

Waterfront Property Owners Guide

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION



W A T E R F R O N T P R O P E R T Y O W N E R S G U I D E



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

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FOREWORD & ACKNOWLEDGEMENTS

This document is the result of many individual efforts to update “The Waterfront Property Owner’s Guide” that was initially published in November 1979 by the East Central Florida Regional Planning Council.

The original version of the Guide, for which there is still a strong demand, served the citizen’s of Florida very well for more than two decades. We would be thrilled if this publication endured the test of time nearly as well and are thankful to those who came before us for leaving a solid foundation of science and common sense to build upon. Eric Livingston, who first saw the need to update the Guide, is acknowledged for his vision and support of the project, and editorial reviews of dozens of drafts. Mike Scheinkman created the document through the selection and use of parts of the former Guide as well as other sources of public and contributed information. He then rearranged and rewrote almost everything until the material eventually made sense as a whole and became pleasant to read. Kimberly Jackson and Devan Branscum revived the project on several occasions when it was mired in technical difficulties by providing modern computer skills, training and technical support, and are greatly deserving of recognition. Also within the Department, suggestions, materials and assistance were

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We apologize if we have failed to mention anyone who enabled this new version of The Waterfront Property Owners Guide to be produced and hope that we inspire and encourage all Florida residents to be active in caring for our state’s aquatic resources. Your efforts can make a difference!



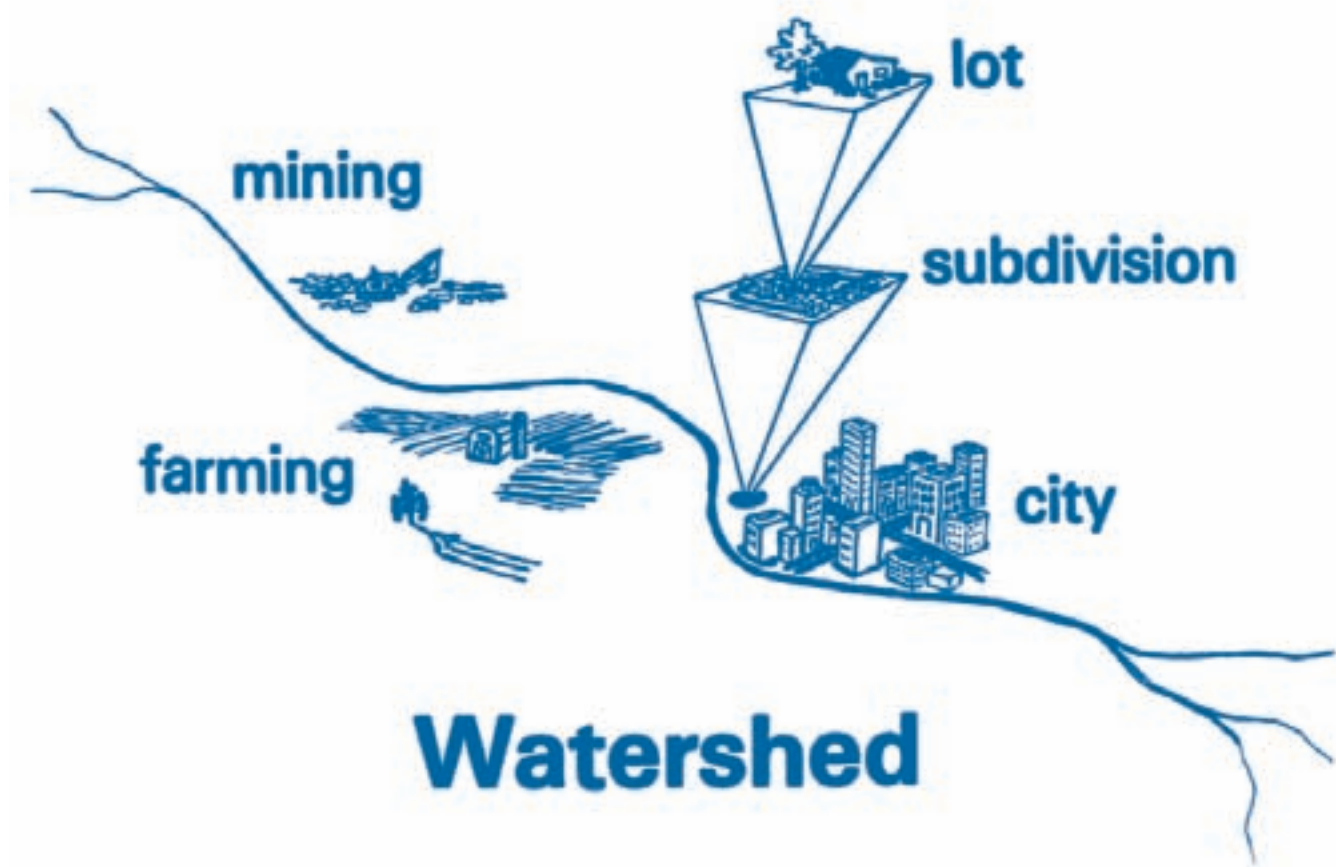
INTRODUCTION

This Waterfront Property Owner's Guide was prepared to educate and broaden awareness on the causes, effects and prevention of water pollution. This publication is directed toward waterfront property owners. Why? Because they:

- typically are the most affected if water quality problems occur,
- can have a tremendous influence on whether water quality problems occur, and
- need to be aware of the many tools that can be used to solve these problems.

Many of the ideas in this booklet are relevant to all Floridians and even non-residents and visitors. We have focused on everyday activities that can affect the quality of our lakes, streams and other waterbodies. Clean water is essential to all forms of life. By setting a good example and convincing your neighbors to follow the tips contained in this Guide, you can help to assure that the quality of your valuable aquatic resources are protected or enhanced.

Regardless of where you live in Florida, a waterbody is not far away. In fact, each piece of property is part of a watershed, which is the total land area that drains to a waterbody. As a consequence, we all live downstream, and we all share responsibility for keeping our waterbodies healthy.



CITIZEN ACTION - GETTING INVOLVED

Governmental agencies receive many calls daily about water quality. A typical caller might ask, "When will someone be out here to clean up my lake?" No one can offer simple, quick and cheap solutions to our environmental problems. Government alone cannot develop, fund and implement them.

Instead, solving water quality problems depends largely on citizens taking collective responsibility for their actions. After reading this Guide, it should become apparent that we are all contributing to degraded water quality conditions. Pollution from our homes, businesses, roads and farms is washed into the state's waters by rain or irrigation water. This is known as "nonpoint source" pollution because it is diffuse and, unlike "point sources", doesn't always enter a waterbody from a pipe. Unlike many other types of pollution, WE cause this pollution and WE can stop it. That is why nonpoint source pollution is also called POINTLESS PERSONAL POLLUTION. How can we reduce pointless personal pollution? A few ways we can help are listed below. Others are mentioned throughout this guide.

- Shop wisely - Buy products labeled biodegradable, non-toxic, or water soluble. They readily decompose and will not pollute surface or ground waters.
- Store Products Safely - Keep toxic products in original containers, closed and clearly marked to prevent spillage or misuse.
- Maintain septic systems - Inspect them every two or three years and pump out as needed. Avoid using strong chemicals in the household. When rinsed down the drain, they destroy the bacteria that treat the wastes in your system. The result is more pollution in your waterbody.

- Connect all Wastewater Discharges to the Sewer Line or Septic Tank System - Check your washing machine and sink drainage outfall location. These discharges should be hooked into your sewer or septic tank system instead of being discharged onto your property. This is important because stormwater runoff will pick up these impurities and transport them into the water. Odor and sanitation problems have also been reported as a result of improper wastewater disposal.
- Service Your Car Regularly - Frequent inspections and maintenance prevent leakage of motor oil, antifreeze and other fluids that can end up in your waterbody. Take used motor oil and antifreeze to a recycling center.
- Maintain Your Housing Development's Stormwater System - Stormwater management systems must be maintained to continue operating properly. Property owner associations usually are legally responsible for this maintenance. Unfortunately, they are often unprepared for this task. Groups such as Adopt-a-Pond (based in Hillsborough County) can help you develop a strategy for operating and maintaining your facilities. Determine who is available to help in your area and seek their advice.



