuse to cooperate.

One such case in which Black Warrior Riverkeeper achieved positive change was with one of Alabama's largest state prisons, Donaldson Correctional Facility. The prison had been dumping raw sewage on the rural communities of West Jefferson County for nearly nine years when Black Warrior Riverkeeper decided to file a notice of intent to sue. After negotiations with the Alabama Department of Corrections, the Alabama Attorney General's office, and the ADEM, the state prison has now cleaned up its mess to the tune of a half million dollars. Donaldson Correctional Facility is now operating in relative compliance with its permit, and to date there is no more raw sewage being discharged into Big Branch negatively affecting users downstream on Valley Creek and Bankhead Lake of the Black Warrior River. Thank you Black Warrior Riverkeeper!

People **deserve clean water**
for drinking, fishing, and swimming
and we aim to **protect** those uses.

Sources of SEWAGE and waste water

CHAPTER 3

The biological pathogens and pollutants discussed in the previous section can enter sewage systems and get discharged into water bodies either directly or indirectly. For example, households, industry, and institutions intentionally and legally discharge waste down drains that flow into a sewage system and are treated before entering a waterbody. These sources are monitored by various laws or permit requirements. Unfortunately, pollutants can also enter waters through unidentified sources that are difficult to control and prevent.

Household waste

What people pour or flush into drains can sometimes cause or contribute to water pollution problems. Between 5 and 15% of materials that people dispose of contain hazardous substances, which can contaminate waters. Americans generate 1.6 million tons of household hazardous waste every year. Products such as paints, cleaners, oils, pharmaceuticals, and pesticides contain hazardous chemicals that have the potential to contaminate septic tanks or sewage treatment systems if poured down drains or toilets.[17] Household waste can also be high in nutrients such as nitrogen and phosphorus found in human excretion and other products such as toothpaste, soaps, detergents, and pharmaceuticals.

Institutional waste

Institutions such as hospitals, schools, and prisons can create significant amounts of waste. Hospital waste, in particular, often contains pharmaceutical chemicals that are toxic or endocrine disrupting. Hospital waste also has greater potential to include dangerous pathogens that, if not properly treated, can be discharged to waterways. Additionally, institutional waste often contains cleaning supplies such as bleach, drain cleaner, floor polish, spot cleaner, and toilet cleaner. These chemicals can sometimes disrupt sewage treatment by killing the bacteria that process sewage.

Industrial waste

Most industries, from tanneries to paper mills, are allowed to directly discharge wastewater into sewage treatment plants as long as they meet certain restrictions. Industries are usually required to pre-treat their water before releasing it to the treatment plant. The contaminants in this waste vary widely, depending on the industry type, but can include oil and grease, metals, synthetic organic chemicals, human waste created onsite, and many other types of pollutants.

Sewage treatment plants are typically designed to treat residential wastewater, not the types of pollution that can come from industrial facilities. For this reason, it is important that the pollutants in industrial waste not interfere with the ability of a sewage treatment plant to operate correctly.

MORE information

What is "Point" & "Non-Point" Pollution?

Point Source pollution generally comes from the millions of gallons of wastewater discharged directly from industrial facilities and municipal sewage treatment plants into rivers, streams, lakes, and the ocean. The Clean Water Act prohibits the discharge of pollutants and stormwater runoff through a point source without a permit under the National Pollutant Discharge Elimination System (NPDES) Permitting Program. These permits are typically issued by each state and should include limits on what can be discharged, monitoring and reporting requirements, and other provisions to ensure that the discharge does not harm water quality or people's health. Sewage treatment plants, industrial facilities, and municipal stormwater discharges all require an NPDES permit.[18]

Non-point Source pollution comes from diffuse sources that are difficult to identify such as uncollected stormwater runoff moving over and through the ground. Non-point source pollution includes: fertilizers from farms; oil, grease, and toxic chemicals from urban runoff; sediment from poorly managed construction sites; and bacteria and nutrients from livestock and septic systems that do not discharge directly into a stream. The EPA considers pollution from non-point sources to be the leading cause of water impairment in the country.[19]

Stormwater runoff

Stormwater runoff is rain water that flows off of surfaces, some of which is collected in storm drains or other channels. While this water ultimately flows into lakes, rivers, wetlands, coastal waters, and underground waters, some of it can make its way into our sewer systems.

As the water flows over surfaces, it picks up and carries along natural and human-made pollutants. These pollutants include:

- fertilizers, herbicides, and insecticides from agricultural lands and residential areas
- oil, grease, and toxic chemicals from runoff, paved surfaces, and energy production facilities
- sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks
- salt from irrigation practices
- acid drainage from abandoned mines
- bacteria and nitrogen and phosphorus pollution from livestock, pet waste, and faulty septic systems[20]

Inflow and Infiltration

Stormwater, groundwater, or river water can mix with raw sewage through inflow and infiltration (I/I). Inflow is water that enters the system through improper or illegal connections such as downspouts and sump pumps. Infiltration occurs when groundwater enters the sewer system through cracks or leaks in sewer pipes or manholes. Infiltration can be a result of deterioration of pipes, loose joints, poor design, or damage from growing tree roots.

Many sewage treatment systems in the nation have serious problems with inflow and infiltration, especially older systems. During heavy rainfall events, inflow and infiltration can overwhelm sewage treatment plants. The result is that these plants are sometimes forced to discharge improperly treated sewage because if they do not, sewage will overflow at some point in the system.

MORE information

Don't Let That Go Down the Drain![21]

Cleaning Products
- Oven cleaners
- Drain cleaners
- Wood and metal cleaners and polishes
- Toilet cleaners
- Tub, tile, shower cleaners
- Bleach
- Pool chemicals

Indoor Pesticides
- Ant, cockroach, flea sprays and baits
- Houseplant insecticides
- Moth repellents
- Mouse and rat poisons and baits

Automotive Products
- Motor oil
- Fuel additives
- Air conditioning refrigerants
- Transmission and brake fluid
- Antifreeze

Workshop/Painting Supplies
- Adhesives and glues
- Furniture strippers
- Oil or enamel based paint
- Varnishes
- Paint thinners and turpentine
- Paint strippers and removers
- Photographic chemicals

Cooking Products
- Cooking Oil
- Grease

Lawn and Garden Products
- Herbicides
- Insecticides
- Fertilizers
- Wood preservatives

Personal Care
- Nail Polish/Nail Polish Remover
- Pharmaceutical Products

Please consult your city/state for ways to properly dispose of these products. Environmentally friendly alternatives for many of these products exist. Check online for resources that can help you make these decisions.

Sewage COLLECTION and TREATMENT

CHAPTER 4

In order to identify sewage treatment problems and properly advocate for the correction of these problems, it is necessary to know the basics of how sewage is collected and the general methods of sewage treatment. Many sewage problems can persist if citizens do not feel empowered enough to demand change. You do not need an engineering degree to make sure that your local sewage treatment plant is effective. If you can express basic knowledge regarding the treatment of sewage, you can be a much more effective advocate for the health of the waters you care about. This section gives a basic overview of the different types and methods of sewage collection, treatment, and the causes and consequences of poorly working or malfunctioning treatment systems.

Sewage and Stormwater Collection Systems

If you live in a city or town with a sewer system, you might be familiar with manholes that say "sewer" on them. The obvious reason for this is that in urban and suburban areas, before sewage is treated, it must first be collected and moved to a sewage treatment plant. In the Gulf States, sewage reaches a treatment plant through what are referred to as Separate Sewer Systems.

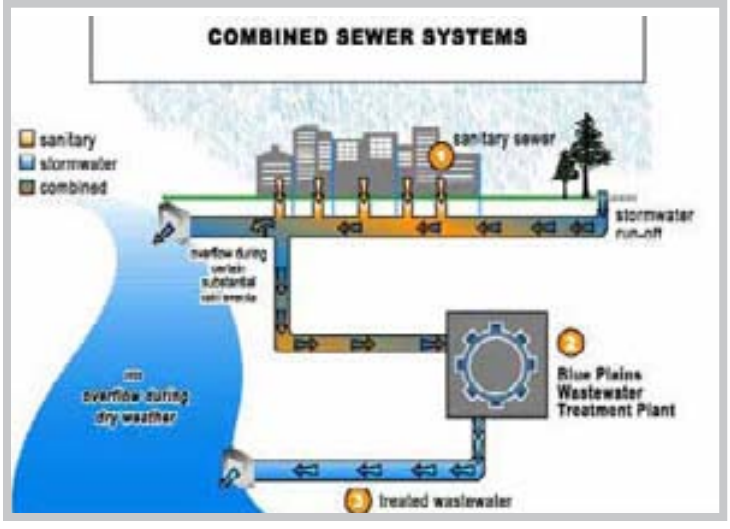
Separate Sewer Systems

Separate sewer systems involve a set of pipes that are designed solely to convey sewage to a treatment plant. These systems transport domestic, institutional, and industrial sewage to treatment plants, and are the type of sewage collection systems found most commonly in the Gulf States. Separate sewer systems are not designed to convey stormwater runoff from urban storm drains. Instead, there is usually a separate system of pipes or conveyances to collect and carry runoff from rainfall.

Though separate sewage systems are not designed to collect runoff from rainfall or groundwater, they often do have problems with runoff or groundwater infiltrating the system (I/I). These problems can lead to sewer backups or sanitary sewage system overflows (SSOs). These overflows may be signs of a poorly operated or maintained sewer system, which is a violation of NPDES permit conditions.

Overflows from separate sewer systems typically contain a mix of domestic, institutional, and industrial waste and impact both public and environmental health. An EPA analysis suggests that between 23,000 and 75,000 sewage overflows occur per year in the United States, with a total volume between 3 and 10 billion gallons of raw or inadequately treated sewage discharged annually.[22]

In some areas outside the Gulf, very old sewage collection systems actually combine their sewage and stormwater systems. These are called Combined Sewage Overflows (CSOs). During rain events, these systems often cannot handle all of the water and end up releasing raw sewage into local water bodies. While CSOs are a major problem, they are not found in Gulf States, and therefore this manual does not explore them in detail. For more information on CSOs, visit the EPA website at: *www.epa.gov*.



MORE information

Failure of Treatment Plants Due to Faulty Collection Systems

In separate sewer systems, flows to sewage treatment plants increase during periods of wet weather. Many treatment plants are not equipped to handle the large amounts of water caused by flow into the sewer system during large rainstorms. The inability to handle these higher flows can adversely affect the capacity of pipes and pump stations to treat efficiently and to control adequately the treatment processes. As a result, there may be discharges of untreated or partially treated wastewater at the treatment facility or in the collection system. Treatment plants are sometimes designed to route high flows during rainfall around treatment units and then blend the untreated flows with treated wastewater in order to meet discharge permit requirements. With few exceptions, treatment facilities are only permitted to discharge fully treated wastewater. Discharges of untreated or partially treated wastewater at these kinds of treatment facilities are often in violation of a permit, and can be a serious threat to the health of the receiving water body and surrounding community.

Types of Sewage Treatment

Once sewage is collected, it arrives at a sewage treatment plant. As of the year 2000, there were 16,255 known sewage treatment facilities in the United States.[23] While there are a multitude of treatment plant designs, this section will focus on some of the common methods of treatment that municipalities employ. In general there are three levels of treatment: primary, secondary, and tertiary.

