

Town of Oak Island

OWNER'S & RENTER'S MANUAL
Guide For Protecting Water Quality



4601 E. Oak Island Drive
Oak Island, NC 28465
(910) 278-5011

TABLE OF CONTENTS

The Clear Choice: Managing Stormwater on Your Property	5
What is Stormwater?	5
Reducing Pollutants in Runoff	6
Where does stormwater go?	6
Does your car or truck leak?	6
Storage of household products	7
Handling chemicals safely	7
Animal wastes	8
Yard and garden wastes	9
Landscaping and Site Management to Control Runoff	9
Bare soil	9
Paved surfaces	10
Roof water flow	10
Layout of landscape	10
The Need for Riparian Buffers	10
Beaches and Dunes	12
Household Wastewater: Managing Your Septic System	13
Why be concerned?	13
Conventional septic system	14
The septic tank	14
The distribution system	14
The drain field	15
Planning for a New Home: Septic System Design & Location	16
Review property	16
How much wastewater can your system handle?	17
Septic System Maintenance	18
Why maintain your system?	18
An ounce of prevention is worth a ton of cure!	19

How to Avoid Septic System Failure	20
Know when system was installed	21
Install filter and baffle	21
Install safety devices	21
Gardening Safe & Sound: Home Landscape Management	22
Environmental concerns	22
Using time and money effectively	23
Designing an Environmentally Friendly Landscape	24
Planning tips	24
What plants should I use?	25
Site preparation	25
Riparian buffers	25
Managing Your Lawns, Gardens and Woody Ornamentals	27
Has your soil been tested?	27
Fertilizers	27
What do those numbers on fertilizer bags mean?	27
Fertilizing near coastal bodies	28
Taking Care of Your Lawn	29
Cut grass to proper height	29
Recycle grass clippings	29
Do your yard care practices save water?	30
Water wisely	30
Aerate your lawn	30
Are you applying pesticides wisely?	30
On The Water: Caring For Your Boat and Dock	32
What are the environmental concerns?	32
Boat Cleaning and Maintenance	33
Washing the hull and deck	33
Engine Maintenance	34

Spill Prevention and Waste Disposal	34
Fueling your boat	34
Bilge water	35
Head sewage	36
Plastics and trash	36
Fish wastes	37
Dock Maintenance	38
Acknowledgements	39

The Oak Island Stormwater Advisory Board

PRESENTS

The Clear Choice: Managing Stormwater On Your Property

What is stormwater, and why should you be concerned?

Stormwater is water from rain – or melting snow – that does not quickly soak into the ground. Stormwater flows from rooftops, over paved areas and bare soil, and through sloped lawns and fields. As it flows, this runoff collects and transports soil, pet waste, pesticides, fertilizer, oil and grease, leaves, litter, and other potential pollutants. You don't need a heavy rainstorm to send pollutants rushing toward Davis Canal, the Intracoastal Waterway and the ocean. A single garden hose can supply enough water.

Even houses that are not beside the Canal or the Waterway can contribute to problems. Storm drains, ditches and swales are designed to move runoff from your neighborhood to the nearest body of water.

You don't need a heavy rainstorm to send pollutants rushing toward Davis Canal, the Intracoastal Waterway, or the ocean. A single garden hose can supply enough water.

The bottom line is that polluted stormwater degrades The Oak Island coastal environment. Sediment clouds water and smothers habitats for fish and plants. Nutrients like phosphates and nitrates can promote excessive algae growth. Toxic substances such as antifreeze and oil from leaking cars, carelessly applied pesticides, and zinc from galvanized metal gutters and downspouts may threaten the health of fish and other aquatic life. Bacteria, viruses and parasites from animal waste may make the Canal, the Waterway

and the beaches unsuitable for wading, swimming, or shellfish harvesting after storms.

As many people have discovered, stormwater can be a problem closer to home. Although runoff is natural, changing the landscape increases the amount of runoff by limiting infiltration. For highly developed, gentle sloping, low-lying areas of the coast, runoff causes chronic (and sometimes severe) flooding problems.

Public officials are shifting their pollution control efforts from wastewater discharges to stormwater management, especially in those coastal areas experiencing rapid population growth. Stormwater pollution cannot be treated in the same way as water pollution from discharge pipes. Runoff pollution originates from multiple sources. **Every street, parking lot, sidewalk, driveway, yard and garden can potentially contribute to the problem.** The issue can only be solved with everyone's help.

Reducing Pollutants in Runoff

Stormwater in the coastal zone is unavoidable, but its effects can be reduced by keeping harmful substances out of the runoff.

Where does stormwater go?

The next time you're home during a storm, and it's safe to go outside, take your boots and umbrella and watch where the rainwater goes. Does water soak into the ground quickly, or does it puddle in places and flow off lawns and driveways? Your soil type affects water infiltration (soaking into the ground). As you might expect, water infiltrates sandy soil quickly but has a hard time seeping into fine-grained silt or clay soils.

During your walk, note how far it is to the nearest storm drain, ditch, wetland, stream or surface water. Note whether runoff flows onto your land from adjacent streets, lands or stormwater systems. Try to go out during more than one rain shower to get a good understanding of runoff flow during small and large storms.

Does your car or truck leak?

Oil stains on your driveway and spills of antifreeze, brake fluid or other automotive fluids are easily carried away by a rainstorm. If the runoff from

your driveway has an oily sheen, that's a sure sign that you need to be more careful.

Pans, carpet scraps, and matting can catch drips. Routine maintenance can prevent your car from leaking and help identify potential leaks. If you change your own oil, be careful to avoid spills and collect waste oil for recycling. Store oil, car parts and fluid containers where rain and runoff cannot reach them. Never dump used oil, antifreeze or gasoline down a storm drain, in a ditch or on the ground. These wastes will end up in Davis Canal, the Intracoastal Waterway or the Ocean.

Washing your car in the driveway creates runoff without the help of a rainstorm – your hose provides the water. The dirty, soapy runoff drains directly into storm drains or ditches, picking up oil and other pollutants as it goes. Try washing your car on the lawn.

Are household products stored outside the reach of stormwater?

Many households store lawn and garden products such as weed killers, insect killers and fertilizers. If stormwater or floodwater reaches these products, it can transport them into surface waters. Pool chemicals, salt for water softeners and a wide variety of other chemical products can also cause trouble if they are washed away.