Citizen involvement is an essential part of solving water quality problems. The interest in caring for Florida's environment has prospered primarily due to the efforts of concerned citizens. Unpaid and unsung individuals who form groups can use the momentum of numbers to accomplish much. Such groups have initiated new governmental programs, reformed old ones, and even restored their own lakes. They have gone to court to secure enforce-



Residents aquascaping their wet detention pond.

ment of conservation laws and have intervened in support of agencies trying to implement them. Find out who is already environmentally active in your community or start a group to meet specific needs.

When was the last time you spent an hour or two at a county or city commission meeting or workshop? This opportunity is one of the rights our forefathers fought so desperately to attain. You can have a voice in what goes



on in your waterbody, watershed or community. However, the choice between taking an active part or ignoring the issues is your own.

We hope water quality will become an important concern of yours. If so, collect information to find out about your watershed and waterbody. Become aware of the various groups that may be active in your area. Find out what laws or governmental programs affect land and water management in your watershed. Attend and participate in public meetings. Write your elected officials and contact your local stormwater or water resource management staff. Add your name to interested persons mailing lists and become an active participant in your watershed. Remember, if we each do a little, we can do a lot to ensure clean water in Florida's rivers, lakes and estuaries. Be part of the solution to pointless personal pollution. You can do some of these things today to ensure cleaner water tomorrow. It's your right, your responsibility, and part of the legacy you will leave for future generations.

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WHAT IS WATER POLLUTION?



Every river, lake, and estuary goes through an aging process, called eutrophication, whereby it eventually becomes dry land. Gradually, the waterbody changes into a marsh, then a swamp, and finally uplands. The eutrophication process occurs naturally over hundreds of thousands of years but it may be greatly accelerated by the activities of humans. This is called cultural eutrophication, which is a very common type of water pollution.

Eutrophic means well nourished. Lots of nutrients stimulate the growth of plants and algae. The most abundant nutrients are nitrogen and phosphorus. Minor nutrients include sulfur, manganese, iron, and others. Nutrients are contained in fertilizers, pet wastes, leaves, dust, debris, and detergent, just to name a few sources. If your waterbody is too well nourished, it may become hyper-eutrophic and fill in from the accumulation of plants, dead plankton, and sediments.

The growth of an alga or plant bloom is often a rapid and dramatic phenomenon. A bloom may cause lots of oxygen to be produced in the daytime as a result of photosynthesis. However, at night the algae use oxygen, leading to a depletion of oxygen.

These swings from high to low oxygen content are too much for many species to survive.

The organisms that can survive are pollution tolerant species such as shad, gar, and catfish, which are usually considered less desirable. Game fish such as bass, bluegills, and speckled perch are usually among the first to disappear because they need high quality habitat. Some algae blooms also release substances that are extremely toxic to fish, domestic animals, and birds.

Nutrients are not the only pollutants that affect our waterbodies. Sediments from dirt roads, construction sites, and other erodible areas cause turbidity or cloudiness in the water. This can block out sunlight that is needed for aquatic plants to grow properly. Sediment can also clog the gills of fishes and



blanket the bottom of waterbodies with a layer of silt, causing many beneficial organisms a lot of problems. Toxic substances, such as heavy metals, hydrocarbons, and pesticides, can also cause big problems. Let's take a look at where these pollutants come from and what we can do to help keep them out of our waterbodies.



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SOURCES OF POLLUTANTS

POINT SOURCES

Years ago, domestic and industrial wastewater effluent were the major sources of pollutants to many lakes and streams. Additionally, most household laundry detergents contained large amounts of phosphorus. Modification of our wastewater treatment plants has eliminated most point source discharge of nutrients to Florida waters, and phosphorus is no longer contained in most detergents used in Florida. Therefore, while Florida still has about 1,100 discharging point sources, they are no longer the main source of pollution being discharged to our surface waters.



people are familiar with nonpoint source pollution, it is easy for them to see how everyday activities, such as the misuse of common household lawn and garden products, can adversely affect a waterbody. Unfortunately, these products don't always stay where we put them on our lawns and around our plants. As little as one-half inch of rainfall can generate runoff that may transport pollutants from these sources to your waterbody.

STORMWATER RUNOFF

As an area is urbanized, the construction of streets, sidewalks, parking lots, and buildings (including our homes) disturbs natural vegetation, as well as covers and compacts the soil. The land surface becomes more impervious, which prevents rainfall from soaking into the ground as before. This increases the volume and speed of runoff. Historically, we have been concerned with diverting runoff from developed areas as quickly as possible to minimize flooding of our homes, businesses and property. To do this,

we built highly efficient drainage systems consisting of pipes or ditches that convey the runoff quickly to the nearest waterbody.

Unfortunately, to solve the flooding problem, we unwittingly created another problem – pollution of our waterbodies. Stormwater runoff picks up leaves, litter, heavy metals, pesticides, fertilizers, oils, greases and other substances left behind by our everyday activities.

NONPOINT SOURCES

Nonpoint sources of pollution include agriculture, silviculture, mining, urbanization, construction sites, landfills, septic tanks, and, in general, all human activities. Together these contribute the majority of the sediments, nutrients, pesticides, heavy metals, oils, greases, and other contaminants to our water resources. As any waterfront property owner can attest, the associated symptoms of turbidity, algae and plant blooms, fish kills, odor, and unsightliness are undesirable. Once



HOW “YOU” CAN HELP

STORMWATER MANAGEMENT

Since 1982, all stormwater systems in Florida have included features to treat and remove much of the pollution. However, older “drainage systems” continue to discharge stormwater pollutants directly into our waterbodies. Retrofitting these drainage systems to reduce pollutant loads is very difficult and expensive, but it can and is being done in many places. The following principles, which are discussed in the DEP booklet “Stormwater Management - A Guide for Floridians”, should influence your stormwater management efforts:

- It is much easier and cheaper to prevent problems than to correct them later. Good site planning is the first and perhaps most important step. Low impact design principles should be followed, especially minimizing impervious surface and avoiding removal of vegetation.
- Every piece of land is part of a larger watershed. We all live downstream!
- The stormwater management system should mimic (and use) the features and functions of the natural environment that are largely capital, energy and maintenance free.
- Attempt to approximate pre-development conditions for volume, rate, timing and pollutant load from your property.
- Maximize on-site storage of stormwater and never discharge directly to surface or ground water.



- Begin designing your system at the outfall to a waterbody and work uphill.

BEST MANAGEMENT PRACTICES (BMPs)

BMPs are the actual methods that are used to reduce stormwater pollution. BMPs are classified into two broad categories – Nonstructural and Structural. Nonstructural controls are preventive measures. They include good land use and site

planning, minimizing impervious area, good house-keeping techniques, street sweeping, storm drain stenciling, and landscape suggestions described in the section ahead on Florida Yards and Neighborhoods.

Nonstructural BMPs help by eliminating or limiting the generation of runoff and of pollutants at the source. They are considered the first line of defense and are the easiest to do.

Structural controls, on the other

hand, are what we typically think of when stormwater management is mentioned. They include facilities such as detention ponds, retention basins, ex-filtration trenches, pervious paving and filters. Most structural BMPs are costly, require a considerable amount of engineering to implement, and must be maintained regularly. Please refer to Chapter 6 of FDEP's [Florida Land Development Manual A Guide to Sound Land and Water Management](#) if you are interested in learning more about BMPs. A copy may be obtained by calling the Nonpoint Source Management Section at (850) 245-7508.

STORMWATER BMPs FOR HOMEOWNERS

Several stormwater BMPs can be built and used by individual property owners. These include the following:



- Direct **DOWN SPOUTS** from rain gutters to your lawn or flower bed rather than your driveway. This will prevent water from draining directly to a storm sewer and your favorite waterbody.



- Another good choice is to set up a rain barrel or **CISTERN** to capture your roof runoff and use it to irrigate your yard.

- Use **POROUS PAVING** blocks or other pervious material such as rock or shell for patios, driveways and pathways so rain may soak into these areas rather than run off your property.



- Establish a **VEGETATED BUFFER** between your property and the water as a final filter for runoff. This “riparian” vegetation helps reduce pollutants in surface and ground waters flowing into a waterbody.
- **RESHAPE OR CONTOUR** your property to reduce slopes and provide areas where water can pond temporarily and soak into the ground. Include these areas within your overall landscaping plan.