Primary Treatment

Primary treatment is generally defined as removing 30% of conventional pollutants from sewage.[24] In practice, primary treatment refers to removing large solids from sewage through the use of screens or tanks that allow solids to settle out of the water. All sewage treatment plants should be designed to far exceed primary treatment levels.

Secondary Treatment

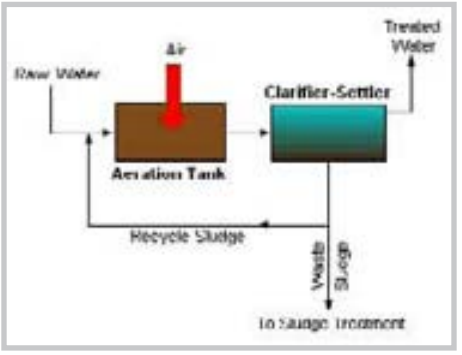
By law, most sewage treatment plants have to provide a minimum level of treatment called secondary treatment as set out in federal regulations. There are various types of secondary treatment techniques but all of them combine bacteria, waste, and oxygen in order to remove floating and settable solids, oxygen demanding substances, and suspended solids.

MORE information

According to a 2000 EPA report to Congress, despite the fact that secondary treatment is required by the Clean Water Act, there are at least 47 facilities in the United States that are not equipped to provide secondary treatment of wastewater. This number does not include malfunctioning secondary treatment facilities, lagoons, and other sewage treatment plants that treat to levels considered "equivalent to secondary treatment."[25] This "equivalent to secondary treatment" is actually a misnomer since it is not equivalent at all, but is less stringent and does not offer the same level of protection to natural water bodies.

Activated Sludge

Activated sludge systems are the most common method of treatment for large municipalities that process sewage. The activated sludge process speeds up the process of breaking down the untreated sewage by using sewage-eating bacteria. After the sewage leaves the settling tank in the primary stage, it is pumped into an aeration tank, where it is mixed with air and sludge loaded with bacteria and allowed to remain for several hours. During this time, the bacteria consume the waste. The sludge that is "activated" with billions of bacteria can be re-used by returning it to the aeration tank for mixing with air and new sewage.[26]



Activated Sludge Sewage Treatment

The advantage of an activated sludge system is that wastewater can be mixed and reprocessed until it meets a required level of treatment. In addition, activated sludge systems can be combined with other treatment components to remove nitrogen, phosphorus, and various other pollutants. The disadvantage, however, is that activated sludge systems require additional electricity to operate pumps and require trained operators. In the event of electrical outages, such as those caused by hurricanes, the system cannot operate properly and may begin discharging untreated sewage because there is limited capacity to store sewage as it accumulates.

Trickling Filters

Trickling filters, another secondary treatment technique, treat sewage by passing it over a bed of stones or other materials three to six feet deep. Bacteria gather and multiply on these stones as they consume most of the organic matter that is dripped or "trickled" from rotating arms. The cleaner water flows out through pipes for further treatment. From a trickling filter, the partially treated sewage flows to another sedimentation tank to remove solids.[27] Trickling filters have generally fallen out of favor in recent years because of maintenance concerns and the need for greater levels of treatment.[28] Also trickling filters are not well-suited to colder climates because the rocks and spray heads freeze during the winter.

Trickling Filter

Lagoon Systems

Lagoon systems are sewage treatment facilities that are made of one or more pond-like bodies of water that receive, hold, and treat wastewater for a certain period of time. Lagoons should be constructed and lined with clay or artificial liners to prevent leaks to groundwater.

The idea behind lagoon systems is that sewage is treated through basic biological breakdown processes. Some lagoons use aeration devices to enhance the treatment process by increasing the amount of oxygen in the wastewater. Lagoon designs should be based on factors such as:

- type of soil
- amount of land available
- climate
- amount of sunlight and wind in the area
- type and amount of wastewater to be treated
- level of treatment required by state and local regulations

Lagoons are not typically capable of treating sewage to as high a level as activated sludge plants or trickling filters and often require more available land. [29] Despite their inability to treat at higher levels, these systems are often attractive to small towns and rural areas because they tend to be a cheaper option.[30] Lagoons, like other sewage treatment plants, must be monitored to make sure that they are in compliance with permit requirements.

HISTORY

history

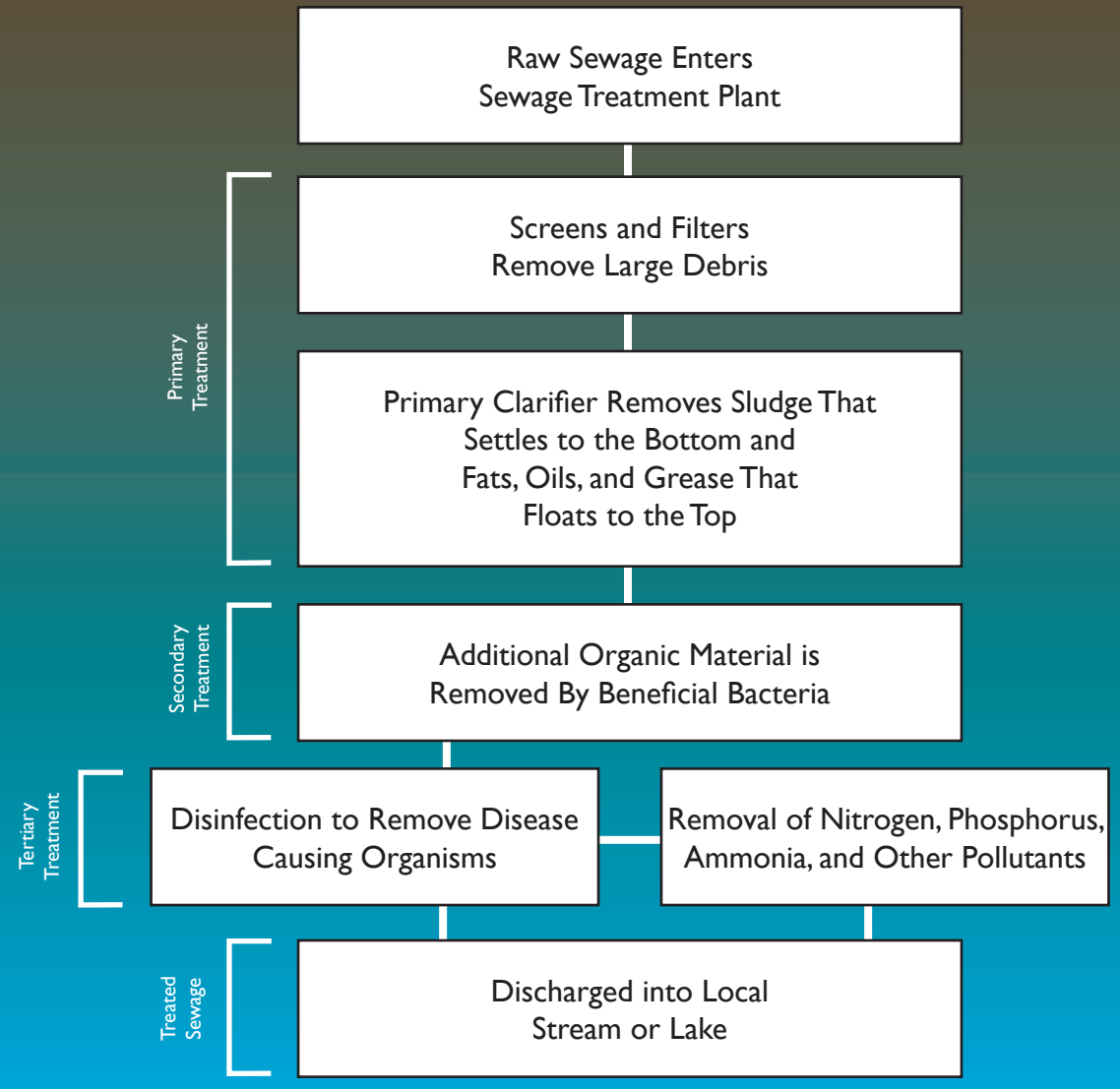
Advanced methods of sewage treatment began to appear in the United States in the early 1900's. Prior to that time, raw sewage was often used for irrigation or was discharged directly into bodies of water, where it was assumed that the pollution would be diluted and washed away.

The first extensive treatment plant was constructed in Worcester, Massachusetts in 1890, and utilized a chemical process. The treatment plant was built after the Blackstone River was severely degraded by sewage discharges in the area. The plant went on to serve as a model for many others in following years.

It was not until the 1920's that dilution as a solution to sewage pollution was publicly criticized. At the time, sanitation experts pointed out that sewage needed to be treated before it was discharged due to the possible effect on drinking water sources. However, many cities continued to not treat their sewage, claiming that it was just too expensive.

By the 1930's and 1940's, many cities had adopted some form of sewage treatment and disposal for at least part of the population. Cities employed a number of different technologies, many of which remain in use today.[31] However, it is important to note that until the passage of the Clean Water Act in the 1970's and the allocation of treatment plant construction grants through the EPA, many cities were still using rivers as sewers.

The Sewage Treatment Process



MORE information

Wetlands and Sewage

Sewage Discharge into Natural Wetlands

A practice that is gaining popularity in the Gulf Coast, especially in Louisiana, is the use of natural wetlands as tertiary treatment for sewage. The theory is that if you discharge treated sewage into impaired or damaged wetlands, you will be nourishing the wetlands with valuable "fresh" water and nutrients, thus bringing them back to health. This practice must be watched very closely.

Discharges into wetlands, or "wetland assimilation" as it is becoming known, is attractive to municipalities and private developers because they can sometimes receive weaker discharge limits in their permit. In fact, some of these projects have been improperly granted "lagoon" limits (see page 34) which means they are allowed to discharge less treated waste into natural wetlands than would be required for a stream. Another concern is if the sewage treatment plant is operating improperly, the wetlands might become over-nourished and suffer ecological damage, such as growth of unwanted species and harmful algal blooms.

Constructed Wetlands

Constructed wetlands use shallow ponds planted with aquatic plants to treat wastewater. Constructed wetlands are used either to provide secondary treatment or as tertiary treatment for water that has already undergone secondary treatment. If done correctly, treatment can be provided at both a low cost and with little use of energy.

Constructed wetlands can treat sewage by decreasing pathogens and by removing some nitrogen, phosphorous, ammonia, and heavy metals. However, to be effective, constructed wetlands must be carefully designed, built, operated, and maintained. [32]

Tertiary Treatment

Technically, any treatment beyond the minimum requirements for secondary is considered tertiary or advanced treatment. Tertiary treatment is designed to remove excessive nutrients and further remove BOD, ammonia, and suspended solids. [33] Disinfection, the elimination of bacteria and pathogens, is another component of tertiary treatment. Though all sewage should be disinfected, it is not required in every state. Ultraviolet light and chlorine are the two most commonly used methods of disinfection and can be very effective in removing pathogens from wastewater.

Other tertiary treatment options range from biological removal of phosphorus to physical-chemical separation techniques such as filtration, carbon adsorption, distillation, and reverse osmosis. These techniques can achieve almost any degree of pollution control desired. [34] Relatively few sewage treatment plants are required to use tertiary treatment to remove phosphorus and nitrogen, even though EPA has determined that phosphorus removal technology is extremely effective and affordable; also EPA found that sewage treatment plants that remove phosphorus also reduce other pollutants, such as suspended solids and pathogens. [35] While many municipalities think that tertiary treatment is cost-prohibitive, it is becoming more economical. Tertiary treatment may be required for treatment plants to comply with the Clean Water Act, particularly when sewage treatment plants discharge to streams that have limited capacity to assimilate waste.