*Using more pesticides or
fertilizers than recommended
invites pollution problems
and is unnecessarily costly.*

Do you use and handle chemicals safely?

Safe storage is only the first step in preventing contaminated runoff. When mixing chemicals, try to do it within a washtub so spills will be contained. If you spill chemicals, act quickly to contain and clean up the spill. This is particularly important on paved surfaces. Carefully read and follow all application instructions. Using more pesticides or fertilizers than recommended invites pollution problems and is unnecessarily costly. Timing of applications is also important. DO NOT apply pesticides and chemicals if rain is expected within 24 hours.

How can you keep animal wastes from becoming a pollution problem?

Droppings from dogs and cats and other commonly kept animals such as horses, exotic birds, rabbits, goats and chickens can be troublesome in two ways. First, animal wastes contain nutrients that can promote the growth of algae and aquatic plants if they enter the Canal or the Waterway. More important, animal droppings are also a source of disease organisms (dog waste, for example can contain *Salmonella* and *Giardia*, pathogens that can affect human health). The risk of stormwater contamination increases if animal wastes are allowed to accumulate in pen areas or left on sidewalks, streets or driveways where runoff can carry them to storm drains and ditches.

The job of cleaning up after your pet can be as simple as taking a plastic bag or pooper scooper along on your next walk. Don't just stand there and pretend you don't see what your dog is doing when he squats over – carry a bag and PICK IT UP!

No solution is perfect but here are three ways to handle pet waste:

1. Flush it down the toilet: The water from your toilet goes to a septic system that removes the pollutants.
2. Bury it in the yard: Dig a hole or trench that is about 5 inches deep, at least 100 feet away from gardens or surface water bodies. Microorganisms in the top layer of soil will break down the waste and release the nutrients to nearby plants. Do not add any pet waste to gardens or compost piles.
3. Put it in the trash: Even if it's legal and easy, it's not the best solution. Waste taken to a landfill can still cause pollution problems.

Droppings from dogs and cats and other commonly kept animals such as horses, exotic birds, rabbits, goats, and chickens can be troublesome.

Are yard and garden wastes kept out of stormwater?

If left on sidewalks, driveways or roads, grass clippings and other yard wastes will wash away with the next storm. Although leaves and other plant debris accumulate naturally, home sites can contribute excess amounts of plant matter, especially in areas with concentrated development. As the plant materials decompose, they release nutrients into the water. These nutrients can then stimulate growth of algae and aquatic plants.

Burning yard waste is not an environmentally friendly alternative and is also illegal. Hydrocarbons and nutrients released by burning leaves contribute to water pollution as well as air pollution. Rainfall washes smoke particles out of the air, and runoff picks up dust and ashes left on pavement or in ditches. You can easily avoid the problem by sweeping clippings back onto the grass, and composting leaves and garden wastes on your property to recycle nutrients.

Landscaping and Site Management to Control Runoff

You can control some stormwater risks by making changes to buildings, paved surfaces, the landscape and soil surfaces.

Are there areas of bare soil around your home?

Areas of bare soil often exist in vegetable and flower gardens, on newly seeded lawns and around construction projects. Even on the shallow sloping Coastal Plain, water from runoff can remove large amounts of soil and carry it to estuarine wetlands. Planting grass or other ground cover, such as vegetated buffer, is a good way to stop erosion. Putting straw, wood chip mulch or a biodegradable geotextile over gardens or newly seeded areas will slow erosion and promote plant growth. Properly placed straw bales, diversion ditches and commercially available silt fences around construction sites can help slow runoff and trap sediment on-site. If you are working with a contractor, insist that precautions be taken to control runoff and erosion during construction. Likewise, if you are undertaking construction on your own, look into some of these options.

Can you eliminate paved surfaces or install alternatives?

Paved roads, driveways and walkways prevent rainwater from soaking into the ground. When you have the choice, consider alternative materials such as gravel or wood chips for walkways. Avoid paving areas such as patios. Where you need a more solid surface, consider using a “porous pavement” made from bricks, interlocking cement blocks or rubber mats that allow spaces for rainwater to seep into the ground. If you must pour concrete, keep the paved area as short and narrow as possible.

Does your roof water flow onto pavement or grass?

Roofs, like any other hard surface, shed water. Gutters should be aimed toward grassy areas and away from paved surfaces. If grass is not planted, gutter flow should be directed to a dry well to facilitate infiltration. For roofs without gutters, use gravel under the drip line to prevent soil erosion and increase the ground’s capacity to absorb water. Consider using cisterns or rain barrels to catch rainwater for watering lawns and gardens in dry weather. Keep these containers closed to avoid providing a breeding site for mosquitoes.

Can you change the layout of your landscape to reduce runoff?

An essential part of coastal stormwater management is keeping water from leaving your property, or at least slowing its flow as much as possible. Many lawns are sloped to encourage water to run off onto neighboring properties or streets. Instead, landscape low areas with shrubs and flowers to encourage water to soak into the ground. If your yard is hilly, terrace slopes to slow the flow of runoff and make mowing and gardening easier. If you have a large lot, “naturalizing” areas with native woodland or wetland plants will improve aesthetics and minimize runoff impact.

The Need For Riparian Buffers

Rapid population growth and suburban sprawl are resulting in pollution problems all along the coast. Increased paved or hard surfaces, primarily in the form of rooftops, parking lots, and roads has reduced infiltration and increased runoff. Among the results are greater pollutant loading,

accelerated erosion and increased flooding. Establishing riparian buffers (areas of vegetation along Davis Canal and the Intracoastal Waterway) can provide numerous benefits for overall watershed health, while also protecting water quality.

In its natural state, the land next to a tidal creek or estuary has native plants growing on it such as trees, shrubs or tall, coarse grasses, depending on the climate. Vegetated buffers can provide a natural filter to remove pollutants and sediments contained in surface water runoff. The effectiveness of any given vegetated buffer for removing pollutants depends on a variety of site-specific conditions, such as slope, soil type, type of vegetation and permeability.

Establishing riparian buffers – areas of vegetation along Davis Canal and the Intracoastal Waterway – can provide numerous benefits for overall watershed health, while also protecting water quality.