- If your property is steeply sloped, then the pollution potential is greater. Stormwater runoff cascading down a steep yard with almost no deterrents usually causes erosion. **TERRACING** your yard can help slow down the water, minimizing the potential for erosion. This in turn can help reduce nutrient loading and turbidity problems for downstream waterbodies. It can provide other benefits too. Terracing can create dramatic views and broaden your yard's usage. For example, one tier could be used as a patio; a second could be reserved for gardens with an open grassy space for volleyball or other types of recreation. The last tier, which would probably meet the water's edge, could incorporate a swale and berm system and some beneficial shoreline vegetation. Clover is ideal for ground cover near the water. It doesn't need mowing or fertilizers. Avoid the temptation to establish an artificial sandy beach. It provides very little habitat value compared to more naturally vegetated shorelines.

WATERSHED SCALE STORMWATER BMPs FOR COMMUNITIES AND NEIGHBORHOODS

Some stormwater BMPs are more appropriate for communities or neighborhoods to implement rather than individual homeowners, because they involve the storage or redirecting of larger amounts of runoff. This requires more planning and reaching consensus with neighbors to ensure success. These watershed scale BMPs include:

SWALES AND BERMS

Like ditches, swales collect stormwater. Unlike ditches, swales are not deep with straight sides. Swales have gently sloping sides, are wider than they are deep, and are vegetated. Side slopes should be a minimum of 3 feet horizontally to 1 foot vertically. These dimensions spread rainwater over a broad area, which slows it down, allowing temporary ponding. This design also makes it easier to mow and periodically remove trash and other debris. Swales are meant to hold water only during or shortly after a storm. Swale blocks or raised driveway culverts can be used to further promote ponding and infiltration, particularly when the swale has a steep angle. Swale blocks can be made of soil, wood or concrete.

Swales are often used alongside streets, but they also may be incorporated elsewhere in the landscape, such as in your own front or back yard to improve stormwater quality. They are particularly useful as a final buffer near the edge of a waterbody to prevent the direct discharge of runoff.

Proper placement of a swale and berm system can slow down and provide treatment of stormwater runoff to our waterbodies. The swale catches the flow, which is then held back by the berm. Impurities sink to the bottom



and the cleaner water on the surface spills over the berm when the swale becomes full. Slowly, the stormwater in the swale evaporates or percolates through the soil. This helps to clean the stormwater runoff before it seeps to a nearby waterbody.

Swales and berms can be built with such gentle slopes and contours that they can be safely used in playgrounds. Thus, a playground or your yard is a perfect location for them because these areas are not often used during wet and rainy days. A Seminole County development has encircled a lake with a swale and berm system where it doubles as a jogging trail. The various uses of swales are an excellent example of how stormwater abatement techniques can serve multiple purposes.





RETENTION BASINS OR AREAS

If you live in an area with sandy soils or where the water table is well beneath the ground's surface, you can create retention or infiltration areas. These are simply small depressions in your landscape where the water can pond for a short time before soaking

into the ground or evaporating. These areas can be planted with appropriate native vegetation that help to maintain soil permeability, filter runoff, and use nutrients. These types of landscaped retention areas are also called "bioretention" practices.

DETENTION PONDS

If you live in an area where the water table is near the ground surface, a wet detention pond may be the right BMP for managing your stormwater. Wet ponds are not often used on residential lots, but if your property has a natural contour that forces water to drain into one or two locations, a pond may be a good

BMP. However, a berm and swale system would be less expensive and easier to install. Detention ponds typically are used to serve large areas, such as subdivisions or shopping centers. Depending on the characteristics of your subdivision (topography, drainage and soils) and development plans, your neighborhood may have one wet detention pond or several ponds located in different areas.





Removal of pet wastes by property owners can be extremely beneficial.

Another common pet related problem occurs when home owners wash their animals in a lake or stream. Many of the products used, such as flea and tick shampoos or sprays, are toxic to aquatic life. Bathe your pets on uplands, which can absorb the rinse water.

There is little a citizen can do about the waste contributed by wildlife with one notable exception. Ducks! Many species of ducks are fond of feeding on flowers, particularly roses. Their excrement is often left behind to mark their territory which results in spotted lawns as well as polluted waterbodies. Avoid planting flowery ornamentals such as roses near waterbodies.

Serious water quality problems can occur when septic tank and drainfield systems are located too near a waterbody. Untreated or improperly treated sewage may reach the water. Unfiltered sewage that reaches surface water causes odor problems, increases nutrients, and is a source of disease. Ground water can also be contaminated if septic tank systems are located near wells or in high water table areas. Waterfront homeowners should connect to the public wastewater treatment system whenever it is possible.

When an onsite disposal system is needed, waterfront property owners should consider more specialized onsite wastewater systems such as aerobic units. Although more expensive and maintenance intensive, aerobic units provide a much higher quality effluent. This means less nutrients to affect your waterbody. Aerobic units can be grouped together for commercial applica-



tions or they can be incorporated into a residential landscape quite nicely, as shown in the photo below, where the green lid is barely visible.



When a septic tank is the only available option, homeowners should become familiar with the health regulations, permitting, and maintenance requirements associated with them. You also need to know when your septic tank was installed, how big it is, where the tank and drainfield are located, and when it was last inspected or pumped out. Agencies that can furnish information concerning septic tank systems include:

1. Local County Health Department
2. City and County Planning Departments
3. Agricultural Extension Agents
4. USDA Natural Resources Conservation Service

Soil permeability is an important characteristic that determines how well septic tanks may work. Soil permeability is the trait that allows water and air to move through the ground. It is influenced by the amount of gravel, sand, silt, and clay in the soil. Water moves faster through sand and gravel soils than through clay soils. If your soil is either too permeable or not permeable enough, problems may occur from septic tanks.

Construction of a septic tank system on steep slopes near a waterbody should be avoided. Slopes of less than 15% are preferred provided the soils are satisfactory. Ideally, a septic system should slope away from the waterbody.

The sludge in a septic tank is actually an active microbe solution that converts waste products into carbon and energy. Solid by-products of this process settle to the

bottom of the tank and the liquids spill over to a drainfield that provides final polishing before seeping into the ground water. Do not pour household chemicals such as bleach or other cleansers down drains or the microbes that are working in the septic tank may die and the system will fail. Laundry should be washed throughout the week rather than all at one time to avoid overloading the system on wash day.

Septic tanks should be inspected every two or three years, and be pumped out as needed to prevent the buildup of solids that can spill over into the drainfield when the tank's storage capacity is used up. If the drainfield becomes clogged, expensive repairs will be needed to restore the system to proper operating condition. Some distributors promote the use of various products such as seed bacteria to start or restart a tank's microbe population, or food to maintain the microbes. These are not usually necessary. A sufficient supply of microbes and food are inherent in the waste the tank accepts. However, precautions should be taken to keep the drainfield free from the roots of nearby trees. If it cannot be located away from problem trees, then Root-Out, Root-Be-Gone or some similar product should be considered and used properly if chosen.



MOTOR BOATS

Small incremental discharges of petroleum products associated with boating contribute 137 million gallons of oil pollution to waterways worldwide every year, according to NASA, which can add up to significant water quality impacts. Algae and small organisms that live in water bodies can be killed immediately by a fuel or oil spill. Even if they should survive the spill, it is possible for the effects to bioaccumulate, harming bigger fish and even people and wildlife that eat them. Spills most often occur during the fueling and maintenance of engines and boats. They can be prevented through common sense and knowledge.

FUELING



- Portable fuel containers should be removed from the boat and filled over land or above a dockside containment system. Use the correct ratio of fuel to oil for two cycle outboard engines (usually 50:1). A mix that is too rich results in unburned oil being discharged into the water.



- Personal watercraft should be driven onto stationary skids to prevent rocking and to keep the vessel level while refueling.

- Vent Guards should be installed beneath air vent/overflow systems for inboard fuel tanks to prevent accidental releases.



- Oil absorbing materials should be used in the bilge of all boats with inboard engines to collect drips and leaks. These should be examined at least once per year and replaced as needed.



- If you trailer your boat, don't remove the drain plug while on the ramp as shown in the photo below. The fouled bilge water will pollute the waterbody you just finished enjoying. Instead, move your boat away from the ramp, preferably onto a grassy area well away from the water before pulling the plug.



