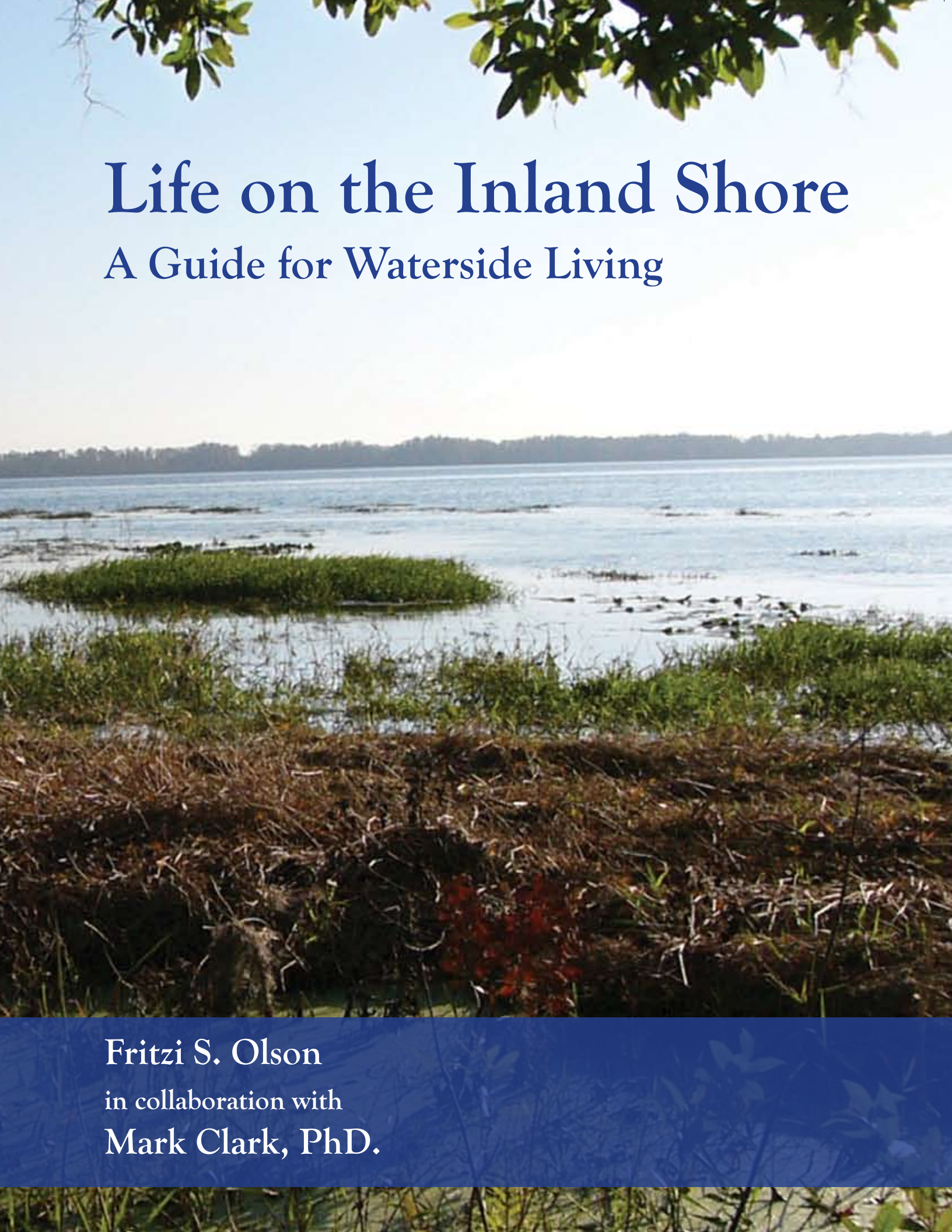

Life on the Inland Shore

A Guide for Waterside Living

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in collaboration with
Mark Clark, PhD.

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A Guide for Waterside Living

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Example of a healthy shoreline. The house is set back from the water with the natural buffer zone intact.