A vegetated buffer is typically found between an inland area (pollutant source) and an adjacent waterway. As runoff moves through the vegetated buffer, sediment and pollutants attached to sediment are filtered out as the buffer slows flow velocity, allowing sediment and pollutants to settle out. In general, the greater the width of vegetated buffer the surface runoff must travel through, the more sediment and pollutants it can remove.

A vegetated buffer provides these benefits:

- Filters pollutants out of stormwater runoff from land surfaces.
- Decreases and filters ground and surface water runoff.
- Retains nutrients such as nitrogen and phosphates. Excessive amounts of these two nutrients can lead to algae blooms, which can cause depleted oxygen levels and reduced light penetration.
- Transforms toxic substances such as ammonia to nontoxic substances.
- Provides an energy source and organic food for a productive aquatic food chain.

- Provides shading that helps regulate water temperatures and keep waters from getting too hot for aquatic and plant life.

Beaches and Dunes

Beaches

The Town of Oak Island is blessed with 65 street-end public accesses along 9 miles of beach. Look for the green Town logo signs and use these places to get to the beach.

Trash on the beach is an eyesore, and it can injure people or kill wildlife. Pick up trash, even if it's not yours. There is a trashcan on the street side of every public access.

It is against the law to:

1. Leave trash on the beach
2. Walk your dog on the beach without a leash
3. Drive on the beach
4. Disturb nesting female sea turtles, their nests or hatchlings
5. Set off fireworks on the beach

Dunes

If you have beachfront property, remember that the dunes on or near your property are important protective barriers between you and the sea. During storms, dunes function as flexible barriers and provide sand to nourish the beach. Numerous bird species and sea turtles use our coastal dunes as nesting areas.

Coastal dunes are fragile structures that require protection and maintenance. Build a walkway (and use it) to avoid trampling and damaging dunes. Extend the life of your dunes by vegetating bare patches, fertilizing the new beach grasses and protecting them from foot traffic.

Dunes are an effective sand reservoir for storms and abnormally high tides, but a dune won't last and vegetation won't grow in an area that is regularly inundated by the sea.

It is against the law to:

1. Walk, run or slide on sand dunes
2. Dig, cut, pull, trample or damage dune plants

The Oak Island Stormwater Advisory Board

PRESENTS

Household Wastewater: Managing Your Home Septic System

Most people don't give much thought to the wastewater created in their homes from kitchen, bathroom and laundry area drains. Wastewater treatment is usually out-of-sight and out-of-mind until problems occur. However, many people don't realize that a septic system failure is more than a nuisance: It's a health hazard and a significant danger to the coastal environment.

Why should you be concerned?

Knowing the basics about your household system and taking simple precautions to safeguard it can prevent the health risks posed by inadequate wastewater treatment.

When household septic systems fail, untreated sewage can end up both on land and in water. This untreated wastewater may contain dangerous bacteria or viruses that can threaten human life and pollute shellfish grounds and other environmentally sensitive coastal areas.

Septic tank systems are designed to remove or break down these contaminants before they enter groundwater or nearby estuaries or wetlands.

Keeping your system working properly is a wise investment for environmental, human health and economic reasons. In addition to degrading natural resources, a failed system can cost thousands of dollars to replace.

Septic system failure is more than a nuisance: It's a health hazard and a significant danger to the coastal environment.

What is a conventional septic system and how does it work?

Most residential septic systems consist of a 1,000-gallon-capacity watertight septic tank buried in the ground and a drain field that can fit within the front or back yard of the home site. Household wastewater flows into the septic tank where the solids are retained. The liquid flows out of the tank to the drain field where it leaches through the soil and is purified before reaching the groundwater.

The Septic Tank

First, wastewater flows through a sewer pipe out of your house and into the septic tank, a large container commonly made out of concrete. Fiberglass and polyethylene tanks are also used. The tank must be watertight to keep sewage from leaking out and groundwater from seeping in.

Lighter solids in the wastewater – such as grease, hair and soap – float to the top of the tank and form a scum layer. Heavier solids settle at the bottom and form a layer of sludge. Bacteria in the tank begin to break down some of the sludge into simple nutrients, gas and water. The remaining solids are stored in the tank until they are pumped out.

A baffle or a sanitary tee pipe at the tank inlet slows the incoming rush of water, so the sludge is not stirred up; another, located at the tank's outlet, keeps solids from leaving the tank. Access openings (i.e., removable sections of the tank lid) at the inlet and outlet ends of the tank make it easy to see how well the inlet and outlet pipes, baffles, and tee pipes are functioning, and allow access for pumping. Although not standard equipment, an effluent filter at the tank outlet is recommended for two-compartment tanks, because solids carried out of the septic tank can clog the drain field. Effluent filters in single-compartment tanks may require cleaning too frequently, resulting in homeowner inconvenience.

The Distribution System

Next, the liquid waste, or effluent, flows out of the tank through the distribution system, and into the drain field or soil absorption field. The distribution system commonly consists of a series of perforated plastic

distribution pipes laid in the ground, usually in gravel-filled trenches. Effluent can flow into the pipes by gravity and out to the trench.

The Drain Field

Good wastewater treatment depends on proper siteing, design and operation of the system. The size and configuration of the drain field area will vary from site to site based on soil texture and seasonal high water table characteristics. The soil must be of a suitable type and deep enough to treat wastewater before it reaches groundwater. The soil filters out larger particles and pathogens, which eventually die off in the inhospitable soil environment. Under the right conditions, beneficial soil microbes and natural chemical processes break down or remove most of the contaminants in the effluent.

Soils vary in their ability to absorb and treat wastewater. Well-drained soils are generally best; however, excessively drained soils such as coarse gravel or sands may allow wastewater to flow through too quickly for effective treatment. In fine clays or compacted soils, water may move too slowly. High seasonal water tables, which occur in many coastal soils, can affect both absorption and treatment. Septic systems don't work well when: soils are poorly drained, groundwater levels are high, surface runoff saturates the drain field or excessive amounts of water are used in your household.

Our beaches are a fragile environment due to their location, the type of soils present and the typically limited land area available for septic systems. Although the placement of all septic systems must follow state regulations, it is recommended that they be placed as far away as possible from the ocean and other environmentally sensitive coastal waters.

Good wastewater treatment depends on proper siteing, design and operation of the entire septic system.