Sewage Treatment Plant Malfunction

Treatment facilities can malfunction or fail for a number of reasons. Commonly, a treatment plant will malfunction when forced to process more sewage than it was designed to handle. Rapidly growing populations in many parts of the country, particularly coastal areas, have caused some sewage treatment plants to process more wastewater than their original design allows. The effect is that a treatment plant will inadequately or only partially treat sewage, resulting in a discharge of unacceptably high levels of pollutants.

Treatment of sewage in excess of design capacity often occurs when a local government or utility fails to properly limit or plan for growth or invest money in an expanded or new sewage treatment plant. Increased suburban sprawl also exacerbates this problem when developers construct new housing, but fail to pay sufficiently for the right to dump new sewage into a treatment plant. Some cities have begun to charge development impact fees to developers to help pay for the necessary expansion of sewage treatment capacity.

Inflow and infiltration, mentioned previously, can overload sewage treatment plants with stormwater and groundwater, forcing the plant to discharge untreated or inadequately treated sewage. In addition, inflow and infiltration leads to altered concentrations of sewage, where the concentration of wastewater entering the plant is considered "weak." Because the water entering the plant has less actual sewage, the bacteria accustomed to thriving on higher concentrations of sewage can have a difficult time treating the weaker sewage.

All kinds of chemicals come through a treatment plant and the results can be unexpected. For example, a small sewage treatment plant that serves a school, hospital, or prison may fail when cleaning supplies such as bleach are poured down the drain and kill the bacteria that are necessary for the treatment process. Sometimes industrial discharges can result in a treatment plant receiving toxic chemicals that prevent proper treatment. In some cases, toxic discharges can render a plant completely ineffective, resulting in the discharge of untreated sewage.

Sewage treatment plants can also malfunction due to human error or breakage of old equipment. Sewage treatment plants, especially activated sludge plants, require advanced training of operators. Thus, it is important that these plant operators are well qualified and actively engaged in plant maintenance.[37] Knowing that citizens are interested in monitoring plant performance is one incentive operators may have to take preventative measures.

MORE information

February 23, 2000 – The owners and operators of Schippers Service Inc., a trucking company that transported hazardous materials such as kerosene, diesel fuel, and gasoline pled guilty to multiple federal offenses including violations of the Clean Water Act (CWA). The defendants washed out their truck's cargo tanks and let the wastewater flow into the City of Easton's public sewer system. The hazardous petroleum-based chemicals are a danger to public health and safety because these chemicals can create an explosion, harm important sewage treatment equipment, and can dramatically kill off the essential microorganisms which process the sewage. The case was investigated by EPA's Criminal Investigation Division with the assistance of EPA's National Enforcement Investigations Center and the U.S. Department of Transportation Inspector General's Office. [36]

While many plants fail due to operator error, lack of maintenance, or improper use, sometimes treatment plants are simply designed or constructed incorrectly and will never operate at a sufficient level. This problem most often occurs with smaller treatment plants. When engineers do not design certain stages of a treatment system to be the proper size. In addition, engineers may not plan for problems such as I/I when designing plants.

Finally, it may be that sewage is treated properly, but is discharged to a stream that cannot assimilate the treated waste. Some streams, particularly smaller ones, are extremely sensitive to pollution, and can become degraded even when a sewage treatment plant is functioning properly. In addition, some streams already have pollution problems due to polluted runoff or other sources, and cannot tolerate any additional pollution.

Decentralized and Onsite Sewage Treatment Systems

In rural, remote, or suburban locations where a large community sewage treatment facility is impractical or cost-prohibitive, decentralized sewage treatment systems are often used. Decentralized sewage treatment systems treat and dispose of relatively small volumes of wastewater, generally from private residences and businesses that are located close to each other. These systems serve individual residences as well as mobile home parks, campgrounds, and subdivisions. These systems are often generically referred to as "septic systems" which essentially means that sewage is disposed of onsite rather than centrally collected. Approximately 25 percent of the total population of the United States is served by decentralized wastewater treatment systems, and about 33 percent of new residential construction employs this type of treatment.[38] While these systems can provide low-cost sewage treatment, they can also cause serious water pollution problems if they are not properly designed or maintained. The EPA estimates that decentralized sewage systems are the primary source of groundwater pollution in the country.

MORE information

Here are a number of related terms used to describe decentralized sewage treatment systems.

Septic system— A generic term used to describe an onsite wastewater treatment system, which often involves the use of a septic tank and drainfield.

Cluster system— A system that serves more than one home. Each home has its own septic tank, but the entire community is served by one drainfield.

Onsite wastewater treatment system—A system that relies on natural processes and/or mechanical components to collect, treat, and discharge wastewater from single dwellings or buildings. An onsite system can employ either conventional methods to treat waste, such as a septic tank, or alternative technologies that provide advanced treatment and disposal by spray or drip irrigation.

Decentralized system—An onsite or cluster wastewater treatment system that treats and disperses or discharges small volumes of wastewater, generally from dwellings or buildings that are located relatively close together.[37]

Spray Irrigation System—A system that is useful in areas where conventional onsite wastewater systems are unsuitable because of low soil permeability, shallow water table, or complex site topography. This system distributes wastewater evenly on a vegetated plot for final treatment and discharge. Buffer zones are commonly used to prevent sewage from coming into contact with human beings.

The most common form of onsite treatment is through the use of a septic tank. There are over five million septic systems in the Gulf States alone.[40] A typical septic system has four main components: a pipe from the home; a septic tank; a drainfield; and the soil. The septic tank allows solids to settle at the bottom forming sludge while oil and grease float to the surface as scum. It also allows partial decomposition of the solid materials. The wastewater exits the septic tank and is discharged into the drainfield for further treatment by the soil. Microorganisms in the soil provide final treatment.[41]

Septic systems can be much lower in cost than a traditional centralized sewage treatment plant and can provide adequate treatment. However, there are many limitations to the use of septic systems. Many parts of the country lack proper soils that are needed for absorption. Only one-third of the land areas in the U.S. have soil suited for absorption of septic leachate. In addition, many coastal areas have high water tables, making septic systems a threat to ground and surface water quality. Malfunction of septic systems can cause odors, soggy soil, liquid waste, excessive

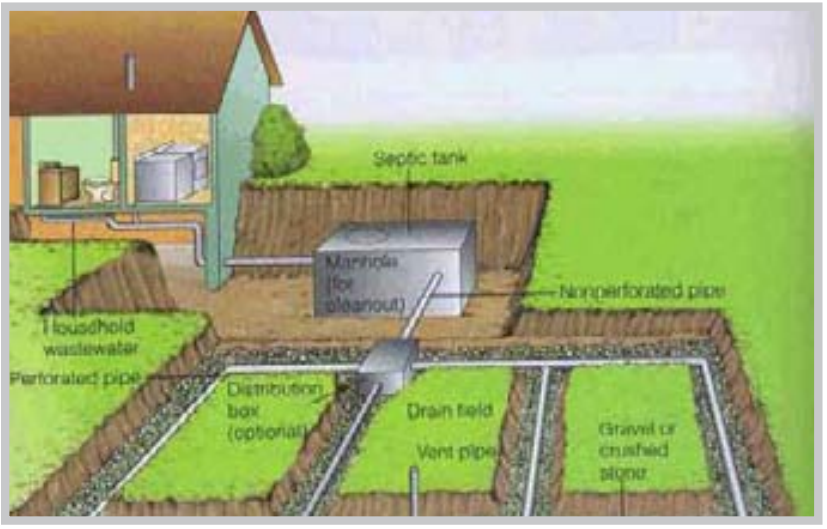
MORE information

Decentralized vs. Centralized Treatment

Though decentralized systems may not provide advanced treatment and can also contribute to water quality problems, some individuals are in favor of their use as a way to control growth or urban sprawl in rural areas. Because of soil suitability problems, large-scale development is often limited unless a centralized wastewater treatment facility is built. Innovations in septic system design, operation, and management, however, are now beginning to open up new areas for septic system use that would have once been considered unsuitable.[42]

Those opposed to the use of centralized sewage treatment plants also point out that replacing septic systems with a centralized facility may be substituting one type of water quality problem for another. Sewage collection lines often lead to increases in paved roads, driveways, and parking lots – all of which lead to increased urban stormwater runoff. As discussed elsewhere in this chapter, there are often problems associated with improper operation and maintenance of sewage treatment plants and collection systems.

Whatever your position, it is important that both septic systems and wastewater treatment plants are adequately maintained and operated. Old, malfunctioning, or improperly maintained and operated septic systems and sewage treatment plants are both likely to cause water pollution problems.



Typical Septic Tank Design

bacteria, and increased discharge of nutrients, resulting in excess algae growth in water near shorelines.

As with other technologies for sewage treatment, there are also varying levels of performance in septic systems. Conventional septic systems that are commonly used throughout the country are not designed to remove excess nitrogen or phosphorous.[43] Also, different soils have the capacity to absorb different amounts of septic waste, so if there are too many septic systems in one area, the sewage in these systems will not be treated adequately.

Every year, approximately 1.5 million septic tank systems in the United States fail.[44] These malfunctions can often go undetected due to little or no required inspection in many states. In addition, septic system owners sometimes knowingly continue to operate malfunctioning systems due to the cost of repairing or fixing systems. Failing decentralized wastewater treatment systems can contribute to pathogen and nutrient contamination of surface water and groundwater.[45]

MORE information

Common causes of septic system failure:

- Lack of maintenance or old age
- Excessive water use
- Improper design and construction
- Physical damage
- Alteration of the absorption field

Signs of system failure may include:

- Sewage backup into a home
- Water or sewage surfacing into a yard or a ditch
- Sewage odors indoors or outdoors
- High levels of nitrates or fecal coliform in well water tests
- Algae blooms and excessive plant growth in nearby ponds or lakes[46]

REGULATION of SEWAGE

Protecting Our Water

CHAPTER 5

All citizens have the right to clean water. That is a guiding principle of the Federal Water Pollution Control Act Amendments of 1972, which became known as the Clean Water Act. The Act created the essential structure for regulating pollution discharges to waters of the United States. With the passage of the Act, the EPA was given the authority to create pollution control programs, set industrial wastewater standards, and establish water quality standards for contaminants in surface water.

Point and non-point sources of pollution are regulated differently under the Clean Water Act. Point source pollution, such as a sewage treatment plant discharge or a city's storm drain, requires a permit under the Clean Water Act. Non-point sources such as septic systems are not required to have a permit under the Clean Water Act. Pollution from a septic system is considered non-point source under the reasoning that it cannot easily be traced back to a single source.

Discharge Permits

Under the Clean Water Act, sewage treatment plants are required to have a permit to discharge treated water into water bodies.[47] These permits, known as NPDES (National Pollutant Discharge Elimination System) permits, are required for all treatment plants, and, in the Gulf States, are issued by state environmental agencies. While all large, municipal sewage treatment plants in the country likely have permits to discharge, it is still the case that some smaller sewage facilities do not. For example, some schools, businesses, churches, and other institutions may have their own sewage treatment system, but may not be operating under a permit. State agencies are often unaware of these smaller systems, and it is often left up to local citizens to bring these facilities to the attention of the states.