Example of an unhealthy shoreline. No buffer zone between house and waterway. This boat ramp sends runoff directly into the water with none of the filtration provided by a buffer zone.

Table of Contents

Preface iv
Introduction v
Vegetation Considerations 1
Wildlife Habitat Considerations 6
Invasive Exotics 10
Stormwater Considerations 12
Contaminants 14
Construction Considerations 16
Green Boating 18
Closing Thoughts 19
References 20

Preface

Alexandra Morton states so well the spirit with which Mark and I set about compiling this booklet. We hope that it will instill the same feeling in its readers.

"After living here for 20 years, I see that everything, big or little - whales, ravens, maggots, bears, humans - is connected. We are all part of the complex and intricately balanced web of life that has evolved over the unknown thousands of years."
- Alexandra Morton, R.P. Bio, Echo Bay, B.C.
from her book, Beyond the Whales

We found a need existed to explain for waterfront residents the importance of their activities around the waterways - not just the should or shouldn't do, but also the why. Such guidelines are not at all for the purpose of causing human inconvenience or limitation, but rather, allowing them to live along their waterway in greater harmony with the wildlife and beauty they love. It is our great hope that you will find this booklet useful and use it to explore suggested resources for further information on subjects that you find of particular interest. We humans tend to improve the places we love to death. The trick is to learn to practice lifestyle habits that minimize our impact. Your special water body is a legacy worth protecting, preserving, and restoring so that all may have clean water to drink, uncontaminated fish to eat, and safe water in which to swim - especially you and your family.

- Fritzi

How to use this book

In attempting to make it easier for you to find information about a topic that particularly interests you, we have divided this guide into categories. Each category will have several points that we felt important to maintaining the shoreline and waterway integrity and health, as well as recommended web sites and tips to help you live more harmoniously with the water body you share with the animals.

Introduction

As a homeowner living adjacent to a lake, river or creek, you are probably aware of the benefits and difference this water feature makes in your life. You may be less aware of how connected this same water body is to other areas you might enjoy and how fragile these systems can be to impacts from changes in the quantity and quality of water that enter them and how exotic species can take hold as a result of these altered conditions.

In addition to enjoying the water feature in your backyard, your close proximity to this aquatic habitat also gives you a unique opportunity and responsibility to minimize impacts that might be associated with landscaping and other activities on your property. This close connection is most apparent during storm events when surface runoff of rainwater can carry soil, fertilizers, pet waste, pesticides, and other undesirable chemicals and debris into the water body.

Living by the water is like living in an environmental risk zone. If we spill a dangerous household product, or wash one into our septic system, there is an increased risk that the ingredients in that product could find their way quickly, even directly into our waters - either in surface runoff or through groundwater.
Because we are all in the same boat, the lifestyle choices we make affect our neighbors, just as our neighbors' choices affect us. Each individual and each household can make a difference - and it's in our interest! Although any one landowner's contribution may be small, the combined contribution of all homeowners, along with possible inputs from urban, agricultural or industrial sources, can be significant and possibly impact water quality, aquatic life, and the use of the water by you and others.

The shoreline edge is also valuable to wildlife and plant species. The transition from dry land to submerged land provides a wide variety of habitats for both plants and animals. Many animals move along shorelines in search of food or when moving from place to place. This zone is also home to many unique plant species that tolerate extended periods of inundation. In many cases, this zone between upland and open water is defined as a wetland, which can help to filter runoff and reduce degradation of more open water areas.

This shoreline homeowner's guide is designed to make you more aware of potentially undesirable impacts that your activity might have on the water feature near your yard. It will also give you ideas on what you can do to minimize your impact and how you can protect and enhance the "buffer" zone between you and the adjacent water body. The location of your land provides you a unique opportunity to protect water quality and wildlife habitat. We appreciate your individual effort that benefits us all.

Waterfronts are special places with their own special problems in need of special considerations. Imagine that you have chosen to live in a boat for a year on a tiny freshwater lake. You use the lake's water for drinking (so you don't pollute it with your wastes) and as a disposal site (you have nowhere else). Everything you do - washing the dishes, using the toilet, traveling about - could affect the safety and cleanliness of the water and your ability to survive. This is what it is like when we add the cumulative impacts of each person who lives on the land beside water.