The Oak Island Stormwater Advisory Board

PRESENTS

Planning for a New Home: Septic System Design and Location

When buying property for a home, it pays to plan ahead, especially if the property doesn't have access to a public sewer. Most homes in the Town of Oak Island depend on individual septic systems for wastewater disposal, although a public sewer system is planned. In the excitement of planning the appearance of your new home, it's easy to overlook practicalities like the disposal of your family's wastes.

It is important to note that not all property is suitable for a septic system. Unfortunately, not all soils can absorb wastewater or purify it. Septic systems installed in unsuitable soils usually malfunction by leaking raw, untreated sewage to the ground surface or into ditches or into the groundwater. Untreated sewage may contain deadly bacteria and viruses. It can be expensive to remedy the potential health hazards and odor problems that result from the use of septic systems in unsuitable soils.

Reviewing property before buying

Before purchasing a lot for your home, review the land yourself. Pay particular attention to any features that could affect the installation or operation of a septic tank:

- Are there gullies, ravines, excessively steep slopes or other severe topographic conditions?
- Is the land prone to flooding?
- Does the land seem to be wet or to hold water? Does surface drainage seem to be a problem?
- Does the land contain designated wetlands? Has the extent of any designated wetlands been mapped on the property?

- Are there any utility or road easements?
- Is there enough space on the lot for the home, the septic system and the driveway?

Even if the land appears suitable during your review, there may be conditions under the surface of the ground that make it difficult or impossible to install an adequate septic system. Have a thorough evaluation of the property done to determine the capacity for a septic system.

How much wastewater can your system handle?

Make sure your septic system can meet the demands of your household, whether you're planning for a new home or evaluating your existing system. Both the septic tank and drain field need to be large enough to treat all the wastewater generated in your house, even at times of peak use. The system must be designed for the maximum occupancy of your home. An average household produces about 100 to 200 gallons of wastewater per bedroom per day. The septic tank should be large enough to hold at least two days' worth of wastewater. (Two days is long enough to allow solids to settle out by gravity.)

Keeping the size of your septic system in line with your needs is important. If water use in your household is greater than the system's designed capacity, you may suffer inadequate wastewater treatment or system failure. If you add rooms or water-using appliances to your home (such as a Jacuzzi, dishwasher or water softener) – or renovate a former vacation house for year-round use – you may need to increase the capacity of your system. Persons who intend to rent or lease their coastal property for high-use vacation rental should be aware that they could jeopardize their septic system, unless it has been specifically designed and installed to accommodate the maximum number of people that will occupy the unit.

Never flush...

- *Coffee grounds*
- *Dental floss*
- *Paints, Varnishes*
- *Thinners*
- *Cigarette butts*
- *Disposable diapers*
- *Kitty litter*
- *Waste oils*
- *Sanitary napkins*
- *Tampons*
- *Pesticides*
- *Paper towels*
- *Condoms*
- *Photographic solutions*
- *Fats, grease, or oil*

Septic System Maintenance

Once you have the correct capacity septic system in place, don't forget about it! With proper maintenance, a septic system can last for 20 to 30 years or longer. Maintenance involves good daily habits as well as regular inspections and pumping accumulated solids out of the septic tank. Responsible maintenance also calls for using your system to dispose only of the types and amounts of wastes that it's actually designed to handle.

Why maintain your system?

There are three important health reasons for maintaining your septic system. The first is the health of your pocketbook! Poor maintenance results in failed systems requiring expensive repairs at a minimum – and sometimes system replacement. Repairs or replacement costs can be thousands of dollars, whereas a periodic inspection and pumping cost is considerably less.

The second reason is the health of your family, your community and the coastal environment. Untreated sewage water contains disease-causing bacteria and viruses, as well as unhealthy amounts of nitrate and other

chemicals. Failed septic systems can allow untreated sewage to seep into wells, groundwater and surface water bodies, contaminating water meant for drinking and recreation.

The third reason is the health of your local economy. Contaminants from failed septic systems pollutes water supplies, closes shellfish beds and recreational areas, and creates offensive odors. Quality of life, recreational opportunities and tourism may decline, and with them, the property values and economic vitality of an area.

An ounce of prevention is worth a ton of cure!

Committing a little attention to the care of your system can help you avoid the inconvenience and expense of a failing system. As long as your septic system was properly located, designed and installed according to state codes, good maintenance habits will help your system work properly for years to come.

Pumping your septic tank is probably the single most important thing you can do to protect your system. If the buildup of solids or grease in the tank becomes too high and solids move to the drain field, this could clog and strain the system to the point where a new drain field will be needed.

Do's:

- Conserve water to reduce the amount of wastewater that must be treated and disposed of by your system. Doing laundry over several days, for example, will put less stress on a system than doing many loads all day long.
- Repair any leaking faucets or toilets. To detect toilet leaks, add several drops of food coloring to the toilet tank and see if the color ends up in the bowl.
- Divert down spouts and other surface water away from your drain field. Excessive water keeps the soil from adequately cleaning the wastewater.
- Keep your septic tank cover or lids accessible for inspections and pumping. Install risers with lids if necessary.

- Keep a detailed record of repairs, pumpings, inspections and other maintenance activities. Pass these on to the next homeowner if you sell your house.

Don'ts:

- Don't drive over your drain field or compact the soil in any way.
- Don't dig in your drain field or build anything over it, and don't cover it with a hard surface such as concrete or asphalt.
- Don't plant anything over or near the drain field except grass. Roots from nearby trees and shrubs may clog and damage drain lines.
- Don't use a garbage disposal, or limit its usage at the very least. Disposals increase the amount of solid waste entering your tank by about 50%, so you have to pump your tank more often than normally suggested.
- For the same reason, don't use your toilet as a trash can.
- Don't poison your septic system and the groundwater by pouring harmful chemicals, cleansers or fuels down the drain. Harsh chemicals can contaminate sludge in the septic tank, kill the beneficial bacteria that purify your wastewater, and seep into groundwater.
- Don't put in a separate pipe to carry wash waters to a side ditch or the woods. This graywater contains germs that can spread disease.
- Don't waste money on septic tank additives. The bacteria needed to treat wastewater are naturally present in sewage. Additives can re-suspend solids, causing your drain field to clog. Additives do not eliminate the need for routine pumping of your tank.
- Don't allow backwash from home water softeners to enter the septic system.
- Never enter a septic tank. Toxic gases from the tank are deadly. If your system develops problems, get advice from you the Health Department or a licensed septic tank contractor.