MAINTENANCE

- Proper maintenance of motor boats and engines is an important factor in maintaining good water quality. Motor boats are prone to leaking oil and gas. If your boat or motor leaks, **FIX IT!** Keep your engine tuned so that fuel/oil mixtures are completely burned.



- Painting projects and other major repairs should be performed over land away from the water. If a boat must be roll or brush painted or fiberglassed while on the water, use care to avoid drips or spills. Spray painting over water should be avoided entirely. Ideally, the work area should be shrouded to prevent wind drift when spray painting as shown in the photo above.



Boat Waste Management

Properly dispose of used oil, oil filters, and fuel filters at an authorized collection center or landfill. Don't toss them in the dumpster at the boat ramp. Contact



your local DEP office for information regarding local companies that provide this service. Transmission and hydraulic fluid can be mixed with used oil for recycling. Simple carelessness about trash is another concern. Turtles, birds, fish and other critters can become entangled in or choke on monofilament fishing line, six-pack rings, bottle caps, sandwich bags, and other items that are frequently used on a boat. Your favorite waterbody will quickly lose its appeal if you toss your trash overboard. Remember, we are visitors on the water but fish and other wildlife live there. Observe one simple courtesy, "leave nothing behind except for the gentle wake of your craft", and our waterways will remain much cleaner for all to enjoy.

SLOW DOWN

When cruising along the shoreline, your speed should not exceed 5 M.P.H., and your boat should leave no visible wake. Driving your boat at high speeds causes two environmental problems in addition to being dangerous. First, shoreline erosion is



accelerated by the larger wake of a speeding boat. Second, if your waterbody is shallow, the nutrients and sediments that have settled to the bottom become resuspended by the churning action of a high-speed motor, which may cause turbidity and algae blooms. Prop dredging (both running aground and intentional) should also be avoided. Propeller damage to aquatic plants and bottom habitat may take many years to repair. Large motors should be prohibited on very small or shallow lakes.

AVOID SPREADING EXOTIC PLANTS AND SEA LIFE



Exotic plants (water hyacinth, hydrilla, Eurasian milfoil, etc.) and sea life (zebra mussels) may become attached to boats and trailers when used on an affected waterway. These can be very easily and accidentally introduced at your favorite waterbody. Once introduced, exotics can spread rapidly and become difficult, if not impossible, to control. Left unchecked, these invasive species may develop an advantage over native species resulting in a loss of fish and wildlife habitat and a decline in water

quality. Some exotic plants, such as water hyacinth, can even block navigable waterways. Boat owners should check their trailers/motors after each use and especially before launching at a new location to prevent the spread of exotic species. Any that are found should be removed and disposed of in a trash bin. Encourage other boaters to do the same and post warning signs at your boat ramps. To learn more about exotic species and how to control them, contact DEPs Bureau of Invasive Plant Management at (850) 245-2809.

BOAT WASHING

Wash boats over land away from the water as shown in the below photo. If the boat must be cleaned while on the water, use phosphate-free and biodegradable products rather than conventional cleaners, polishes, and detergents that can pollute your waterbody. Use sponges and soft towels rather than abrasive processes such as



scraping which can release paint chips and metals to the water.



WATERFRONT PROPERTY OWNERS GUIDE

FLORIDA YARDS & NEIGHBORHOODS

CREATING A FLORIDA FRIENDLY LANDSCAPE

You can help reduce pollution by landscaping and managing your property according to environmentally sound Florida Yards and Neighborhood (FYN) principles. FYN began in southwest Florida in the early 1990s to reduce nonpoint source pollution to Sarasota and Tampa Bays from residential yards. The program was so popular and beneficial that DEP wanted to expand it statewide. It is offered through the Florida Cooperative Extension Service (FCES) in cooperation with the University of Florida Institute for Food and Agricultural Sciences. Check with your local FCES office to see if FYN assistance is available in your area.

A Florida Yard (right) serves as a buffer between a waterbody and nonpoint sources of pollution from our homes, helping to reduce pollution.

In contrast, a conventional landscape (below) can contribute to the pollution of a prized waterbody.

Waterfront property owners, in particular, have a vested interest in keeping the water clean in order to protect their property values. However, it is important to understand that even yards located many blocks away from the water can affect a waterbody, depending on the stormwater management system. Set a good example for your neighbors to follow,

and encourage them to participate. If your good habits catch on, you will be rewarded with a sparkling, healthy waterbody of which your entire community can be proud.



The Basic Principles of Florida Yards and Neighborhoods Include:

RIGHT PLANT, RIGHT SPOT

Plant selection and location are very important to consider. Plants used in landscaping should be native or well adapted to the geographic area and the particular characteristics of the site. Trying to create the special circumstances needed to accommodate an unsuitable plant requires extra time, care, and money. Moreover, it increases the need for fertilizers and pesticides that can pollute a waterbody.

Select native plants that grow slowly. They will attract fewer pests and be more tolerant of diseases than exotic ornamentals. They will also require less pruning, which means less work and less yard waste. Group plants with common requirements together. This way you can be selective about feeding and watering them only when they really need it. Locate plants in the direct sun or shade, or in wet or dry areas, according to their needs. Don't try to force them to adapt to an inappropriate site.

Lawn areas tend to require more water and fertilizer than other landscape features, mainly because people overdo it in their desire to have a lawn that looks like a professionally maintained green space such as a golf course or ball field. Turf is OK if it is properly managed and the property owner has some tolerance for imperfections. Studies have shown that turf can absorb nitrogen from slow release fertilizer as well or better than some ornamentals. Unfortunately, turf is a mono-culture that offers very little wildlife value. Consequently, turf should be used selectively in a landscape for recreational areas or accents to ornamental or wildlife zones, rather than as a blanket solution to the need for groundcover. A mixture of several grass types (including weeds) will increase your lawn's pest resistance and help lessen the need for fertilizer and water when grass is used.

USE FERTILIZERS SPARINGLY

It is wasteful and expensive to fertilize automatically at certain times of the year. Give nature a chance and fertilize only according to need. Planting the right plant in the right place will practically eliminate the need for most supplemental feeding. To see if fertilizer is needed, do a soil or leaf test by getting the test materials from your County Extension Agent. These tests will determine the current nutritional value of your soil and provide guidance about the type and amount of fertilizer that may be needed, if any. When fertilizer is required, natural, organic fertilizers, such as grass clippings and compost, are better for your yard and the environment in many ways. However, in the event these are not available, and you have determined that you need a basic fertilizer, choose

one that contains at least 30% slow release nitrogen and other essential nutrients. It will cost a little more, but fewer applications are required, and it can make a big difference in protecting our waterbodies. Do not apply fertilizer if you anticipate rain. A heavy rain may wash most of it off your property before it is absorbed. Instead, wait for dry weather and then apply just enough water to help bind the fertilizer with the soil. Avoid using fertilizers that contain weed killers or insecticides. Such chemicals should be used only as a last resort when other options fail. It is best to contact the County Extension Service for advice if you have specific questions.

CONSIDER ALTERNATIVES TO USING CHEMICAL PESTICIDES

Fungicides, herbicides, and insecticides are collectively known as pesticides. They are designed to kill pests. The use of a pesticide is regulated by its' label, which is fully backed by state and federal law. Even approved uses of pesticides have known risks. Inappropriate uses are criminal offenses. Despite their many drawbacks, chemical pesticides are staples in most households. They are used routinely by many homeowners on a seasonal basis and selectively on occasion to combat a specific problem. Are chemicals such as these necessary? Have you considered the health risks associated with them and the toxic effects they may have on your waterbody? Common sense should lead us to try less toxic methods first. However, we have been conditioned through advertising and the advice of many industry experts to resort instead to stronger chemical solutions to control pests. We shall examine various types of pesticides in the section ahead, but first let's consider a creative alternative .



INTEGRATED PEST MANAGEMENT (IPM)

IPM is an environmentally friendly approach to pest control. IPM emphasizes the use of pest resistant plants, proper landscape management to encourage natural enemies of pests, and the selective use (rather than widespread use) of least toxic alternatives if pesticides are required.

Avoid pest problems by only planting very tolerant species in your yard. Go easy on water and fertilizer. Too much of either causes excessive growth which attracts pests. Set your lawn mower at a higher level and prune minimally to leave more foliage in place to support the plant.