The best management practices (BMP's) offered here attempt to address these issues. They are meant as recommendations to minimize human effect on water quality and wildlife habitat. The approach by all who live on the water should not be the maximum one can do "to" the waterway and his property, but rather how one can do the very least harm by virtue of his presence there. If you want to learn about the justification and science of each recommendation, go to the suggested web sites listed throughout the book.

Otter photographed by Alison Blakeslee

Vegetation Considerations

Ichetucknee Magic by Wes Skiles of Karst Producions

Vegetation along the shoreline plays such an important role in protecting our water resources. While often we humans think only of our wish for a clear and pretty view, the actual quality of the water itself and the lives of many species of wildlife rely very directly on the riparian zone vegetation. Shoreline plants take up nutrients that would otherwise lead to harmful algae blooms, which can be a death knell to an aquatic ecosystem's plants, fish, and other aquatic animals, and can sometimes make humans very sick. The plants help prevent toxic contaminants from reaching the water in the same manner. Erosion prevention provided by the shoreline plants keeps sediments from fouling the waters. Without clean water, living organisms will not find enough oxygen, light, food, shelter, or nesting places to survive. The water people drink oftentimes comes from surface waters, and we also swim in them. In Florida, our aquifer is very directly connected to our surface waters, making clean lakes, rivers, and creeks important to those who drink ground water as well.

Plants in the riparian zone are home to many terrestrial creatures. Birds, mammals, insects, and other animals live here. The shoreline world provides them with easy access to clean water to drink, food to eat, places to nest, shelter, cooler temperatures in summer and warmer ones in winter, and safety from humans and predators. Think of all these benefits to other species of animals as well as the water itself when you think of vegetation that grows along your waterfront, or the riparian zone. Rather than being a nuisance, plants are what keep our waters life-giving and safe for humans and wildlife.

Over time, even small ripples from passing boats can gradually erode banks, bluffs, or beaches that have had their protective vegetation removed.

Our recommendations regarding vegetation:

Shoreline Buffer Zones

A natural, undisturbed vegetated buffer along the shoreline is recommended. The larger the buffer the less likely your activity will impact the water body. Studies have concluded that some wildlife species require as much as 1500 feet to avoid impact, while others require much less. Your county comprehensive land use plan will determine the absolute minimum acceptable in your county, but this is by no means ideal for wildlife.

Aquatic Vegetation

Leave aquatic vegetation undisturbed. Fish use these zones of vegetation for nurseries; ducks hide their young safely among the grasses and rushes; and birds find much needed food in these ribbons of aquatic plants that lie along the water's edge. Remove exotic species, but make sure the plant is an exotic. Permits to take out invasive exotic species must be obtained from the Florida Department of Environmental Protection / Bureau of Invasive Plant Management.

Web sites:

National Sustainable Agriculture Information Service's Pest Management System Guide
www.attra.org/attra-pub/farmscape.html

The Georgia Strait Alliance: Gender Bender Chemicals Threaten Reproduction
www.georgiastrait.org/?q=node/512
and Alternatives to Pesticides
www.georgiastrait.org/files/share/PDF/PesticideAlternatives.pdf

Information about contaminants and human development
www.ourstolenfuture.org
www.ourstolenfuture.org/newscience/behavior/yaqui.htm#

Information about shoreline buffers
http://www.scdhec.net/environment/ocrm/pubs/docs/backyard.pdf
http://www.nwfwmd.state.fl.us/pubs/shoreline/shoreline.pdf

Maidencane

Lake Santa Fe

Pesticides and herbicides

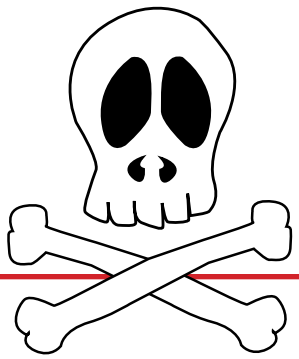
Use should be avoided on waterfront properties. Integrated pest management (IPM) is the preferred method, although it is recognized that on occasion herbicides will be necessary for the control of invasive exotic plant species. IPM refers to the use of different techniques in combination to control pests, with an emphasis on methods that are least injurious to the environment and most specific to the particular pest. For example, pest-resistant plant varieties, regular monitoring for pests, pesticides, natural predators of the pest, and good management practices may be used singly or in combination to control or prevent particular pests.