Under the Clean Water Act, any discharger must meet applicable "technology-based limits" and "water quality-based limits" whichever are more stringent for a given pollutant. Technology limits do not specify what actual technology a sewage treatment plant should use, but are numerical pollution limits that are supposed to be based on what is possible through the best available technology that is economically achievable. Unfortunately, the technology-based limits for sewage treatment plants were last updated in 1985 and do not accurately reflect the modern technology available to treat sewage.

In addition to technology-based limits, plants may have to meet water quality-based limits, which state agencies should develop based on the characteristics of the specific water body to which a treatment plant discharges. Generally, a large river should be able to assimilate more waste than a smaller stream. Thus, a permit for a sewage treatment plant discharging to a large river would allow greater quantities of pollutants, assuming the river's ability to assimilate waste isn't already compromised by other sources of pollution. Permit writers are required to apply both technology and water quality based limits, whichever are more protective. Thus, all permits must, at a minimum, meet the technology standards, referred to as "secondary treatment standards."

Minimum Secondary Treatment Standards[48]

Parameter	30 Day Average	7 Day Average
BOD5	30 mg/l	45 mg/l
TSS	30 mg/l	45 mg/l
pH	6 – 9 s.u. (instantaneous)	-
Percent Removal	85% BOD5 and TSS	-

Secondary Treatment Definitions

Term	Definition
BOD5 5 – Day Biological Oxygen Demand	Measures the rate of oxygen uptake by micro-organisms in a sample of water at a fixed temperature (20°C) and over a given period of time in the dark. Generally, pristine rivers will average <1 mg/l; moderately polluted rivers range 2 - 8 mg/l; treated sewage ranges 5-45 mg/l; untreated sewage ranges 200-600 mg/l.
TSS Total Suspended Solids	Determined by pouring a carefully measured volume of water through a pre-weighed filter of a specified pore size, then weighing the filter again after drying to remove all water. The gain in weight determines the amount of suspended solids in the water.
pH	Measure of the acidity or alkalinity of a solution.
Percent Removal	85% of conventional pollutants, namely BOD and TSS, must be removed.
30 - day average	The arithmetic mean of all samples taken in a 30-day period.
7 - day average	The arithmetic mean of all samples taken in a 7-day period.

If you look at a sewage treatment plant's permit, you should at least find limits for BOD5, TSS and pH. While these secondary treatment standards are a useful baseline, the limits of sewage treatment plants should often be more stringent than those in the sidebar. That is because in addition to meeting secondary treatment standards, sewage treatment plants must also ensure that their discharge does not cause degradation or exceed the assimilative capacity of the stream to which they discharge. It is important that limits are calculated for ammonia, biological oxygen demand, suspended solids, and other pollutants based on what a water body can withstand, not just what is technologically required under secondary treatment.

The Exception for Lagoons

The Clean Water Act allows certain types of sewage treatment plants, including lagoons and trickling filters, to meet less stringent technology-based standards. These weaker standards vary from state to state, but in the Gulf States can be as high as a monthly average of 45 mg/L for BOD5 and 60 mg/L maximum limit and 90 mg/L monthly average of TSS with a maximum of 135 mg/L. According to federal regulations, for a lagoon to receive weaker limits, the lagoon must be *unable* to meet the secondary treatment standards for BOD5 and TSS and must not be causing impairment of the receiving stream. If a facility can meet the more stringent "secondary treatment" standards, it is not eligible for weaker lagoon limits. In addition, if the facility is not operating properly or is operating beyond its design capacity, it is not eligible for weaker limits.

It is important to look at whether a facility is actually meeting these requirements and whether it is operated and maintained properly. Often states improperly allow a facility to meet the less stringent limits, even when the facility is capable of meeting more stringent secondary treatment standards or even when a facility is causing pollution in a stream. Given current advances in technology, a properly designed sewage lagoon in the Gulf region should be able to meet fairly restrictive limits and therefore not receive the "equivalent to secondary" lagoon limits.

Sewage Lagoon near Hammond, LA

Pretreatment

In many communities, waste from homes is not the only source of sewage flowing into a treatment plant. Industrial users sometimes discharge directly into a wastewater treatment facility. These users can be required to follow what is called a "pretreatment program" to remove, reduce, or alter the pollutants in their wastewater before discharging into a sewage treatment plant.

A pretreatment program is required for all sewage treatment plants that discharge more than 5 million gallons per day or those that receive wastewater from significant industrial facilities.[49] There are more than 1,600 sewage treatment plants that are required to implement local pretreatment programs. In a few cases, pretreatment programs are administered and enforced at the state level. In pretreatment programs, industrial facilities are required to monitor and make sure the waste that they discharge into a sewage treatment plant is not too polluted; this often means that the industrial users have to treat their own sewage before it is pumped to the municipal sewage treatment plant. Pretreatment programs are designed to ensure that industry does not discharge waste to a sewage treatment plant that would damage the treatment plant, disrupt its ability to treat sewage, or pass pollutants through at harmful levels. If individual industries are not pre-treating properly, this failure can lead to more pollution into local water bodies.

What to look for when reviewing a Sewage Treatment Plant Permit

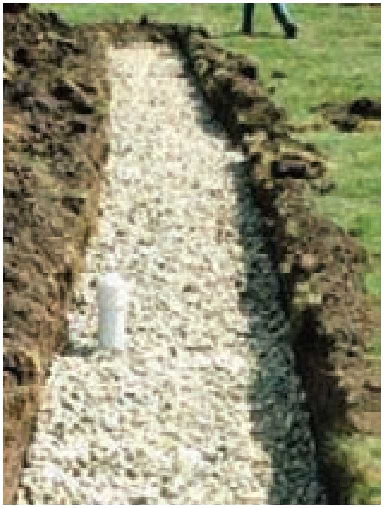
Since individual states usually issue wastewater discharge permits, the permits can vary widely among states. However, all permits should have the same basic information. When reviewing a permit, there are a number of issues to consider:

- How often is the regulating agency requiring monitoring of discharges?
- Is this a new facility or an increased discharge at an existing facility? If so, the state is required to complete a special review which looks at alternatives to the proposed treatment plant. Since this review is intended to make sure that water quality isn't unnecessarily degraded, it is know as an *antidegradation analysis*.
- Do the listed 30-day and 7-day averages meet technology-based limits? Check your state's regulations. Is the discharger trying to use "equivalent to secondary" treatment limits?
- Are the effluent limits protective of the water body? A common problem is high ammonia concentrations that can be toxic to aquatic life and also deplete oxygen in the receiving water body. Typically, raw sewage has an ammonia concentration around 20-30 mg/l, so the discharge should be significantly lower. What is the ammonia limit for your sewage treatment plant's discharge (if there is one)?
- Has the facility violated its previous permit? This information can be found through the EPA's Enforcement and Compliance History website, *www.epa.gov/echo*. If the facility has a history of violations, it may mean that the plant is not functioning properly or its design capacity has been exceeded.
- Is the facility discharging to an impaired water body? If it is, the facility should not be allowed to increase its discharge of the problem pollutant. Check your state's impaired waters list or visit the EPA's Enviro-facts website, where you can view a map of a facility in relation to impaired water bodies: *www.epa.gov/enviro*.

For a more in-depth look at NPDES permit review, see Permitting an End to Pollution, a handbook produced in 2002 by Prairie Rivers Network, Clean Water Network, and River Network. To obtain a copy call: (217) 344-2371 or download a copy at: www.prairierivers.org/Projects/CleanWater/Permits.html.

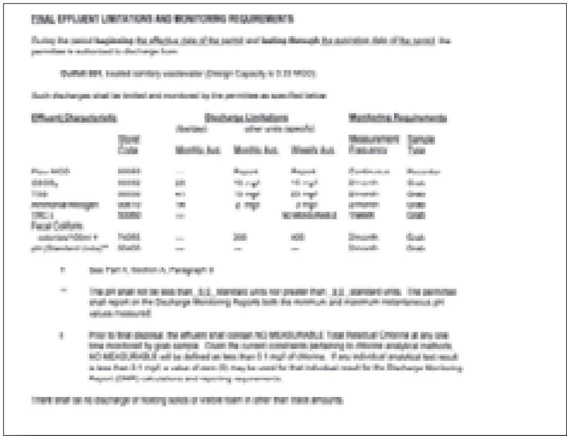
Regulation of Septic Systems

Septic systems are not generally regulated under the Clean Water Act because, in theory, there is no discharge to surface waters. Because septic systems are considered outside of the Clean Water Act's purview, state or local health departments or state environmental protection agencies are often the regulatory agencies that govern them.



These regulations often do not apply to what is discharged from a septic system, but instead govern septic system construction and inspection. For example, some local governments may have specific guidelines for septic system drain field size. Other state or local governments have laws that require septic systems to be inspected upon the sale of a home or perhaps every five or ten years. However, in many states, very little is done to ensure that septic systems are not polluting groundwater or streams.

Health agencies generally determine whether a septic system will be allowed in a certain area. These agencies are supposed to evaluate whether the soils in the region will be able to handle the waste from a septic system. In some cases, septic systems may only be allowed if the density of development is low and the soils are suitable, otherwise the septic system use may be prohibited. In those instances, developments may be required to link to an existing sewage treatment plant, or they may attempt to construct a small sewage treatment plant (often a lagoon) to serve the development.


FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Example pollution limits page from a sewage treatment plant's NPDES permit

ADDRESSING SEWAGE PROBLEMS

in Your Community

CHAPTER 6

Armed with the best information and knowledge, you have the power to improve your community and environment. As you have learned, faulty and inadequate treatment of sewage can be extremely harmful to our lakes, rivers, oceans, and wetlands. Poorly treated sewage poses major health threats to our families and communities. If we see a sewage problem, it is up to each of us to make sure policies and treatment facilities are changed for the better. How do you enact this change? This section outlines simple and important steps to identify and address local problems through identifying your issues, planning your campaign strategy, developing campaign tactics, and other methods.

Identify Your Issues

Chances are, you have already begun this process. Perhaps you have noticed strange smells in your local stream, seen large algal blooms near your wastewater treatment plant, or you have witnessed sewage coming directly out of a pipe and flowing into your favorite stream, bayou, or lake.

Listed below are problems that are sometimes the result of sewage pollution:

- Local Beach Closures
  - Look for signs posted at your local beaches
  - See Appendix A for researching beach closure information
- Unusual amount of algae on the surface of the water or clogging waterways
- Localized fish kills
- Bad odors or sewage smells
- Streams with little to no aquatic life
- Warning signs at lakes, rivers, and beaches

While these indicators may suggest the presence of sewage, absence of these indicators does not mean that sewage problems in your area do not exist! Below are other methods you may use to see if your area has sewage problems.

Do your research

It is best to arm yourself with as much information as possible. Someone with good documentation will be taken more seriously than someone who has vague complaints. Before you make a formal complaint, do your research using the following guidelines.

Find the specific location of where your local sewage treatment discharges into the water body.
Unbeknownst to you, there may be sewage discharging to your local stream because those locations are rarely advertised. Here are some steps to locate local sewage discharges:

MORE information

Documents to Request from Your State Agency

Discharge Monitoring Reports (DMRs):
Every entity that has a permit to discharge must submit records of tests of their effluent to see if they are meeting permit limits. These DMRs will give you the values and concentrations of the pollutants that are being discharged, along with how many times they have violated their permits.