Don't overreact to minor damage. Remember that the "good" bugs need some "bad" bugs around as a food source. Also, don't mistake environmental or maintenance problems for diseases. For example, Spanish moss, ball moss and lichens aren't parasites, but are plants themselves. They don't need to be killed or removed. On the coasts, irrigating with salty well water can cause yellowing around the edges of leaves and some leaf drop. Breaking out the arsenal of chemicals won't help a bit. However, bear in mind that there are some diseases that can seriously damage or kill the plants they affect. It is best to contact your Cooperative Extension Service for advice if a concern persists.

Learning to identify pests is the first step towards taking action. Detecting small insects can be difficult. Life cycles as short as one week add to the problem. Try striking the leaves of small branches against a sheet of white paper and use a 10X magnifying glass to see what's in your yard. Check the undersides of leaves and look for tell tale signs, such as sooty mold, on foliage. Sooty mold is a harmless black fungus that is a byproduct of present or past pest activity. It grows on a residue, called honeydew, that is secreted by pests. Ants also like honeydew and their presence may indicate other pests are around.



Once pests are identified, what should you do? If the damage is minor, let nature take its course. Healthy plants will usually recover after the pest is gone. Hand picking, pruning or spraying with water can be effective if the damage is caught early. If the damage is severe and intolerable, and action must be taken, least toxic alternatives should be tried first. These include insecticide soaps (2 1/2 tablespoons of dish soap per gallon of water), horticultural oils (add 2 tablespoons of vegetable oil to the soap solution described earlier), and *Bacillus thuringiensis* or Bt (a natural bacterium useful for controlling caterpillars). Other possibilities that have proven effective over the years include:

- RYANIA
- COPPER-LIME MIXES
- SILICA GEL
- PYRETHUM (PYRETHRINS)
- LIME SULPHUR
- NICOTINE SULPHATE
- ROTENONE
- SULPHUR
- DIATOMACEOUS EARTH

For indoor pests, such as cockroaches, try silica gel or boric acid powder dusted in cracks and crevices. Be careful to place these products where children or pets will not come into contact with them.

Establishing a thriving population of beneficial bugs can reduce the need for insecticides. The following insects have

been found to be most successful at controlling pests:

- LADYBUGS
(ladybirds, ladybird beetles—these are all the same)
- PREYING MANTIS
- TRICHOGRAMMA
(a pinhead-size parasitic wasp)
- BACILLUS THURINGENSIS
(Bacteria)
- MILKY SPORE POWDER
(a fungus effective against some beetles)

How do you encourage “good” bugs?

Wilderness areas can be created in your yard for the purpose of attracting birds and beneficial insects. Is it worth it? One house wren can eat 500 insects in an afternoon. A large brown thrasher consumes 6,000 insects a day. Toads, lizards, and many snakes are harmless and help keep insects and other pests under control.



There may be some value to using certain plants as bug repellents. Supposedly, planting onions, chives, and garlic will help keep aphids in check while radishes planted with cucumbers will discourage cucumber beetles. Try it out for yourself and see what works for you!

INSECTICIDES

Insecticides are chemicals used to kill insects that are considered nuisance organisms. The U.S. Environmental Protection Agency estimates that seventy three million pounds of active insecticide ingredients are purchased annually for home and garden use. Ironically, there is mounting evidence that insects develop immunity to the insecticides that originally controlled them. Continued use may create a superbug that could defy the toughest poisons. What most people don't realize is that, in general, nature can take pretty good care of itself. Healthy plants can usually fend off pest attacks, while predatory birds and insects keep threatening species under control. Routine preventive use of strong chemical pesticides is unnecessary.

If you must use chemical insecticides, carefully read the list of ingredients on the label. Chlorinated hydrocarbons are the most dangerous. Creatures can store these poisons in their bodies and pass them along, eventually to humans. A few to watch out for are listed below (those with stars beside them are particularly dangerous):

- Aldrin*
- Endrin*
- Ethylene dibromide
- Chlorobenzilate
- Strobane
- Dieldrin*
- Endosulfan*
- Chlorodane
- Perthane
- Ethylene dichloride
- Heptachlor*
- Lindane*

Organophosphates should also be avoided. They do not persist in the environment as long as the chlorinated hydrocarbons above, but they are extremely dangerous, especially to the person applying them. They are also harmful to pets and to beneficial insects such as honeybees.

Organophosphates that are a concern include:

- Diazinon
- Nemacide VC 13
- Parathion*
- Malathion
- Diazathion*
- Disulfoton*
- Ethion*
- Bidrin*
- Carbonphenothion*
- Phorate*
- Methyl Parathion*
- Dursban

Another class of dangerous insecticides is the carbamates. The most common one is Sevin. It affects all insects, killing good and bad alike.

HERBICIDES

Herbicides are chemicals used to kill plants. They can be used selectively to kill one kind of plant or indiscriminately applied to kill massive overgrowths. The ability of a herbicide compound to be used selectively may depend on the amount used as well as the type. At least 100 different herbicides or combinations are available.

Herbicides affect plants in three different ways. First, they can kill all parts of a plant with which they come in contact. Second, they may be absorbed through roots or foliage and transported to all parts of the plant. Finally, a third group of herbicides sterilizes the soil.

The use of herbicides has been found to change the chemical content of certain plants. However, due to the physiological differences between people and plants, many believe herbicides aren't toxic to humans. Regardless, we should all bear in mind that since some carcinogenic, teratogenic, and mutagenic changes take



a long time to manifest themselves (several generations for mutagenic effects), herbicides should not be casually dismissed as harmless compounds. What are some alternatives?

Keep up with weed and overgrowth problems through manual methods such as periodic trimming and removal of nuisance species. This may show that you don't even need chemical herbicide treatments. However, in the event you cannot keep up with the problem manually, and you decide to use an herbicide, choose the least toxic product that will work. Follow the directions and precautions on labels, apply the product selectively rather than randomly, and do not exceed the recommended application rates.

It is difficult to make a complete list of products to watch out for. **Many undesirable pesticides are hidden behind long chemical names and fancy labels.** If you are not certain, don't use it until you check with a reliable source such as your County Extension Agent. Many pesticides are far more dangerous than poisons such as cyanide, strychnine, and arsenic, which we have all learned to respect.

CHEMICAL STORAGE AND DISPOSAL ISSUES

Let common sense be your guide to the safe storage of pesticides, fertilizers and other household chemicals. Avoid places where flooding is possible. Wind direction should also be considered. Structures should be dry, well ventilated, easily accessible, designed to prevent fires, and separated from

other structures or rooms which may contain food. Be sure all containers are labeled.

Make certain that you don't do more harm than good when you discard these products and/or their containers. The best course of action is to use them up, little by little, over a long period of time. If you are determined to discard your chemical products immediately, follow label instructions or contact your County Solid Waste Department or agricultural agent for advice. **Many local governments hold "Amnesty Days" each year where potentially harmful materials, such as yard and home chemicals, can be safely disposed of for free.** Another possibility would be to check with your dealer who might be interested in helping to recycle containers, empty or otherwise.

Empty containers are seldom completely free of residue, so they must be disposed of just as care-



fully as the chemicals themselves. Most containers can be largely decontaminated by triple rinsing, so you are strongly urged to follow this procedure. Don't forget to use or dispose of rinse liquids properly too. They should be labeled as dilute solutions and applied like the original product. Use the rinsates to make new batches of your product or dispose of them as you would unmixed product, but never into a sewer or onto the ground.

YARD WASTE MANAGEMENT

Grass, yard clippings, and leaves are organic matter that release nutrients bound within them when they



decompose. This can be used to your advantage if the nutrients are managed properly to amend your soil. Otherwise, these nutrients may cause problems by exerting a biochemical oxygen demand (BOD) on a waterbody. If the oxygen demand is too great, fish and other aquatic organisms may be killed. Nutrient releases also can trigger algae blooms and other related problems.

There once was quite a bit of controversy among horticulturists about the desirability of removing grass clippings after lawn mowing. This dispute has since been resolved as indicated by the proliferation of mulching mowers now on the market. Unlike ordinary mowers, mulching mowers do not have a bag or discharge chute. Instead, the grass clippings are chopped very finely by special blade and shroud configurations, and left on the lawn. Grass clippings

are recognized as a benefit to lawns, replacing nutrients drawn from the soil and as mulch that helps retain moisture, lessening the need to irrigate. Grass clippings should not present a problem for your waterbody if left

on your lawn. If your lawn mower is a conventional model equipped with a side discharge chute, the following practices will help protect the waterbody. Direct the chute away from the waterbody when mowing near the shoreline, and direct it back onto the yard, not onto the road or driveway, when mowing upland areas.