How to Avoid Septic System Failure

Any time your septic system is not treating or disposing of sewage in an effective manner, the system is failing. There can be many reasons for system failure. By far the most common reason for early failure is improper maintenance by homeowners. The following symptoms can indicate the failure of your septic system:

- Sewage backs up in your drains or toilets.
- Sinks, bathtubs and toilets drain slowly.
- Wastewater appears on the surface of the ground above or near the system.
- Lush, green grass grows over the drain field, even during dry weather.
- Unpleasant odors are noticeable around your house.
- The growth of aquatic weeds or algae seems excessive in surface waters adjacent to your home.

Before these symptoms appear at your home, do all you can to keep your septic system in good working order. You can prevent septic system failure with routine maintenance and by following a few simple guidelines:

Know when your septic system was installed

Septic systems should last anywhere from 20 to 30 years (or even longer), depending on how appropriately they are designed for a site and how well they are maintained. Even a relatively new system can fail if it is undersized, improperly installed or maintained, or located in poor soil.

Install an effluent filter and gas baffle at the septic tank outlet

Solids that don't settle in the tank can be carried out of the tank with effluent, clog the drain field, and lead to premature system failure. Effluent filters on the outlet capture small particles and prevent them from clogging the drain field; it's important to clean the filter periodically.

Gas bubbles are produced by anaerobic bacteria slowly digesting wastes in the tank. A gas baffle near the outlet deflects the bubbles and the disturbed sludge away from the outlet.

Consider installing safety devices

To prevent hazardous sewage overflows, tanks should have a storage capacity above normal working levels. In addition, an alarm could be installed on holding tanks or pumping chambers to warn you if the tank is nearly full. If your system depends on a pump, you may need to have a backup power supply available in addition to adequate storage capacity in the tank.

The Oak Island Stormwater Advisory Board

PRESENTS

Gardening Safe and Sound: Home Landscape Management

Gardening is a favorite pastime for many homeowners in coastal North Carolina. If yours is like most homes, it's surrounded by lawns, gardens, shrubs and trees that require regular maintenance to remain healthy, attractive and pest-free. Unfortunately, the products and practices that keep your yard looking its best can also send contaminants flowing into Davis Canal, the Intracoastal Waterway and estuaries.

What are the environmental concerns?

Your home landscape, which includes the natural settings of your home and property, might be the last place you would look for pollution problems. However, behind this beautiful landscape are activities that may threaten your health and the health of the coastal environment.

On average, homeowners use 10 times more chemical fertilizers and pesticides per acre on their lawns and gardens than farmers use on cropland. These chemicals can pollute Davis Canal, the Intracoastal Waterway and the Ocean. Closer to home, children and pets are particularly vulnerable to pesticides that are stored improperly, applied improperly or used while ignoring proper safety precautions.

Other problems can occur when exposed soils wash away. Soils moving off your landscape can harm wildlife habitat and choke waterways. Indiscriminate watering of lawns and gardens wastes large amounts of water while washing away fertilizers and pesticides.

Gasoline-powered mowers, weed cutters, leaf blowers and other devices make noise and pollute the air. Powered by a two-cycle engine, a lawnmower in one hour spews the same amount of exhaust as a car driven 350 miles!

The products and practices that keep your yard looking its best can also send contaminants flowing into Davis Canal, the Intracoastal Waterway and estuaries.

Environmental problems can arise as residential and commercial development expands along the coast, imposing modern landscape management practices on previously rural areas. These practices usually involve the clearing of all natural habitats along both natural and manmade waterways. These natural buffers have provided a filtering system to eliminate the movement of pollutants into the watershed, degrading the quality of the system.

Traditional landscape management also encourages the “perfect lawn.” To achieve this type of landscape, homeowners commonly use a variety of chemicals and fertilizers. **Although it may seem that your contribution to pollution is minor, the cumulative effects of chemicals, soil loss and wasted water from hundreds or thousands of homes in your region can really add up.**

Are you using your time and money effectively?

Americans spend lots of money on garden items such as flowers, seeds and chemical products. They also dedicate many hours of their leisure time to caring for their lawns, shrubs and vegetable gardens. Valuable time and money may be wasted, however, if you manage your lawn and gardens in a hazardous, environmentally unsound way.

Think about the cost, time and effort it would take to replace a lawn or injured plants damaged by over-fertilization or misuse of pesticides.

Consider the hard work required for returning unsightly, eroded areas back into productive use. Imagine how much less time lawn care would take if grass clippings were left on the lawn instead of being raked. You can have a low-maintenance landscape without losing the well-kept appearance of your home. Good management practices not only benefit the environment – they can save you time and money as well. Think of an environmentally sound landscape management program as a preventive process. Proper planning, monitoring and tailoring of plantings to local conditions will reduce the amount of pests present, thus reducing the amount of chemicals needed.

Designing an Environmentally Friendly Landscape

Planning a landscape is one of the most important aspects to producing an environmentally sensitive area. Two main components of producing an attractive landscape, while reducing the use of potentially harmful chemicals, are proper site preparation and plant selection. Both goals may be achieved through planning.

Planning tips

- Plant native sedges, rushes or grasses in and near the water to filter stormwater runoff.
- Minimize lawn throughout your property – particularly at the waterfront.
- Add native shrubs and ground cover especially at the top of a slope. Select ground cover instead of hard surfaces to absorb rainfall and reduce heat buildup.
- Position larger shrubs and trees for screening or privacy.
- Vary height and shape of trees to create framed views along the shoreline.
- Locate tall trees on the east and west side of the house to shade the roof and walls. On the north and west sides plant evergreens to block winter winds.
- Select mulch, stone or flagstones for paths. Build steps of timber or stone so as to divert rainfall into adjacent plantings.

What plants should I use?

Proper plant selection is an extremely important aspect to landscape development. Learn as much as you can about native species at your site and how they can fit into your overall design. Clear cutting of the site should be avoided if possible since this will remove those native species that can benefit your design. Soil erosion will also become a problem if plant material is not replaced quickly or exposed soil somehow protected.