Compliance Orders or Agreed Orders:
If a discharger consistently violates their permit, EPA or your state agency might have issued a document that sets up how the facility will get back into compliance along with any fines or penalties.

Whole Effluent Toxicity (WET) Reports:
Many dischargers are required to regularly submit WET reports documenting where their discharge is tested to see how toxic it is.

Inspection Reports:
Sewer plants are sometimes inspected by state agencies where potential problems are sometimes reported.

Stream Surveys:
These surveys can give you important information regarding the health of local waterbodies that are impacted by the sewage treatment plant of concern.

- Check Envirofacts, at *www.epa.gov/enviro* and click on "water." This EPA website will allow you to search by your zip code, city, or county/parish to find which facilities have permits to discharge into water in your area.
  - Locate sewage treatment facilities in your area; these are often abbreviated as WWTP (Waste Water Treatment Plant) or POTW (Publicly Owned Treatment Works).
  - Click on the map and see exactly where the facility is located.
- It is often informative and helpful to physically visit the site where the discharge is located. Look for impacts to the stream such as:
  - cloudy water
  - presence of black sewage sludge
  - lack of aquatic life
  - large amounts of algae
  - bad smells
- You may find that the discharge pipe is not located where it is supposed to be.
- Take your camera and notebook with you! It is critical to document your findings with pictures and notes.

Find out if there is a history of problems with the wastewater treatment plant.
The EPA maintains a searchable website called the Enforcement and Compliance History Online (ECHO) (*www.epa-echo.gov/echo*). Enter your zip code or city and state under "Compliance Searches" to see if nearby sewage treatment plants have violated their permits.

Determine if your treatment plant is disinfecting its discharge.
It is recommended but not required that sewage treatment plants disinfect their discharge. Disinfection keeps illness-causing bacteria from entering streams and is relatively inexpensive. There are a number of different technologies available to disinfect waste, such as chlorination and ultraviolet light. The chlorination method may require de-chlorination to prevent large amounts of chlorine from entering the environment.

Unfortunately, there is no easy way to know if a plant is disinfecting its waste. It is not indicated on most NPDES permits. You may have to call your local plant and ask them what they do to disinfect waste. The municipal section of your state permitting agency may know as well. See the following section, "Request Public Documents" about how to get a copy of these reports.

If the plant is not disinfecting, at a minimum they must be meeting the state's water quality standards. If the plant that you are researching does not disinfect, contact your local permitting agency to see if they have done testing for bacteria in the water body receiving the discharge. Ask to see the results! See Appendix B for contact information for your state agency.

Request Public Records

Usually, the easiest way to get information from your local sewage treatment plant or your states' regulatory agencies is to simply ask, although many are hesitant to hand out incriminating information. Just remember, it is our right to have access to this information! For state-specific information on requesting public records from your state water management authorities, refer to Appendix C.

Most public records must be made available to citizens upon request. It can take up to several weeks for an agency to respond to a formal public records request. Sometimes, calling and directly asking for the information can help expedite the process. To see an example of a Public Records Request letter refer to Appendix D.

Take a tour of your local sewage treatment plant

Remember, you are there on a fact-finding mission and not there to debate the plant manager. It is likely that the plant manager will downplay or deny that there is a discharge problem. Do not expect your concerns to be addressed. Instead, view the visit as a way to help you better prepare your campaign by anticipating their arguments. Also, if you are considering legal action, it is a good idea to have met with the plant manager so they cannot claim they were blindsided by a lawsuit notice.

MORE information

Paying for Sewage Plant Improvements

A stumbling block you will likely encounter will be the claim that improvements are too costly. Lack of funds is never an excuse to violate permits and pollute our waters. Here are some suggestions you can make that could help municipalities or utilities pay for improvements:

Clean Water State Revolving Fund (CWSRF)

The CWSRF is one of the most effective environmental infrastructure financing programs in the United States. The CWSRF program allows each state to maintain revolving loan funds to provide independent and permanent sources of low-cost financing for a wide range of water pollution abatement projects. CWSRF monies are often loaned to local governments at or below market interest rates. These funds may also be used to refinance or buy local debt, guarantee CWSRF debt obligations, and pay state CWSRF administrative expenses. Your state agency most likely has an office that deals specifically with the disbursement of these funds. You may find the EPA website helpful: *www.epa.gov/owm/cwfinance/cwsrf/.*

Water Quality Cooperative Agreements

The Clean Water Act authorizes the EPA to give grants to support research, surveys, and experiments that will assist EPA in addressing water pollution problems. Recipients are chosen by EPA regional offices and can be issued to government agencies, nonprofit organizations, and individuals.

Plan Your Campaign Strategy

Now that you have defined the problem, it is time to think about how to solve it. No one sewage problem is exactly the same as another. Therefore, you will need to devise a strategy that specifically targets problems in your community. Your next step should be to figure out what needs to be fixed and who has the power to fix it. Do not get bogged down in trying to devise technical, cost-effective solutions. That is up to the municipality or treatment plant. Your role is to keep the pressure on and make sure the city and/or utility follows through with improvements.

Develop Goals

You need to set clear goals in order to achieve success with your campaign. Clear goals are essential in helping you decide what steps to follow, what actions to take, and which people to influence. The general rule with goal setting is to follow the SMART principle: Specific, Measurable, Attainable, Realistic, and Time-bound. You may also want to think about your long term, intermediate, and short term goals. Goals should also answer the question "What do we want?" You might also want to answer "What would we settle for?"

Identify "Actors"

When you begin to work on fighting sewage pollution in your area, it is important to understand the different actors or players that might be involved in the situation.

Allies

Think through all of the organizations, businesses, and individuals who might support you. Who cares about the issue? What might they lose if the problem is not addressed? What resources or influence could they bring to your campaign?

Coalition building

A coalition is an alliance of people and/or organizations that come together in order to increase their ability to enact change. They can empower individuals and groups that have few resources to compete with powerful interests. Building a coalition also helps build a power

base and attract others to your cause. Make sure that your coalition partners agree to the vision and goals of your campaign.

Identify the allies who are best able to bring resources and power to influence the decision maker. There are different types of coalitions and each coalition partner may serve a different role. What skills and resources are your allies able to contribute? Some partners may sign on to a letter, while others may be willing to help activate community members to contact the decision maker.

Think about the following when building your coalition:

- What image do we want to portray?
- What resources do we need?
- What actions do we want our coalition partners to take?
- How will participation benefit coalition partners?

If your coalition is well-organized, then you may succeed in changing policy, raising public awareness, forming a broad network, and creating solutions to your community's problems.

Opponents

Just as you want to identify your supporters, it is important to also know your opposition. Who might face losses or repercussions if you were to win? How actively might they organize against you? What resources or influence might they use to oppose you? How will you get your message to this group?

Undecideds/Unknowns

This group of people could be sympathetic to your cause, but may be unaware of the problem. How might you persuade them to become an ally? What issues would drive them to oppose you?

Identify Decision Maker

A decision maker is the specific individual with the power to give you your desired outcome. Often this decision maker is referred to as a "target" because your actions will be directed towards influencing this individual. For example, your target is not the county commissioners, it is Commissioner Joe Smith.

Some campaigns may have more than one target, but these targets are always specific people not entire organizations or offices. They are individuals who have the power to say "yes" or "no" to your demands, requests, or petitions.

Hint

Go for the low hanging fruit first. Target the person who is most accessible and most easily influenced. If both the Governor and the Mayor have the power to give you what you want, target the Mayor first.

Common Pitfall

Failing to identify the correct target. Research the decision making process to figure out which individual has the authority to resolve the problems. Do not go after a state official if a subordinate can make the necessary budget changes to provide money needed to update an existing sewage treatment plant.

Research Your Decision Maker

Now that you have identified the correct target, you will need to determine how to influence that person. Research your target and discover who has the ability to move him/her to action. Do you have the ability to directly influence your target? If not, who can? Is it a specific campaign donor, a religious leader, the local homeowners association, Commissioner Joe Smith's barber, etc.?

Power mapping

One tool to help you determine the best way to influence your decision maker is to draw out what is called a "power map." This exercise involves identifying all the people who have the ability to influence your decision maker. See Appendix E for a Sample Power Map.

Once you map out these influences, identify the people you can move to action—it might be helpful to reference your list of allies when doing this. You may have no direct connection to Commissioner Joe Smith, but you might be able to persuade the fishing group that endorsed him in the last election to put pressure on him.

Identify the Audience You Seek to Influence

Sometimes your audience is your decision maker. More often than not, your audience is the people who can persuade the decision

maker to make the right decision. The audience might be smaller than you think. Instead of targeting the general public or an elected official's entire constituency, focus on smaller groups such as fishermen, parents, or homeowners. This would be a more effective use of your time and resources.

Go back to the Power Map you drew earlier. Which groups did you identify as avenues of influence over the decision maker? Prioritize the audience with the greatest influence over your decision maker and who will readily join your cause.

Once you choose your audience (or audiences), research their interests and values. If you have multiple audiences you will more than likely have multiple strategies. For example, the way you describe the problem to fishermen will be different than the way you communicate your issue to nearby property owners.

Hint

While you want to make sure your audience is large enough to influence your decision maker, the smaller your audience, the easier it will be to focus and execute your communications strategy.

Perception is important. Think about ways you can build the perception that you have broad support. One way to achieve this is to have different coalition members author Letters to the Editor; avoid having one person submit every opinion piece. Instead of having one person speak at multiple events, invite a broad group of leaders to speak at your events.

Common Pitfall

Avoid "converting" and "answering the opposition." Don't fall into the trap of trying to change the minds of those who oppose you.
Focus your efforts on folks you can easily persuade to your side. Spend time on audiences that will readily join you or who might support your position with a little information.

Crafting Your Message

You have developed your goals, named your target, and identified the audience that will move your target to action. Now it's time to figure out the best strategies to communicate your issue. Go back to the values

and interests of your audience. What will motivate your audience to take action? Make your issue personal to them. Don't simply describe the problem. Give your audience a sense of hope and fellowship: "Together we can overcome this problem!"

Common Pitfall

Do not assume your audience's values are the same as your own. This might be true, but there are often cases where they are not.

Your message is the story you are conveying to your audience. We suggest using the problem, solution, action framework when developing your message: the problem is X, and the solution is Y, and that is why we are calling upon Commissioner Joe Smith to do Y. When crafting your message, remember to be concise—no more that 2-3 lines for each part. See the Problem Solution Action Text Box for more information.

Problem

What problem are you working to address? Be sure to describe the problem clearly and in a way that is the most compelling to your audience.

Solution

This is your opportunity to provide optimism and speak broadly about the issue. Use value-laden language to paint a picture of what should happen or how the world should be. "In order to make Little River clean for our families to swim, boat, and fish in, Commissioner Joe Smith must make sure that the sewage treatment plant is upgraded."

Action

You have laid out the problem, identified a solution, it is now time for the exciting part: calling upon your audience to take action! Give your audience a specific action to help achieve the solution. For example, schedule a call-in day and have as many people as you can call Commissioner Joe Smith with a specific ask.