Do not store or discard your collected yard wastes by shorelines, in ditches or swales, or near storm drains. You may overload the capacity of your waterbody to assimilate organic matter safely and be causing or contributing to overenrichment of the system. Burning is also a poor alternative, because it releases solid particles and smoke into the air. Burning not only causes air pollution, but these airborne pollutants may return to the earth through rainfall and contaminate your waterbody.

COMPOST HEAPS: THERE IS LITTLE IN THE WAY OF A BETTER FERTILIZER AT ANY PRICE

Organic substances, including yard wastes, can be recycled in compost heaps with the resulting mate-



rial being an excellent soil amendment and conditioner. If you choose to collect your grass clippings, rather than leave them on your lawn for aesthetic reasons, try composting them or bagging them for disposal at a community recycling facility.

The principal behind a compost heap is simple. It takes place in every forest where leaves, fallen wood, and other organic matter are converted to soil conditioners (humus) by bacteria and other organisms that are aided by oxygen.

A compost heap is simply a means of carrying out this process in one spot, using materials such as grass clippings, leaves, and small branches that may accumulate on your property.

A simple pile in a good location on your property will do the job. A cement block or wooden enclosure may be added to contain the pile. Some companies manufacture barrels and other containers that may speed up the process.

Regardless of the type of composting method you choose, make certain that you locate it on an upland portion of your property where it will not impact your waterbody.

Other essential things to remember are:

1. The refuse must be kept damp but not soggy. Sprinkling periodically with a hose and then covering the pile with a tarp will help speed up the process.
2. Oxygen must reach through the pile because the decaying process is aerobic. Turn or stir the pile with a pitchfork on a weekly basis.
3. Seed the pile by mixing in garden soil which contains essential decaying organisms.
4. Kitchen scraps can be put in the pile, but never add meat or dairy products. They take longer to convert to

compost and may create odor, pest and disease problems.

What is your compost good for? Just about everything that store bought supplements are used for. Adding compost to your soil will:

- Help to aerate and loosen compacted soil, improving structure and texture.
- Increase the soil's capacity to hold water and stimulate plant root development.
- Improve conditions for microorganisms, earthworms, and insects that further benefit the soil by breaking down organic matter.
- Help reduce the demand on waste management facilities that formerly hauled and disposed of your biodegradable yard and kitchen material.

We suggest that you contact your local nursery, gardening center or Cooperative Extension Office for more information about composting and other Florida Yards and Neighborhoods practices.

Your local water management district may also offer advice about xeriscaping, which is a similar program, which emphasizes landscapes that conserve water.



WATERFRONT PROPERTY OWNERS GUIDE

SHORELINE MANAGEMENT

Shorelines are complex areas that can protect your upland investments from the water you live near. They also protect the water from your land-based activities. As if that isn't enough, shorelines are the preferred habitat of many different types of wildlife, especially young aquatic organisms, and are prime recreational areas. With such an important purpose, you might think our shorelines would be quite durable or even indestructible. You would be partly correct. In their natural state, shorelines are very resilient and dynamic. That is, they yield and then recover from most of the stresses to which they are subject. Shorelines also change shape as erosion occurs in some areas and deposition occurs in others.

Wind driven water contains a lot of energy that is best dissipated upon a gradually sloped shoreline. Unfortunately, this requires land we are often unwilling to relinquish for this purpose. We often build too close to the shoreline or in other flood prone areas. As a result, we end up spending enormous amounts of money and effort trying to protect a misplaced investment from damage. The problem occurs when people cannot accept the natural variability of the shore. Instead of abiding by nature's rules, loads of fill material are brought in and seawalls may be built. This might help to save one property but often at the expense of neighboring shorelines and the waterbody you live on. The loss of natural shoreline vegetation harms our waterbodies because these "kidneys" can no longer filter nutrients and other pollutants.



We should recognize and accept how nature works. Two processes, erosion and sedimentation, have shaped and reshaped the earth into the form we currently know it. Understanding and respect for these processes, coupled with careful site planning, a good

landscape design, and the use of beneficial shoreline vegetation, can help you to protect your waterfront property and the water it adjoins. To minimize shoreline erosion and protect our waterbodies, we can use several methods. These include:

- natural vegetation
- rip rap
- gabions
- seawalls – only as a last resort, normally not permitted on “waters of the state”

SHORELINE VEGETATION

Shoreline vegetation is part of the “kidneys” of a watershed. The root systems of vegetation help stabilize the soil along a shoreline, protecting it from waves and erosion. The leafy part of vegetation helps reduce the velocity and erosion potential of surface runoff and absorbs wave energy. Shoreline plants uptake nutrients from runoff preventing them from entering the waterbody. Finally, some shoreline plants help reduce pollutants in the ground water flowing to a stream or lake. A vegetated, tree lined shoreline may also provide shade that helps to keep

water temperatures low. Many game fish and other desirable aquatic organisms prefer cooler temperatures. As water temperature increases, its capacity to hold oxygen decreases. This can lead to an abundance of less desirable fish. Ideally, the shoreline should remain completely natural - modification of its form or shape inhibits a waterbody’s ability to effectively use or absorb nutrients. Unfortunately, many waterfront owners have removed beneficial vegetation and formed sandy beaches along their shorelines. This loss of a natural buffer may contribute to shock loads of nutrients and other pollutants affecting the waterbody and may lead to erosion.

You can help restore the kidneys of your waterbody by “aquascaping” your shoreline. Beneficial shoreline vegetation should be planted close to the shore along a gentle slope. A wide shallow area, called the littoral zone, improves a plant’s filtering efficiency. Allow for water level fluctuations and plan your work so the most depth tolerant species are planted closest to, or in, the water. Shoreline vegetation height should extend far above the water level. There is a direct correlation between height and a plant’s nutrient absorptive capacity. In fact, if vegetation height is clipped below the water level, a buffer zone’s filtering efficiency steadily declines to zero.





Pickerelweed

A partial list of desirable shoreline species for freshwater systems follows:

<u>Common Name</u>	<u>Scientific Name</u>
Delta duck potato	<i>Sagittaria lancifolia</i>
Common arrowhead	<i>Sagittaria latifolia</i>

Softstem bullrush	<i>Scirpus validus</i>
Giant bullrush	<i>Scirpus californicus</i>
Wood grass bullrush	<i>Scirpus cyperinus</i>
Joint grass	<i>Panicum geminatum</i>
Maidencane	<i>Panicum hemitomom</i>
Pickerelweed	<i>Pontederia cordata</i>
Cardinal flower	<i>Lobelia cardinalis</i>

Softstem Bullrush



We suggest contacting your local Regional Biologist with the Department's Bureau of Invasive Plant Management for help with selecting plants and locating sources for those plants in your area.

In addition, a simple, free of charge permit may be required from the bureau, for activities involving aquatic plants along your lakefront.

RIP RAP

Rip rap is an environmentally friendly alternative to consider for some situations where higher wave energy levels require more buffering than shoreline vegetation alone can provide.



The photo above depicts erosion up to the treeline of an unprotected shoreline in northwest Florida.

The photo at right, taken in February 2000 in the same general vicinity, shows how rip rap installed in 1988 helps to protect the shorelines of five waterfront homes. The rip rap was placed to absorb wave energy and control erosion, but it also provides great habitat for crabs and juvenile fishes. In addition, marsh vegetation that was planted up to forty feet landward of the rip



rap has flourished providing even more wonderful habitat and further helping to stabilize the area.

The project, which was built through a short term dredge and fill permit issued by the Northwest District Office of FDEP, has endured several hurricanes and is a success story by all accounts. It is recommended that similar designs be considered for other areas with gradual sloping shorelines.

For steeply sloped shorelines where a seawall is needed (and permitted) rip rap can be placed in front of the wall, as shown below, to help absorb energy and provide additional habitat in the littoral zone, which is the most biologically productive area in a waterbody.





GABIONS

Gabions are rectangular baskets made of heavy galvanized or PVC coated steel mesh. The baskets are assembled in place, laced together, and filled with rock to form a continuous, strong yet flexible structure.