*You can have a low-
maintenance landscape without
losing the well-kept appearance
of your home*

Site preparation

Find out all you can about your soil type, soil fertility, natural drainage, existing vegetation and any problem you may have with excess water and how it will flow off site. Soil testing would be a good idea at this point to acquire some important data.

The majority of turf and woody ornamentals planted in the home landscape need adequate drainage to produce quality growth without the use of pesticides. Healthy plants can withstand minor infestations of insects and disease and recover without introducing potentially harmful chemicals. To maintain healthy growth, eliminate all poorly drained areas by adding organic matter to the soil. This will allow water to percolate through the soil, reducing root problems.

Riparian buffers

Homeowners who live near Davis Canal or the Intracoastal Waterway are usually not aware that their actions toward landscape management may actually be harming aquatic life. Landscaping down to the water with inappropriate species increases riverbank erosion and potential for flood damage while decreasing the available habitat for wildlife and scenic views.

One way to avoid polluting our environment is to establish vegetated buffers on your property. The term riparian refers to areas of land along a stream, river, marsh or shoreline. In its natural state, this land has native plants growing on it, such as trees, shrubs and tall grasses.

*Buffers along water bodies
are easy to establish and
maintain if provided for at
the outset of construction*

These buffers offer a number of benefits to you, your property and the coastal environment. They reduce the amount of runoff that actually reaches a water body in addition to improving the quality of the runoff by removing pollutants. A vegetated buffer acts as a filter by reducing the amount of sediment reaching the water; by slowing the movement of stormwater runoff, and by allowing more time for sediment contained in the stormwater to settle out.

Vegetated buffers also reduce downstream flooding by slowing stormwater velocity, storing some water in soils, and allowing more water to percolate to the water table. Riparian buffers are also useful for flood zone management by keeping development back from the immediate banks of waterways and out of most floodways.

In addition, many animals either live in the riparian area or use the buffer as a travel corridor. Wildlife diversity within a buffer is linked to a buffer's size. For example, wider buffers support a greater variety and number of species. A continuous buffer is of particular value in protecting amphibians, waterfowl and coastal fish spawning and nursing areas.

Buffers can even minimize property destruction by maintaining some undeveloped land along waterways and by keeping developing areas away from floodwaters, storm surges and extreme high tides.

Managing Your Lawns, Gardens and Woody Ornamentals

Most homeowners want a well-kept home landscape with attractive flowers, woody plants and a green lawn. Normal usage of lawn and garden-care products, when applied as recommended, generally poses few problems. A properly maintained home landscape, in fact, can help reduce soil erosion, increase water retention and improve soil fertility. Poor maintenance – either through neglect or excessive chemical use – can lead to soil problems and polluted runoff.

Has your soil been tested?

Adding fertilizer without first testing your soil is like taking medicine without knowing if you need it. It is important to find out how much of each nutrient is present along with the soil's natural pH. Soil testing takes the guesswork out of how much fertilizer to use.

Fertilizers

If you apply fertilizer at the wrong time, or in the wrong amount, you may make conditions in your landscape worse. Insect and disease problems can actually increase due to excess fertilizer applications. Excess fertilizer is likely to wash away before plants take it up. This lost fertilizer can move offsite in runoff water and contribute to unwanted plant and algae growth in Davis Canal and the Intracoastal Waterway. Especially in sandy soils, nitrogen and other chemicals can seep downward and enter groundwater used for drinking. On clay soils, water will have a tendency to runoff the site carrying excess nutrients with it.

What those numbers on fertilizer bags mean

The numbers on a fertilizer bag – from left to right – give the percent by weight of nitrogen, phosphate and potash. For example, in a 10-4-6 fertilizer, nitrogen makes up 10 percent of the total weight of fertilizer, phosphorus accounts for 4 percent, and potassium makes up 6 percent. The remaining weight of fertilizer (the total must add up to 100 percent) is comprised of a nutrient carrier material.

Fertilizing near coastal water bodies

Pesticides and fertilizers applied to landscape plants and turf can cause pollution problems to nearby aquatic environments if applied improperly. Most current landscape designs have cultivated turf or open areas directly adjacent to the water's edge. Not only does this cause a problem in water movement off the landscape but also can cause problems with pesticide and fertilization application near these sensitive areas. If natural or designed buffers are not feasible on your site, use extreme caution when applying chemicals and fertilizers in this area.

Make sure all application equipment is well-calibrated. Thoroughly research the specific problem you have and apply a chemical remedy only as a last resort. If it is determined that a chemical is needed, read all label directions as to the aquatic hazards of the chemical to be applied.

Too much fertilizer can be harmful to the lawn, burn roots on plants and may also lead to water contamination through runoff or leaching of nutrients.

Taking Care of Your Lawn

Cut your grass to the proper height

Mow your lawn regularly. A good rule of thumb is to remove no more than one-third of the grass height at any one mowing. Cutting off more than one-third at one time can stop the roots from growing and would require frequent watering during dry summers to keep the plants alive. Also, following the one-third rule will produce smaller clippings that will disappear quickly by filtering down to the soil surface.

Mow with a sharp blade. Sharp blades cut the grass cleanly, which ensures rapid healing and regrowth.

Recycle your grass clippings

In the early 1950's, the first bagging mowers made their debut in American lawns. Somehow collecting and removing grass clippings and sending them to landfills caught on. Bagging clippings became an established ritual across the country, accounting for 20 to 50 percent of the solid waste entering landfills between the months of March and September.

Recycling your grass clippings makes up part of a lawn care plan designed to produce a healthy lawn with savings in time, energy and money. At the same time, this lawn care plan will benefit your community and the environment. Grass clippings should be left on the lawn – in many cases, they supply enough natural fertilizer so that only minimal additional fertilizer is needed to keep your lawn green and healthy. Grass clippings contain nitrogen, phosphorus, potassium and smaller amounts of other essential plant nutrients – basically a 4-1-3 fertilizer. When left on the lawn, these nutrients are eventually returned to the soil. Clippings should be swept off of paved surfaces so they aren't carried away by stormwater.

Do your yard care practices save water?

The average American uses approximately 200 gallons of water each day. About half of that water may be used for landscaping and gardening, depending on climate, time of year and plant species in the landscape. This is an immense amount of clean water – and only a small portion is actually used by your plants. If you convert your landscape plants to ones adapted to

your region and climate, you will take the biggest step in conserving water and reducing the amount of pollutants moving offsite into the environment.