Communicating About Sewage

Throughout this manual, we have utilized technical terms you will encounter when dealing with government or engineers. However, when communicating to the public or media you should try to avoid using such terminology. Technical language can be boring, difficult to understand, and off-putting. Here are suggestions to help you clearly communicate your message to a broad audience:

Words to Avoid	Reason	Try substituting
wastewater	sounds like it is water we do not need	sewage, raw sewage
wastewater treatment plant	same as above	sewage treatment plant
sanitary sewer, collection system	the word "sanitary" sounds clean	sewer, sewage pipes
BOD, TSS, pH or other pollutants	too technical	sewage pollution, untreated sewage, improperly treated sewage
fecal coliform	too technical	pathogen pollution, bacteria in sewage
water quality	many people think of drinking water or how water tastes	clean water, healthy water, safe water, polluted water
stormwater	people do not always know what this means or think rain water is clean	polluted runoff
nutrients	people have a positive reaction to this word and often think of nutrients as being good	phosphorous and nitrogen pollution

Write a Letter to the Editor

Citizens and elected officials read local papers. Writing a Letter to the Editor can be an effective way to put pressure on local government officials and raise awareness about your issue. Some tips for letter writing are listed below:

- Do your homework. Many newspapers have word limits. Check to make sure you don't exceed the limit.
- Be brief. Shorter letters often have a better chance of being printed without major edits.
- Limit your letter to one topic.
- Be concise and avoid technical jargon.
- If the paper has done a story on your issue, submit a letter within the next couple of days and reference the article.
- Make it personal. Share your personal experiences and talk about how it impacts your life.
- Be polite and do not personally attack anyone.
- Stay on message. You've developed your talking points, use them.
- Briefly describe the problem and what must be done to remedy it: problem, solution, action.
- Include your name, address, and daytime phone number on the letter.
- See Appendix F for more tips on writing an effective letter.

Delivering Your Message

Once you craft your message, what vehicles will you use to deliver it? Who is the best messenger to reach your target audience? Your messenger should bring credibility to your campaign and should appeal to your audience. If your target audience is parents, a pediatrician might be your ideal messenger because in that community they are considered trustworthy and are highly regarded as experts.

Message discipline is very important. Experts say the audience begins to catch on to your message the moment you feel you are about to become physically ill from repeating yourself! On the campaign trail, politicians have their talking points and stick to them. Staying on message is important for anyone communicating an issue to an audience.

Develop Campaign Tactics

You have discovered your problem, developed goals, identified your decision maker and target audience, and crafted the language to communicate strategically about your issue. Now is the time for the fun part—planning the actions you will take to influence the decision maker.

Media

If you are trying to fix local sewage problems, media attention is one tool to help you advance your cause. Remember that media is not an end in itself, but a means to an end. You should have a plan for what you really want to accomplish by using the media. For example, the purpose of using the media might be to pressure the decision maker to make the right decision, or to recruit new activists to your cause.

There are many types of media. Often people focus on getting an article in the newspaper or a mention in a television story. Instead of targeting a few media outlets, think of a vast array of strategic lines of communication. There are many other venues you can use to influence decision makers. Consider hanging flyers in neighborhood hotspots explaining the problem and what must be done.

Purchase a billboard advertisement, set up a website or blog, or hold a meeting or conference. Think of media as different ways you have to spread your strategic message.

It is important to consider how your audience gets information and communicates with others. Electronic media like blogs and websites might not work well if you are targeting seniors or low-income community members. Conversely, social networking sites such as MySpace and Facebook can be powerful tools to reach college students.

Consider the best form of media for your message. If you want people to *see* the pollution from a faulty sewage treatment plant, take a television camera crew to the site to film visible discharge of sewage. If you are trying to influence a member of the city council, have citizens in the council member's neighborhood place signs in their yards. For more help with media please see Appendix G.

Meet with the Decision Maker

Meeting with the decision maker can be an important part of your campaign. Before setting up an appointment, be clear about why you want to meet with this specific individual and what it is you want to accomplish. You will then need to develop a basic meeting strategy
There are several reasons why people meet with decision makers:

- to gauge their position on your issue
- to provide background information
- to deliver grassroots support such as postcards, coalition letters, petitions, etc
- to ask them to take a specific action

Now that you have determined why you want to meet with the decision maker, determine who you will take with you to that meeting. Do you want to take a technical or legal expert with you? The president of the local fishing group? The head of the parent teacher association? A friend of the decision maker? Work with them to identify roles and talking points.

Prepare for the meeting. Know who you are meeting with—research the person's position, background, and experience with your particular issue. If you are meeting with your target, this part is easy because you have already done the research.

An "ask" is the request/demand you are making to the decision maker. Practice your ask and determine your bottom line in case you are able to negotiate. Make your ask specific, clear, direct, and such that it will elicit a commitment. Phrase it in such a way that it requires a "yes" or "no" answer. It is also helpful to include a date the committed action should take place. Assign one person the task of making the ask during the meeting.

Prior to the meeting, be sure everyone has practiced their talking points and understands their roles. Bring photos, fact sheets, relevant newspaper articles, petitions, or other items that support your position and show that a number of people are behind your effort. Introduce your issue and provide context for why it is a problem. Explain why it matters to you, your supporters, and the greater community. Do not forget to make your ask. Prepare for any questions the decision maker might have. Stay credible! If you are confronted with a question you don't know the answer to or are unsure of, don't make up an answer. Say that you'll get back to him or her later.

Before you leave, be sure to establish next steps. Review any commitments that were made and establish or clarify a timeline for completion. If you need to set up another meeting, do so.

After the meeting, do not forget follow-up work. Are there allies that might need information about how the meeting went? Send a thank you letter to the person restating any commitments and timelines. Did you or your allies make commitments at the meeting? If so, live up on your end of your agreements.

Other Actions

Form a Local Water Group From Your Coalition Members
You have done lots of work, pulled new people together, and developed (or refined) important skill sets. Through your work you may have discovered other threats that face your local waters. At this point, you might consider using your campaign as an opportunity to form a more formal local water group.

Assess whether or not this makes sense for you. Some groups of people who unite around a particular issue decide to dissolve their affiliation at the end of a campaign. However, many others use the momentum and experience gained through previous efforts to launch a more sustained effort to protect local waterways.

Create a name for your group that ties into the name of the water body you are trying to defend, for example, The Chattahoochee Champions. Use the campaign planning steps you went through earlier. Decide what goals your group wants to work toward. With a newly formed group, it is often important to tackle small projects first. Then, as your group gains momentum and experience, you can take on larger projects as. To illustrate, your first project might be to utilize this manual to help your community advocate for better sewage treatment in your community. Later, you might address other pollution issues impacting local streams and lakes.

Comment on your local treatment plant's permit

National Pollutant Discharge Elimination System (NPDES) is a program which controls water pollution by requiring polluters to apply for permits. Permit holders are required to renew their permit every five years. If the current permit is written to allow high levels of sewage discharge, you will have the opportunity to comment on the permit when it is up for renewal. Keep up with public notices. Some states have email lists you can subscribe to in order to receive notices of permits. Other states will post online permits, notices, and drafts. Your best bet is to ask your state agency when the permit will be out for public notice and then watch closely! See Appendix C.

Now that you know the NPDES permit is under review, be sure to read it! Somewhere in the first couple of pages, there should be information on how to submit comments. There are many reasons why you should submit comments:

1. to provide the state with information they have not considered about the facility or receiving water body
2. to correct factual or calculation errors
3. to request a public hearing

4. to provide a different interpretation of the laws governing the permit
5. to offer your opinion

Although the last reason is the least effective, it does let the regulating agency know that someone is watching. The more factual and knowledgeable you are, the more effective your comment will be. A public hearing can be helpful for your campaign. The hearing will give you a specific date and activity to organize around and give you a hook for the press. If you are requesting a public hearing, include in the request the nature of the issues you think need to be raised. A public hearing is your opportunity to address the issues that were not adequately covered in the permit, and to encourage others to speak out against the permit.

In order for your comments to be considered, they must be received by the expiration date of the notice. All comments and requests must include your name, address, and daytime telephone number. There are no hard and fast rules for making comments. They may be long, short, formal, or informal. No matter how ridiculous you consider the permit to be or how frustrated you might feel, it is important to maintain a professional and respectful tone when writing your comments. The comment period for permits is usually 30 days, after which the agency has no requirement to accept and respond to your comments. Therefore, it is imperative to regularly contact the permit writer or state agency to find out the status of the permit and if your comments have been reviewed and addressed. If a public hearing is scheduled, the process may take longer.

Legal Options

Many sewage issues can be resolved through the methods outlined above; however, some parties may be unwilling to follow the law and stop polluting. If you have exhausted these other options, you might consider pursuing legal alternatives. If you decide to take this route, it is vital to have documented your efforts in trying to address the sewage problem before litigating.

Under the Clean Water Act, if a sewage treatment plant is consistently violating its permit citizens may sue the owner or operator of

the plant. While lawsuits can be costly, successful citizen suits usually allow you to recoup financial costs and attorney's fees. You cannot recoup costs if you lose the case. Citizen suits can be very effective in forcing a resolution, but are not always the best strategy. If you are thinking about such an action, you should talk with an experienced lawyer about the benefits and drawbacks to such an action.

Besides suing the operator, you may consider another legal option: challenge or appeal a sewage treatment plant's permit in court. You must first comment on the permit when it is up for public notice. If the permitting agency does not adequately address your comments, you can appeal the permit. This process is different in each state and may be lengthy and expensive.

Throughout the country, there are legal entities (some associated with local law schools) that offer assistance to citizens and groups with legal questions related to environmental issues. You can contact these organizations to ask them questions and get advice about your issue, and possibly receive legal representation. You may also be able to find a local attorney who will represent you or your organization pro bono or for a reduced rate. See Appendix H for an abbreviated listing of environmental non-profit sources of legal assistance in the Gulf States.

Epilogue

We hope this manual will be of great help to you in your fight to protect your favorite creek, river, lake, or bayou! The road can be difficult but it is well worth the effort, and we applaud you for taking the challenge. If you have questions, please contact the Gulf Restoration Network office for assistance. We will be happy to advise you on how to use this manual most effectively.

Good Luck and thank you
for all the work you do!!

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43 D-P5 Housing Characteristics: 1990. U.S Census Bureau. Available at: factfinder.cencus.gov/servlet/QTTable?_bm=y&-state=qt&-cont (link not active). Accessed March 15, 2007.

44 Bowers, Fred. New Jersey Embraces EPA Guidelines for Management of Onsite Septic Systems. NJ Discharger. Winter 2001: 8-9.

45 Olson, Ken. Taking Care of Your Septic System - Owner's Basics. University of Minnesota Extension. 2002. Available at: www.extension.umn.edu/distribution/naturalresources/DD7040.html. Accessed March 15, 2007.

46 Ibid.

47 National Pollutant Discharge Elimination System. United States Environmental Protection Agency. Available at: cfpub.epa.gov/npdes/home.cfm?program_id=45. Accessed March 12, 2008.

48 US EPA NPDES Permit Writer's Manual. United States Environmental Protection Agency. Chapter 5, page 28. Available at: www.epa.gov/npdes/pubs/chapt_05.pdf. Accessed March 12, 2008.

49 Pretreatment of Wastewater (Industrial Users) Compliance Monitoring. United States Environmental Protection Agency. Available at: www.epa.gov/compliance/monitoring/programs/cwa/wastewater.html. Accessed March 12, 2008.