Successive rows of gabions may be stacked to build walls. For more gradual slopes wider, shallower baskets called Reno Mattresses can be used.

Gabions and mattresses use one third of the amount of stone required for protection by rip-rap alone, and can use smaller sized stone. Specialized equipment and skilled labor are not required. Vegetation can be established by adding soil to the stone during installation, or by allowing natural siltation to occur. Gabions will fill in with vegetation over time providing habitat value as well as protection from erosion.

SEAWALLS

Steeply sloped shorelines that are exposed to a lot of energy from wind, waves, and boat wakes are more

likely to erode than calmer areas or gradually sloped shorelines.

As a last resort, for very high-energy shorelines, a seawall may be an acceptable solution. However, bear in mind that it may not be permitted in many locations. If a seawall is needed and allowed, where possible, it should be setback on the uplands portion of the property. This setback will help minimize the removal of shoreline vegetation that is important to the waterbody's ecosystem.

If a seawall has already been constructed on your property, it is helpful to place a swale and berm system a foot or two back from the wall. This will prevent the direct discharge of stormwater runoff over the wall by allowing it to percolate through the soil behind the wall.

Terracing, or gradually stepping down a steeply sloped property as mentioned on page 12, might eliminate the need for a seawall altogether. A variety of materials including wood and masonry can be used to help stabilize particularly vulnerable areas.

WATER LEVEL FLUCTUATION HAS MANY BENEFITS

Although water levels are not usually within the control of most waterfront property owners, understanding a few important principles can help make you a better neighbor to the many fish, wildlife, and plants that require highly varied water levels to thrive. Unfortunately, the levels of many lakes are stabilized by the use of weirs and/or canals. This has been done to help reduce flooding and because citizens become concerned when water levels become very low affecting recreational use and views of waterbodies.

Ironically, considering all of the work that has gone into limiting the range of water levels, studies indicate that water level stabilization efforts are a contributing factor to the increasing degradation of Florida lakes. In fact, natural lakes that fluctuate widely during wet and dry periods can tolerate more pollution than those with regulated lake levels.

As the water level lowers, unconsolidated bottom sediments are exposed to air and direct sunlight. This allows them to dry and solidify. Firmer sediments provide a healthier substrate for aquatic plants. In turn, these plants are important for game fish spawning, along with the reproductive cycles of other aquatic organisms. In essence, these aquatic plants promulgate a more diverse ecosystem.

Exposing sediments to air and sunlight also helps oxidize the nutrients that are stored in them so that they are not available as food for algae. This lessens the chances for algae blooms that can exhaust a lake's oxygen supply. Another benefit of low water levels is that it concentrates rough fish (those considered less desirable) into a more central location. This allows predators easier access, thereby providing a periodic check on rough fish populations. Low water levels are so important to a healthy waterbody that a drawdown, which is the deliberate lowering of water levels, is a common method of restoring lakes.



Lake Jackson sinkhole provides natural restoration.



High water levels can also help by broadening the zone of wetlands around a lake, thereby increasing its buffer capacity against runoff. High water may also interconnect discrete waterbodies, allowing fish and wildlife populations to mix. This can improve the genetic diversity of resident species. Periodic flooding can replace stagnant water in a system with a fresh supply to the benefit of all.

Waterfront property owners may not directly control the gates and valves that regulate water levels, but they can influence and support policy directed towards more fluctuations. Planning to live with more varied levels can reduce the strain of adapting to them after the fact. For example, permanent structures should be located well beyond the floodplain, moorings should be designed for a broad range of conditions, and recreational uses of the waterbody should be scheduled for appropriate times.



ESTABLISHING REASONABLE EXPECTATIONS



For lakes, a good place to start is with the Florida Lake Regions map. The map characterizes 47 distinct lake regions in Florida. It will help you to establish a reasonable expectation for your lake. There are more than 7,700 lakes in Florida. Swampy lakes differ from those on ridges, and perched sand hill lakes differ from the solution lakes of karst areas. Some lakes are affected by ground water while others are fed by surface waters. The variations in size, shape, and hydrology are endless, as are the characteristics of a lake's watershed such as location, soil, slope, and land use. A poster version of the map is available from local DEP and water management district offices, DEP's Office of Environmental Education, and DEP's Nonpoint Source

Many waterbodies in Florida are naturally eutrophic or highly productive due to their location near a swampy lowland or another area of nutrient rich soils. Some of these waters are not polluted and may, in fact, be renowned for their fisheries and importance to local economies. However, others are stressed by cultural impacts. It is important to recognize the difference, where your waterbody is concerned, to avoid wasting your time and money.

For example, trying to manage a highly productive natural lake with dense vegetation and great fisheries to accommodate a desire for pleasure boating is an exercise in futility. On the other hand, if a favorite swimming area has been polluted by runoff or other cultural sources, you may succeed in restoring it to its former beauty and uses through various management practices.

So, how do you determine what type of waterbody you have and why it appears as it does?

Management Section. The poster contains descriptions of each region and additional information about nitrogen, phosphorus, alkalinity, pH, and color distributions.

Florida Lakewatch is a citizen-based volunteer monitoring organization that may be able to help you better



understand your waterbody. The volunteers typically use physical and chemical methods of monitoring to characterize the water. However, they also have an extensive database with which to compare and contrast these results, which makes the information more valuable than randomly collected data. Lakewatch, which is managed by the University of Florida in Gainesville, is interested in more than just lakes. Some of their sampling is conducted on rivers and estuaries. You can learn more about Florida Lakewatch from their website at <http://lakewatch.ifas.ufl.edu> or by calling 1-800-LAKEWATCH.

The Florida bioregions are areas where you would expect streams to have similar biological characteristics, such as the types of insects that live there. There are four Florida Bioregions; the Everglades region, northeast Florida, the panhandle, and the Peninsula. Within each bioregion, the streams that are relatively clean serve as baselines for measuring pollution. These typically have more natural land use within their watersheds. A Stream Condition Index (SCI) should be used together with the bioregions to help see how healthy a waterbody's aquatic insect community is. Just as a doctor uses several measurements (i.e. blood pressure, temperature, etc.) to determine human health, the SCI consists of seven different measurements of aquatic community health. Clean streams will have high SCI scores, while those affected by human activities will score lower. Changes in the biological community may be caused by water pollution or loss of habitat, such as occurs when excess stormwater erodes a stream bed. Please refer to the next section for more information about the SCI and bioassessments.

ASSESSING AND MONITORING

The United States Environmental Protection Agency (USEPA) recommends a three step approach using biological sampling, chemical monitoring, and toxicology studies to characterize the health of a waterbody. While this approach is optimal, it is also very expensive.

BIOLOGY

We suggest beginning with a rapid bioassessment or bioecon, which can be followed by more detailed biological sampling and/or select chemical monitoring if unanswered questions remain. Biology integrates the effects of pollution (and restoration efforts) over time providing a comprehensive assessment of waterbody health. Consequently, biological assessments are becoming increasingly popular. Several tiers of bioassessments are possible depending upon the level of accuracy required. These should be performed by a qualified scientist as they require a lot of experience to do correctly, but the results are fairly easy to understand. For example, when a bioassessment is done by a FDEP biologist, a short report called an ecosummary is prepared. These have been produced for many waterbodies throughout Florida. An ecosummary or other report may be available for your waterbody. There is a very good discussion about bioassessments, and the use of aquatic insects to tell us about water pollution, on DEP's website at www.dep.state.fl.us/water/bioassess/index.htm. Select the public information key word and learn more about how bioassessments can help you determine the conditions and trends of your waterbody.



CHEMISTRY

Sometimes, biological data alone is not enough. For example, an extreme drought or flood may disturb benthic indicator organisms for a period of time suggesting that the system is impaired, when, in fact, water quality may be excellent. Chemistry, which has been the backbone of most water quality sampling programs for decades, can help. While chemistry data typically provides only a snapshot of the condition of a waterbody, this information may identify a condition that requires more attention. The difficulty is that conditions can vary dramatically throughout the course of a day and on a seasonal basis, or if a rainstorm occurs. This can be overcome by continuous chemical monitoring, which provides better information than grab samples, but it is very expensive.



as fish kills and wildlife abnormalities. However, they are expensive to conduct and should therefore be used only for special situations.