In places with dry climates, there are many plants that are drought-tolerant. Consider using drought-resistant turf grass species like Bermuda grass. Perennial flowers conserve water because their roots grow deeper than annual plants and require little or no watering once established. A shallow mulch (about 2 inches deep) of wood or bark chips over bare soil will reduce stormwater runoff and keep water from evaporating.

Water wisely

Because most plants can tolerate at least short dry periods, watering should be timed to meet the biological needs of plants. Watering slowly and deeply helps develop strong roots and in the long run, your plants will need less frequent watering. The plants that seem to benefit most from shallow watering are the ones you don't want – weeds!

Remember that plants can absorb only so much water. **Over-watering wastes water, can injure certain plants and lead to runoff carrying hazardous fertilizers and pesticides.**

If you irrigate your lawn, water early in the morning for efficient water use and to discourage the development and spread of diseases. During the driest part of the year, (April – September) plants and soil lose about 1.5 inches of water every 7 days. Therefore, our lawns require about an inch of water every 5-7 days.

Aerate your lawn regularly

Physically removing cores of soil and leaving holes in the lawn is called core aeration. Aeration loosens compacted soil and improves your lawn's growing conditions by making air, water and nutrients available to the grass roots. It also creates ideal conditions for the growth of earthworms and microorganisms that break down clippings and thatch.

Are you applying pesticides wisely?

Although removing weeds, insects and other pests by hand is safest for the environment and your health, pesticides, if properly used, may pose only a

minimal risk. The key is doing your homework before you start treatment. Correctly identifying the pest is the first step. **Many plant problems are not caused by insects or disease but are related to temperature extremes, waterlogging, drought, damage caused by lawn mowers or an overuse of chemicals.**

Learn when and where pesticides may be needed to control problems. Apply them only where pests occur. Select chemicals that are the least toxic or that break down quickly into less harmful substances. Remember to read the pesticide label carefully and follow the directions for application rates and methods.

Pest prevention is often simpler (and cheaper) than pest removal. If you have disease-resistant grasses or other plants and keep them healthy, pests will be less of a problem. Be sure to ask yourself, for the sake of clean groundwater and an environment with fewer chemical pollutants, if you can tolerate a few more weeds and “bugs” around your home.

The Oak Island Stormwater Advisory Board

PRESENTS

On The Water: Caring for Your Boat and Dock

Recreational boating provides relaxation and enjoyment for thousands of residents. With so many enthusiasts enjoying our shorelines, boat and personal watercraft owners play a major role in water quality along the coast. By understanding the potential impacts of boating practices, you can ensure that the coastal waters we all depend on will not be damaged.

What are the environmental concerns?

Boating and marine-related activities can have a profound effect on local environmental quality. While individual boats usually release only small amounts of pollutants, when multiplied by thousands of boaters, docks and marinas, these pollutants can cause measurable water quality problems in coastal waters.

Products used to wash boat hulls and decks often contain toxic ingredients such as chlorine, phosphates and ammonia. Likewise, wood preservatives, stains, antifouling paints and strippers are used regularly without regard to potential environmental hazards. Individuals often clean or repair their boats in driveways, streets and parking lots where there is no drainage control and contaminated discharge enters storm drains and ditches, which typically lead directly to local surface water bodies.

Another problem occurs when exotic plant and animal life such as hydrilla, water hyacinth or zebra mussels become attached to boats and trailers and are accidentally introduced into waterways. Once established, exotics can spread quickly and are difficult and expensive to control. These uninvited guests degrade water quality and fish and wildlife habitat by out competing valued native species and by blocking out light needed by underwater plants.

The physical alteration of shoreline, wetlands and aquatic habitat during the construction of a private dock can be considerable. If docks are improperly sited or built, there can be significant erosion problems as a result of lost or destroyed vegetation. In addition, the pilings and decking are often made of lumber that is treated with pesticides and other preservatives. While this wood material is largely safe if treated properly, it should still be handled and disposed of with caution.

Boat Cleaning and Maintenance

Most boat owners want a clean and healthy environment in which to enjoy the full recreational potential of our coastal waters. Preventing pollution can be as simple as using good maintenance practices and less caustic or toxic products.

Washing the Hull and Deck

Many of the products that we use every day in our homes are perfectly safe in that environment. On our boats however, where cleaners can be discharged directly into the water without any treatment, the same products can be lethal to marine life.

Grease-cutting detergents, scouring powders and bleaches clean very well, but these products are toxic to marine organisms and threaten water quality. Fortunately, there are many alternative products and practices designed specifically for boaters that are less harmful.

To lessen the impact of cleaning your boat, scrub and rinse the deck and hull with fresh water after every trip. Remember, the safest cleaning product available is good, old-fashioned elbow grease! Use a non-abrasive sponge and don't give that sea salt a chance to build up and corrode important components.

Use cleaning agents conservatively rather than dousing the deck with soap. Apply small amounts with a cloth and wipe it up rather than hosing it off after each application. When you need a hose, use a squeeze nozzle that shuts off when released to conserve water and minimize runoff.

Always think about where you are going to clean your boat. Is it wise to clean it off beside the boat ramp? How about in your driveway or the street?

Don't forget that runoff in both cases will find its way directly into a nearby surface water body. If possible, park your trailer in the grass or other permeable area where excess water will have a chance to seep into the ground and be filtered by the soil.

Engine Maintenance

Maintaining your outboard or inboard engine can pose some special problems, mostly due to the materials involved, such as oil, grease, transmission fluid and antifreeze. **Oil can be a particular problem, since a single quart, when spilled, can pollute an area of up to 2 acres, equivalent to nearly three football fields of water surface.**

Performing routine maintenance will improve boat and engine operation while protecting the environment. The basic rule to follow is to keep your engine well-tuned. It will use fuel more efficiently, reduce fuel consumption and last longer. It will also discharge fewer pollutants into coastal waters.

Spill Prevention and Waste Disposal

Large spills account for only 10% of all the oil that ends up in the water each year. The other 90% comes from polluted urban runoff and other nonpoint sources, such as improperly disposed used oil, bilge water, outboard motors and careless fueling habits.