Appendix A: Beach Closure Information

Alabama
Suzi Farr, Department of Environmental Management
(251) 450-3400
sfarr@adem.state.al.us
To check the status of beaches online, go to *www.adem.state.al.us,* and click on the Monitoring link at the top. Sampling is once a month October through April and weekly May through September. A yellow or red over the Enterococcus count means that the level of bacteria is over the EPA recommended amount and there may be an increased risk of illness from swimming at this site.

Florida
David Polk, Department of Health
(850) 245-4444 ext. 2459
David_Polk@doh.state.fl.us
To check the status of beaches online: *www.floridashealth.com/beachwater*. If Advisory/Warning Issued column says "Yes" then the Department of Health does not recommend recreational activities.

Louisiana
Bruce Champion, Department of Health and Hospitals
(225) 342-7617
bchampion@dhh.la.gov
Swimming season is May-October and sampling results and advisories are available.
To check the status of beaches online: *www.ophbeachmonitoring.com*

Mississippi
Emily Cotton, Mississippi Department of Environmental Quality
Beach Monitoring Coordinator
(228) 432-1056 ext. 112
Emily_Cotton@deq.state.ms.us
To check the status of beaches online: *www.usm.edu/gcrl/msbeach/index.cgi*

Texas
Craig Davis, Texas General Land Office
Texas Beach Watch Coordinator
(512) 463-8126
To check the status of beaches online: *www.texasbeachwatch.com*

Additionally, the EPA manages the Beaches Environmental Assessment and Coastal Health (BEACH) Program which strives to meet public health and environmental protection goals. The public may check the BEACH website for updates on beach closure information at: *oaspub.epa.gov/beacon/beacon_national_page.main*. Unfortunately, the website depends on updates from state agencies and some of the information on the website is several months old.

Appendix B: Discharge Monitoring Reports (DMR) by State

For any questions contact your state DMR or Public Records contact below. Be sure to reference the NPDES permit number on all correspondence.

Alabama
Records Request:
Azure Jones
(334) 271-7712
records@adem.state.al.us
Switchboard: 800-533-2336

Florida
Monthly DMR Reports
Chuck Ziegmont
Florida DEP
(850) 245-8568

Louisiana
Monthly DMR Reports
Joette Kenaley
Louisiana DEQ
joette.kenaley@la.gov
(225) 219-3683

Mississippi
Public Records, MS DEQ, Freedom of Information Office
Debbie Pridgen
(601) 961-5611
Submit requests in writing:
Fax: (601) 354-6356
Email: Debbie_pridgen@deq.state.ms.us

Texas
Monthly DMR Reports:
Call 512-239-2545, give the permit number and permit holder's name and they will connect you with the right person.

Appendix C: Public Records Information

Alabama
Alabama Department of Environmental Management's public records available for review must be requested in writing and should be submitted to the ADEM Public Records Officer.
The request can be mailed to
ADEM Public Records Officer,
P.O. Box 301463, Montgomery, AL 36130-1463.

The request can also be submitted via email at: records@adem.state.al.us, or faxed to (334)271-7950. For more information go to *www.adem.state.al.us/*

Florida
Florida Department of Environmental Protection (FDEP) makes its records available to the public. The Department has several delegated programs, for example, Domestic Wastewater permitting and Drinking Water. Files relevant to each program are maintained at the delegated program office. The Central District does not maintain duplicate files. Visit *www.dep.state.fl.us/central/Home/Ombudsman/RecordsRequests.htm* to determine which office you may need to contact for your specific request from FDEP

Louisiana
Louisiana's Department of Environmental Quality (LADEQ) provides public records to citizens on request under the Louisiana Pubic Records Act. LADEQ makes public record documents dated after July 1, 2005 available online at *deq.louisiana.gov/edms*. These records can be retrieved, viewed, and printed from any location.

Requests for public records created before July 1, 2005 can be made using a form provided online by LADEQ at *www.deq.louisiana.gov/prr*. Public request forms can be either submitted online or by mail or fax to:
Records Management
Louisiana Department of Environmental Quality
P.O. Box 4303
Baton Rouge, LA 70821-4303
Fax: (225) 219-3175 Phone: (225) 219-3168 or (225) 219-3172

Request forms can also be submitted in person to the Public Records Center. For more details go to *www.deq.louisiana.gov/pubrecords*

Mississippi
Mississippi Department of Environmental Quality (MDEQ) makes its public records available to citizens under the Mississippi Public Records Act of 1983.

Public records maintained by MDEQ can be accessed by making a written request, addressed to the Freedom of Information officer, and sent by fax to (601) 354-6356 or by mail to:

Freedom of Information Officer
Mississippi Department of Environmental Quality
P.O. Box 20305
Jackson, MS 39289-1305
The request must contain the following information:

- name of facility
- city and county where facility is located
- specifics on the type of information requested

For more information contact the Public Information Officer at the Department of Environmental Resource Center at (601) 961-561.

Texas

Texas Commission on Environmental Quality (TCEQ) ensures public access to its records under the Public Information Act.

Records at TCEQ can be requested via email at openrecs@tceq.state.tx.us or faxed to (512)239-0888. A written request can be mailed to:
Texas Commission on Environmental Quality
Attn: Public Information Officer, MC 197
P.O. Box 13087
Austin, Texas 78711-3087

For more information on how to make the request go to *www.tceq.state.tx.us/admin/data/reqinfo.html#pubinfoact*

Appendix D: Sample Public Records Request Letter

Justified Citizen
10 Sewer Drive
Bad Odor, LA 70115
(504) 555-5555

Month Day, Year

Records Management
Louisiana Department of Environmental Quality
P.O. Box 4303
Baton Rouge, LA 70821-4303

RE: Public Records Act Request

Dear Records Request Officer:

Pursuant to the Public Records Act of Louisiana, R.S. 44:1 et seq., I request copies of the following public records:
Copies of all discharge monitoring reports (DMRs), notices of violation, and administrative and/or compliance orders for the Bad Odor Sewage Treatment Plant, permit no. LA123456 for the past five years.

I am a concerned citizen of the state of Louisiana. Disclosure of the information sought by this request is in the public interest because it is likely to contribute significantly to my and the general public's understanding of the operations and activities of Louisiana's Office of Pollution Control. The purpose of this request is not primarily in my organization's commercial interest, therefore, I ask for a waiver of any fees associated with this request. **[Note: Individuals are usually not exempt from payment.]**

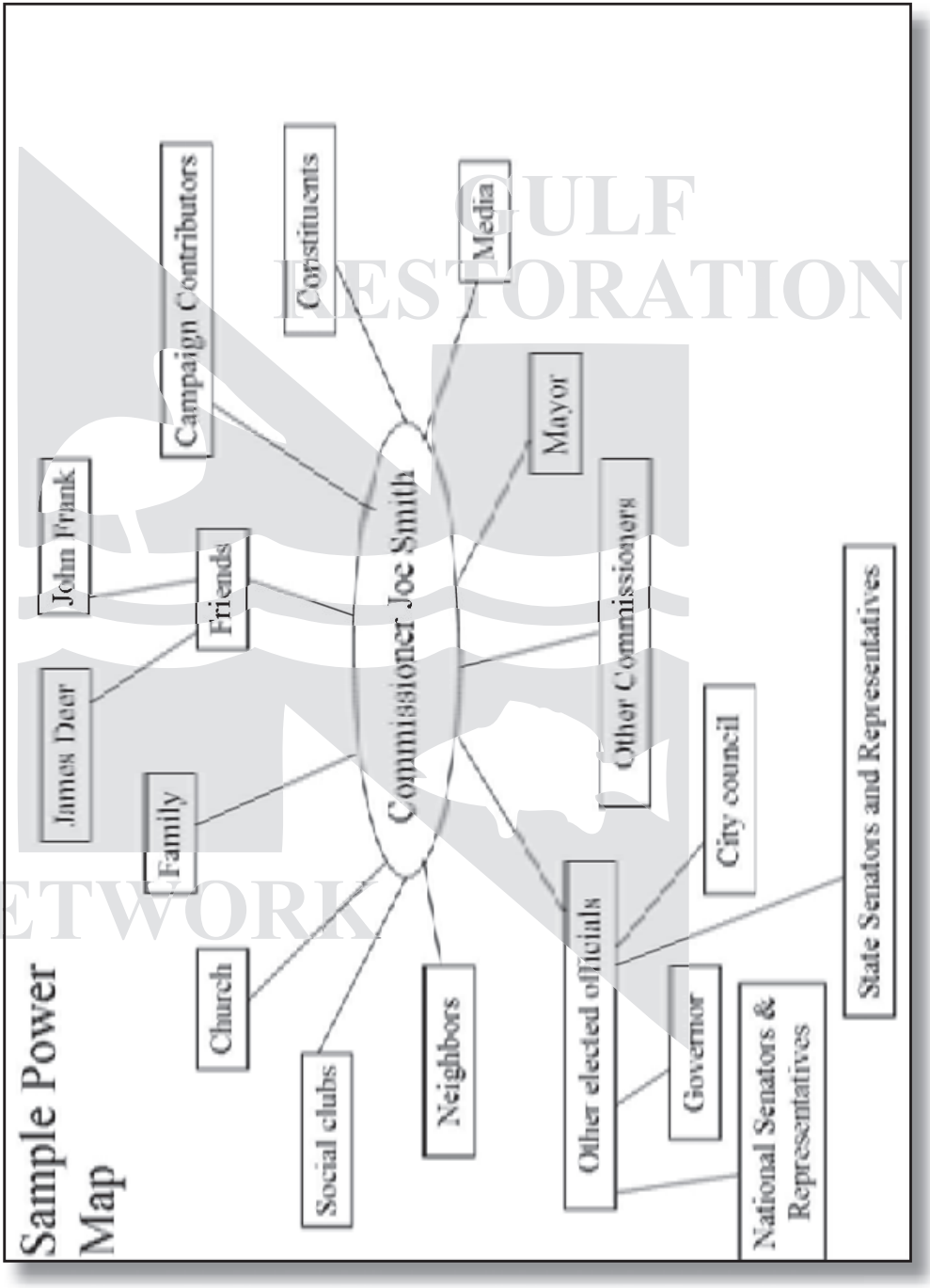
I do not believe that the requested information falls within any of the exemptions to disclosure contained in the Public Records Act of Louisiana. Should you decide, however, that any of the requested material is not to be disclosed, please fully describe the material withheld and specify the statutory or administrative basis for withholding it. All non-exempt portions of the documents should be provided. Thank you for your assistance.

Sincerely,

Justified Citizen

For help with writing other record requests, please see this website: www.rcfp.org/foi_letter/generate.php.

Appendix E: Sample Power Map



Appendix F: Writing a Letter To the Editor

Most newspapers keep their letters to 200 words. So be sure to keep your letter at or under the 200 word limit! If the paper you are writing to has a large circulation then there will be more competition. Do not get discouraged if the first few letters you submit do not get published. Make sure your letter is gripping!

Here are some basic steps for making sure your letter gets published:

- Include your contact information at the top of the letter: full name, address, day and evening phone, e-mail. Your personal information will not be published, only your name and city, the other information is to allow the paper to confirm your identity. If your letter is chosen, the paper will call you to confirm that you are, in fact, the writer.
- You may have better luck getting published if you are responding to another letter, a news story, or column. If you are responding, be sure to identify it by its headline and the date it was published like this: (Re: Polluter Gets Free Ride on New Permit, May 21).
- Be concise and choose one or two (at the most) points.
- Be funny, clever, or even wicked, but keep it clean!
- No clichés or puns.
- Do not use the paper's editorial page to launch personal attacks. Your goal should be to advance the debate so that other readers might jump into the discussion.
- Use a personal story or experience. These are often more compelling.