There is no one right way to characterize the health of your waterbody. Each situation requires an appropriate plan. Your approach may depend on the type of support that is available from a volunteer monitoring organization, local government, the regional water management district or FDEP.

TOXICOLOGY STUDIES

The third part of EPA's recommended methods for determining the health of a waterbody, toxicology studies can pinpoint the causes of phenomena such



DEVELOPING A WATER RESOURCE MANAGEMENT PLAN

Finally, once your waterbody is characterized and its health has been accurately determined, you can begin thinking about developing a management plan.

This usually involves organizing people as well as ideas. The pamphlet "Developing a Lake Management Plan" published by DEP's Bureau of Invasive Plant Management is a useful guide to the process of managing all types of water resources, not just lakes. You may obtain a copy by calling (850) 245-2809.

WATERFRONT PROPERTY OWNERS GUIDE

FUNDING OPPORTUNITIES

Florida has an abundance of rivers, lakes and estuaries. These are important to Florida's economy and the quality of life enjoyed by all Floridians. They provide recreation, attract tourists, and create higher property values. However, from a water quality viewpoint, this abundance of waterbodies has some disadvantages. Where there are only a few major waterbodies, everyone living in the vicinity is concerned about their water quality. Broad-based citizen support for the waterbody can be generated, with the objective being to fund a clean-up program. Once control methods and funding are identified, implementation can begin. However, here in Florida, improving water quality is a more difficult proposition.

Many persons are concerned with improving water quality, yet it is hard for them to sympathize with a problem that does not directly affect them. For instance, a County "A" resident may be very interested in improved water quality for a certain lake, which a County "B" resident cares little about because they never see or use that lake. To ask the County "B" resident to fund a County "A" clean-up project is considered unfair by many persons. Further complicating matters is that there are relatively few steadfast rules in devising watershed management plans. Each situation is different, requiring tailored solutions.

Fortunately, Florida's Legislature has provided state agencies, water management districts, and local governments with many ways to buy land and implement other projects to restore waterbodies. Some of these include:

FLORIDA FOREVER ACT

The successor to Preservation 2000, this program will provide funding, not just for land acquisition, but also the management of acquired lands and the restoration of degraded waters. The Florida Department of Environmental Protection receives nearly \$3 million per year for research and implementation of BMP's to reduce urban storm-water pollution. The Florida Department of Agriculture and Consumer Services (FDACS) receives a similar amount of funding for reducing agricultural NPS pollution. Additionally, many local governments have enacted similar funding programs for these types of activities.

SECTION 319 GRANTS

Each year, the Florida Department of Environmental Protection receives about \$7.5 million for projects de-signed to reduce non-point sources of pollution and improve water-body health. For more details about Section 319, see the Nonpoint Source Management Section web page at www.dep.state.fl.us/water/nonpoint/319h.htm.

STATE REVOLVING FUND (SRF)

In 2000, the Florida legislature amended chapter 403, f.s., to allow low interest loans by the state revolving fund to be used for projects that reduce pollution from urban and agricultural stormwater.



For more information about the SRF loan program, see the water facilities funding web page at www.dep.state.fl.us/water/wff/index.htm.

STORMWATER UTILITY FEES

In 1986, the Florida legislature enacted Section 403.0893, Florida Statutes., authorizing local governments to implement stormwater utility fees. These fees provide a dedicated source of funds for local stormwater management programs. These fees usually are based on the amount of impervious surface on each parcel of land.

SPECIAL DISTRICTS

In an era where “Government” is often criticized for being inefficient and burdensome, let’s acknowledge a truly effective concept—Municipal Service Taxing (MST) Districts. The formation of a MST District can provide a source of funding to maintain, restore and protect your waterbody. Because of their positive purpose, MST Districts are also referred to as Municipal Service Benefit Units. More importantly, MST Districts provide an equitable means of sharing funding between those persons who contribute to the pollution and those who enjoy the beauty and use of the resource.

The organization of a MST District varies depending upon whether you live within city limits or in an

unincorporated area of the county. In all areas, submittal of an information petition is required. Under Chapter 125 of the Florida Statutes, it is stated:

“.....(6)(a) The governing body of a municipality or municipalities by resolution, or the citizens of a municipality or county by petition of 10 percent of the qualified electors of such unit, may identify a service rendered specially for the benefit of the property or residents in unincorporated areas and financed from countywide revenues and petition the board of county commissioners to develop an appropriate mechanism to finance such activity, which may either be by taxes, special assessments, or service charges levied solely upon residents or property in the unincorporated area by the establishment of a municipal service taxing or benefit unit pursuant to paragraph (1) of subsection (q) or by remitting the identified cost of service paid by the taxes levied upon property situate within the municipality or municipalities.....”

However, individual city or county policy can dictate otherwise. For example, Orange County requires a petition containing 2/3 of the residents within the MST District. It could be that your MST District will encompass both property within city limits and unincorporated areas of the county. In fact, there can be so many variables, it is advisable to contact your governing body to find out the specifics of MST District formation in your area.



SUMMARY



CLEAN WATER - Please be sure to do something each day to assure our children may have clean water tomorrow.

Florida's growing population and intensive agricultural production continue to place many strains on our vulnerable surface and ground water resources. Government alone can not assure the long term sustainability of these water resources.

Reducing nonpoint source or "pointless personal pollution", the main source of water quality prob-

lems in Florida, ultimately depends on each and every Floridian.

We hope this book has helped you to better understand how your everyday activities affect our water resources. More importantly, we hope that it will stimulate Floridians to be part of the solution, instead of part of the problem.

Remember, that if we all do a little, we can do a lot to help assure that future generations will enjoy the many benefits of clean water.

ADDITIONAL RESOURCES

Florida LAKEWATCH/Project COAST

University of Florida
Institute of Food and Agricultural Sciences (IFAS)
Department of Fisheries and Aquatic Sciences
7922 NW 71st Street, P O Box 110600
Gainesville, FL 32611-0600
1-800-LAKEWATCH (525-3928), Fax: (352) 392-4902
<http://lakewatch.ifas.ufl.edu>

Florida Yards and Neighborhoods Program (FYN)

University of Florida
Institute of Food and Agricultural Sciences (IFAS)
Department of Environmental Horticulture
1545 WM Fifiel Hall, P O Box 110670
Gainesville, FL 32611-0670
(352) 392-1831, Fax: (352) 392-3870
<http://hort.ifas.ufl.edu> or your local
Florida Cooperative Extension Service Office

Florida Department of Environmental Protection

Office of Environmental Education
3900 Commonwealth Boulevard, MS 49
Tallahassee, FL 32399-3000
(850) 245-2132, Fax: (850) 922-6615
<http://www.dep.state.fl.us/mainpage/programs/ed.htm>

Florida Department of Environmental Protection District Offices

Northwest District – (850) 595-8300
Northeast District – (904) 807-3300
Central District – (407) 894-7555
Southwest District – (813) 632-7600
Southeast District – (561) 681-6600
South District – (239) 332-6975

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION DISTRICT OFFICES



Florida Fish and Wildlife Conservation Commission

Division of Freshwater Fisheries
620 South Meridian Street
Tallahassee, FL 32399-1600
(850) 488-0331, Fax: (850) 413-0381
<http://floridafisheries.com/>

Florida Stormwater Association

(aka Florida Association of Stormwater Utilities)
719 East Park Avenue (32301)
P O Box 867
Tallahassee, FL 32302
(888) 221-3124, Fax: (850) 222-4124
<http://www.florida-stormwater.org/>

Florida Department of Agriculture and Consumer Services

Office of Water Policy
1203 Governors Square Boulevard, Suite 200
Tallahassee, FL 32399-1650
(850) 488-6249, Fax: (850) 921-2153
<http://www.floridaagwaterpolicy.com>

State of Florida Water Management District Offices

Northwest Florida Water Management District
(850) 539-5999
Suwannee River Water Management District
(386) 362-1001 or (800) 226-1066 (Florida Only)
St. Johns River Water Management District
(386) 329-4500 or (800) 451-7106
Southwest Florida Water Management District
(352) 796-7211 or (800) 423-1476 (Florida Only)
South Florida Water Management District
(561) 686-8800 or (800) 432-2045 (Florida Only)

STATE OF FLORIDA WATER MANAGEMENT DISTRICT OFFICES