Likewise, disposal of waste is a serious issue. Human sewage discharged from boats can contain disease-causing organisms that harm marine animals and plants. Plastics and trash are often mistaken for food by marine life resulting in starvation or poisoning.

Fueling your boat

Most recreational boaters fuel their boats on the back of their trailers at a local gas station. Since there is no surface water under the boat and there are safeguards in place to minimize the impacts of small spills, the risk of environmental damage is minor.

Disposal of waste is a serious issue. Human sewage discharged from boats can contain disease-causing organisms that harm marine animals and plants.

In the water, however, filling the fuel tank often means waiting for the gas to spurt out the overflow vent. It doesn't take a genius to figure out where the extra fuel is going.

Following a few simple steps will go a long way toward eliminating this common problem:

- Never leave the fuel nozzle unattended. While fueling your boat, never leave the hose unattended.
- Don't overfill your tank. Know your tank's capacity and learn to gauge the amount of fuel you need.
- Fill slowly. Many marine filling stations are not equipped with nozzles that automatically shut off with backpressure. By slowing down, you can prevent that accidental spill and still top off your tanks.
- Keep absorbent pads handy when fueling. Wipe up any accidental spills immediately, whether they occur at the vent outlet or the nozzle. Dispose of the soiled rags properly by giving them to the marine operator or placing them in a sealed container.
- Consider installing an in-line fuel/air separator. They prevent the fuel from escaping out the vent hole, while letting the air in.

Bilge water

Nearly all boaters have encountered an oily sheen in their bilge water. Oil leaks from numerous lubricated parts of an engine and mixes with water entering the bilge.

How do we dispose of this polluted water? The best advice involves prevention. Fix those small leaks that allow oil to drip into the bilge. Take a

few minutes before you change the oil to ensure the proper capture and cleanup of all the fluids. Always keep an aluminum or plastic tray in the bilge as a containment device.

Once oil has seeped into the bilge, use oil-absorbent pads to capture the surface oil before pumping the water over.

Under no circumstances should you ever add liquid detergents to bilge water. These chemicals only disperse the oil and can foul bilge pumps and absorbent pads. In addition, the U.S. Coast Guard can fine you for up to \$25,000 for those few squirts of soap if you pump the treated water overboard.

Head sewage

Probably no issue draws the attention of regulatory agencies and environmental groups to boaters more quickly than the illegal dumping of raw sewage. The untreated sewage discharge from a single weekend boater can put the same amount of bacterial pollution into the water as does sewage from 10,000 people whose waste has passed through a municipal treatment facility.

Coastal boaters should attempt to achieve zero discharge of all sewage into recreational waters. While on the boat, human waste should be contained in a U.S. Coast Guard approved marine sanitation device (MSD). Upon returning to shore, portable toilets should be emptied into approved shoreside waste handling facilities, and MSDs should be discharged into approved pumpout stations.

Plastics and trash

Today, most folks would not consider throwing their trash – plastic, nets, fishing line, six-pack rings, Styrofoam and so forth – overboard. Yet every year, debris like this finds its way into our coastal waters.

Often unintentionally, boaters contribute to the problem. Empty ice bags and six-pack rings are blown out of the boat. Fishing line is too tangled to save so it gets tossed into the water. Cigarette butts are often not considered trash, and casually flicked overboard.

The following recommendations are pretty straightforward:

- Be careful. Accidents and spills happen even when you have the best of intentions.
- Leave as much plastic ashore as is reasonably possible. That way there is no chance of it falling overboard.
- Carry a trash bag. If you put all of your trash in one place, it's easy to contain and dispose of when you get back to shore.
- Recycle where possible. Deposit your glass, aluminum, plastic and newspapers in appropriately marked containers at marinas or other recycling centers.

Fish wastes

When you've had a great day out catching fish, do you ever give any thought to where and how you clean them? You should!

The amount of fish waste (heads, scales and guts) disposed into an enclosed basin, like Davis Canal, can exceed what would exist naturally in the water. In small quantities, this fish waste is fed upon by such scavenging organisms as crabs or catfish, and is not a problem.

However, in large amounts where water circulation is restricted, decomposition of this fish waste can significantly affect the water quality by lowering the dissolved oxygen levels and even spreading disease among native fish populations. This can be a problem in marinas or near boat landings where fish are cleaned and water is not flushed adequately.

Cleaning and gutting fish at a fish-cleaning station with trash receptacles and wastewater hookups easily solves any potential problems. If one of these stations is not convenient, bag your fish waste and throw it away with your other household garbage.

Dock Maintenance

To many people who own or take care of docks it seems like repair and maintenance is an annual chore. Although pressure-treated wood resists insects and decay, it's still vulnerable to moisture and the sun's rays.

While nailing loose deck boards, replacing rusted or worn framing bolts and fasteners, and inspecting electrical or water lines are all necessary practices, we are going to focus on the maintenance of the wood itself.

Before you go out and purchase any cleaning products, remember that **a hard bristle brush with a long handle (to save your back), a bucket of salt water and an afternoon of elbow grease will often clean your dock as well or better than commercial products.** In addition, you have the added benefit of knowing that if you tipped your bucket over, no harmful chemicals would spill into the water around your dock!

Before you use any of these products, ALWAYS read the label before you begin. Many oil-based wood maintenance products are very harmful to water quality if they are spilled or applied improperly.

The following tips will help you properly apply wood-care products to your dock:

- Remove all loose dirt and debris before you apply wood-care products.
- Try to work on a day with light or no wind.
- Always use a tarp or ground cloth under your project to help prevent drips and spills.
- Use a brush or roller when applying sealer to minimize dripping. Don't use a sprayer because the excess will find its way into the water around your dock.
- Use as little of the product as it takes to completely cover the decking, avoiding drips
- Rinse and clean tools in the yard, well away from surface water.

Prepared by the Town of Oak Island Stormwater Advisory Board

Acknowledgement

**South Carolina Coast-A-Syst, An Environmental Risk-Assessment
Guide for Protecting Coastal Water Quality**

References

**The Oak Island Stormwater Ordinance
The Oak Island Illicit Stormwater Discharge Ordinance
The Oak Island Vegetation Ordinance**

The preparation of this document was financed in part through a grant provided by the North Carolina Coastal Management Program, through funds provided by the Coastal Zone Management Act of 1972, as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.