Appendix G: Media

Writing A Press Release

A press release is a news story that you write in hopes of getting a reporter interested in your news item. It is written in third person, and if done well, can convince an editor and reporter that a particular person, event, or environmental problem is news worthy.

Press releases are sent by e-mail and/or fax with a follow-up call. They are also an essential part of a press kit (see below). Below is a press release template.

ORGANIZATION LOGO (if you have one)

Contact: Justified Citizen
Phone: 504-555-5555
Cell: 504-555-5555
Email:jcitizen@activecitizen.org

FOR IMMEDIATE RELEASE

MAIN TITLE OF PRESS RELEASE GOES HERE ALL IN UPPER CASE*
Sub-head Title Goes Here in Normal Case

NAME OF CITY, STATE: Press Release Lead paragraph. The lead paragraph should answer the who, what, when, where, and how of the story. The reporter should have everything she/he needs to get started. Do not use sensationalism, hype, or sell. Just the facts!

The rest of the press release should focus on backing up the claims made in the lead and headline. It is a very good idea to include some quotes, especially from local people and experts.

Lastly, describe your organization and what you do in 1 or 2 sentences. This section is known as the "Boilerplate", an old newspaper term meaning a block of standard text that is used repeatedly. Use that same text at the bottom of all your releases.

###

For more information about this topic or to schedule an interview, please contact Justified Citizen at 504-555-5555 or email at Jcitizen@activecitizen.org.

Note: The three #'s mark the end of the press release.

*The Press Release Headline is the hook that will grab the reporter's attention. It should concisely reveal your most exciting news, finding, or announcement. Try to write a headline like the ones you see in the newspaper.

TIPS:

- Never use "I" or "we" unless it's in a quote.
- Shorter is better. Try to say what you need to say in one page. A second page can be used for a "More Information" page or a flyer.
- The easier you make the reporter's job, the more likely they are to use your press release.

Holding a Press Conference/Event

Write a Press Release: See the above.

Invite the Press

Email and fax the press release to media outlets. Then make a follow-up call to make sure they received the press release.
Newspaper links: www.50states.com/news/
Alabama TV: www.usnpl.com/tv/altv.php
Florida TV: www.usnpl.com/tv/fltv.php
Louisiana TV: www.usnpl.com/tv/latv.php
Mississippi TV: www.usnpl.com/tv/mstv.php
Texas TV: www.usnpl.com/tv/txtv.php
You may also consider inviting radio stations and bloggers.

Be Punctual!

News stations and newspaper reporters have deadlines so be sure to start on time.

Talking Points for Speakers

Message discipline is critical at a press conference or any public event. Make sure your speakers have prepared comments, otherwise you may have news stories that lack the information you wanted to emphasize. If you have inexperienced speakers, practice with them before the press conference.

The Press Kit

Provide the media with some information about your issue in a bulleted format. Include some quotes from members of your coalition as well as a list of your speakers with names, titles, and contact information. Put this information in a folder with your business card and include information about your coalition/water group if you have developed this.

Q & A

Allow some time at the end for questions and interviews.

When will the Story Run?

Be sure to ask! Make sure the press knows how to get in touch with you for follow-up questions. Include your cell phone number!

Appendix H: Legal Resources in the Gulf States

EARTHJUSTICE

www.earthjustice.org

426 17th Street, 6th Floor
Oakland, California 94612-2820
info@earthjustice.org
(510) 550-6700
(800) 584-6460
(510) 550-6740 (fax)

Gulf Coast Regional Office
Tallahassee
111 South Martin Luther King Jr. Blvd.
Tallahassee, Florida 32301
(850) 681-0031
tallahasseeoffice@earthjustice.org

SOUTHERN ENVIRONMENTAL LAW CENTER

www.southernenvironment.org

Headquarters
201 West Main St., Suite 14
Charlottesville, Virginia 22902-5065
(434) 977-4090
(434) 977-1483 (fax)

Georgia/Alabama Office
The Candler Building
127 Peachtree St., Suite 605
Atlanta, Georgia 30303-1840
(404) 521-9900
(404) 521-9909 (fax)

UNIVERSITY OF FLORIDA LEVIN COLLEGE OF LAW
(INTERDISCIPLINARY CONSERVATION CLINIC)
www.law.ufl.edu/conservation/

P.O. Box 117629
Gainesville, Florida 32611-7629
(352) 392-2237

TULANE LAW SCHOOL
(TULANE ENVIRONMENTAL LAW CLINIC)
www.tulane.edu/~telc
6329 Freret St.
New Orleans, Louisiana 70118
(504) 865-5789
(504) 862-8721

WILDLAW
www.wildlaw.org

Alabama Office
8116 Old Federal Road, Suite C
Montgomery, Alabama 36117
(334) 396.4729
(334) 396-9076 (fax)

Florida Office
1415 Devils Dip
Tallahassee, Florida 32308
(850) 878-6895

Glossary

Aquatic life - Fish, insects, amphibians, plants, and all other organisms that live in the water.

Assimilative capacity - The ability of a body of water to cleanse itself; its capacity to receive waste waters or toxic materials without deleterious effects and without damage to aquatic life or humans who consume the water.

Bioaccumulation – The retention and concentration of a pollutant in an organism. Bioaccumulation refers to the process by which contaminants, such as PCBs or mercury, accumulate or become magnified as they move up the food chain. Contaminants present in the environment get taken up slowly by plants. Little fish eat lots of plants and small amounts of contaminants build up in their bodies. Bigger fish eat scores of little fish building up a larger concentration of contaminants which then get absorbed by the human beings that eat the fish. Substances, like PCBs, are stored in fat tissue and internal organs, hence these types of toxics are difficult to eliminate. When a person consumes a contaminated fish, they accumulate all the PCBs that have been eaten by everything below them in the food chain. Another term for this is Biological Magnification.

Biochemical Oxygen Demand (BOD) – A chemical procedure for determining how fast biological organisms use up oxygen in a body of water usually measured over a 5 day period; it is used to measure the readily decomposable organic content of wastewater.

Combined Sewage Overflows (CSOs) – During rainfall or snowmelt, the volume of water carried by a combined sewage system to a waste treatment plant may exceed the capacity of the pipes or plant and cause overflows of untreated mixtures of storm water and sewage into receiving waters.

Combined Sewage Systems (CSS) – Combined sewers carry raw sewage from household and industrial sites and storm water runoff from streets to sewage treatment plants in the same pipe.

Concentrated Animal Feeding Operations (CAFOs) – Agricultural facilities that house and feed a large number of animals (e.g., poultry, hog, sheep, lamb, cattle, and horse) in a confined area for 45 days or more during any 12-month period. Federal regulations require CAFOs to carry a permit and to develop nutrient-management plans designed to keep animal waste from contaminating surface water and groundwater.

Decentralized wastewater treatment – Onsite sewage facility, e.g. a septic tank.

Endocrine disrupters - Substances that act like hormones in the endocrine system and disrupt the physiologic function of internally produced hormones. Studies have linked endocrine disruptors to adverse biological effects in animals, giving rise to concerns that low-level exposure might cause similar effects in human beings.

Fish Kills - A significant and sudden death of fish, shell fish and other aquatic animals.

Floatables – Trash, debris, and other visible materials that float and are released into the environment when sewers overflow.

Hydrocarbons – Chemicals that consist entirely of hydrogen and carbon. Hydrocarbons contribute to air pollution problems like smog, and can be harmful to aquatic organisms.

Hypoxia – A condition where levels of life-supporting oxygen in water are so low that fish and other aquatic species cannot survive.

Inflow and infiltration (I/I) – Inflow is water that enters the system through improper or illegal connections such as downspouts and sump pumps. Infiltration is when groundwater enters the sewer system through cracks, breaks, or leaks in sewer pipes or manholes. Infiltration can be a result of deterioration of pipes, loose joints, poor design, or damage through tree root infiltration.

Impaired waterbody – Water bodies not fully supporting their uses.

Indicator bacteria – A proxy measure used to determine if the bacteria content in a water sample is dangerous, e.g. enterococci.

Lagoon - Lagoon systems are wastewater treatment facilities that are made of one or more pond-like bodies of water that receive, hold, and treat wastewater for a predetermined period of time, also called oxidation ponds.

Leachate - The liquid that drains or 'leaches' from a landfill, it varies widely in composition regarding the age of the landfill and the type of waste that it contains. It can usually contain both dissolved and suspended material.

Microorganisms – Bacteria, yeasts, simple fungi, algae, protozoans, and a number of other organisms that are microscopic in size and cannot be seen by the naked eye. Most are beneficial but some produce disease. Others are involved in composting and sewage treatment.

National Pollutant Discharge Elimination System (NPDES) - authorized by the Clean Water Act, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

Non-point Source (NPS) – Diffuse pollution sources, e.g., without a single point of release into a receiving stream from a specific outlet, definable structure, or conveyance.

Nutrient – Any substance assimilated by living things that promotes growth. In water quality, the term generally refers to nitrogen and phosphorous.

Organic matter – Any substance containing carbon. All plant and animal matter.

Oxygen Demanding Substances – Organic matter that depletes dissolved oxygen in a water body as it is consumed by aquatic organisms or through chemical reaction.

Oxidation Pond – See lagoon definition.

Parasites - Organisms that live on or in organisms of another species and obtain nourishment from these "hosts."

pH level – An expression of the intensity of the alkaline or acidic condition of a liquid. The pH may range from 0 to 14, where 0 is most acidic, 14 is most alkaline, and 7 is neutral. Normal waters usually have a pH between 6.5 and 8.5.

Point Source – Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Polychlorinated biphenyls (PCBs) - Man-made chemicals that are non-flammable, chemically stable, have high boiling points, and have electrical insulating properties. More than 1.5 billion pounds of PCBs were manufactured in the United States prior to cessation of production in 1977 due to concern over the toxicity and persistence (chemical stability) in the environment.

Polycyclic aromatic hydrocarbons - A group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat.

Sanitary Sewage Overflows (SSOs) – Partially treated or untreated sewage overflows from a sanitary sewer collection system that are often caused by water leaking into or out of old pipes, pipe blockages, pipe breaks, power failures or insufficient capacity in the system especially during storms or high groundwater seasons.

Sanitary Sewage Systems (SSS) – A sewer system that transports only wastewater from domestic residences and/or industries to a sewage treatment plant.

Suspended Solids – Suspended Solids are particles that are suspended in the water, such as decaying plants, algae, animal matter, industrial wastes, and silt.

Total Suspended Solids (TSS) – Total Suspended Solids (TSS) is the concentration of solid pollutants that are suspended in the water and do not settle readily, such as decaying plants, animal matter, industrial wastes, and silt.

Toxicity – The degree to which a substance or mixture of substances can harm or kill humans or animals.

Toxic pollutant – Pollutants, or combinations of pollutants that upon skin exposure, ingestion, or inhalation, can cause death, disease, behavioral abnormalities, cancer, genetic mutations, or other severe symptoms in exposed organisms or their offspring.

Trickling Filter - A treatment system in which wastewater is sprayed over a bed of vegetation or other material covered with bacteria that break down the organic waste and produce clean water.

Notes