With the consequences of endocrine disrupting chemicals (EDC's) only beginning to be understood, a precautionary approach with respect to pesticides and herbicides is considered to be necessary and prudent. This is especially the case near water bodies.
Many synthetic chemicals (and some naturally occurring ones) have the ability to disrupt the hormone systems of fish, birds, reptiles, amphibians, and mammals - including humans - with potentially devastating effects on reproduction and development. UK research has suggested that some male infertility problems in the London area may be linked to the drinking water supply which contains sewage effluent and has been found to be contaminated with hormone-mimicking nonylphenols.
The link between growth retardation and PCBs has been well documented. Studies of pregnant women in Japan and Taiwan who consumed PCB-contaminated rice and pregnant women in the Great Lakes region who consumed PCB-contaminated fish revealed reduced birth weight in their newborn children. Further studies showed the growth retardation still apparent at the age of four. Girls were particularly affected.

Research in the US Midwest has discovered that men with elevated exposures to alachlor, diazinon, and atrazine are dramatically more likely to have reduced sperm quality. The study is the first to show such a link for common, current-use pesticides, and its findings are particularly troubling because the most likely route of exposure is through drinking water. The three pesticides implicated by the research are widespread contaminants in Midwest water systems.
Although not water related, here is another good example of the problems EDC's can cause. In a study done by Elizabeth A. Guillette of the University of Florida, Dr. Guillette found that Mexican school children who had been exposed to pesticides from farm fields showed a much lower level of ability to draw objects than those living near fields that did not use pesticides.

Residential pesticide use, per acre, is more intensive than on most farms.

Highly manicured lawns that extend to the water's edge often make dirty lakes, streams, estuaries, and coastal inlets. They can speed up runoff of dirty water, contribute to soil erosion and add a chemical load from the fertilizers and pesticides used on them.



A summary of pollutant removal effectiveness and wildlife habitat value of vegetated buffers according to buffer width (1 meter = 3.28 feet) Source: Desbonnet et al. 1994		
Buffer Width	Pollutant Removal Effectiveness	Wildlife Habitat Value
5 meters (approx. 16.5 feet)	Approximately 50% or greater sediment and pollutant removal.	Poor habitat value; useful for temporary activities of wildlife.
10 meters (approx. 33 feet)	Approximately 60% or greater sediment and pollutant removal.	Minimally protects stream habitat; poor habitat value; useful for temporary activites of wildlife.
15 meters (approx. 50 feet)	Greater than 60% sediment and pollutant removal.	Minimal general wildlife and avian habitat value.
20 meters (approx. 66 feet)	Approximately 70% or greater sediment and pollutant removal.	Minimal wildlife habitat value; some value as avian habitat.
30 meters (approx. 100 feet)	Approximately 70% or greater sediment and pollutant removal.	May have use as a wildlife travel corridor as well as general avian habitat.
50 meters (approx. 165 feet)	Approximately 75% or greater sediment and pollutant removal.	Minimal general wildlife habitat value.
75 meters (approx. 248 feet)	Approximately 80% or greater sediment and pollutant removal.	Fair to good general wildlife and avian habitat value.
100 meters (approx. 330 feet)	Approximately 80% or greater sediment and pollutant removal.	Good general wildlife value; may protect significant wildlife habitat.
200 meters (approx. 660 feet)	Approximately 90% or greater sediment and pollutant removal.	Excellent wildlife value; likely to support a diverse community.

Santa Fe Pass, Little Lake Santa Fe, North Florida

"When we moved into our house, I thought the cedars would have to come down - seemed so dark. But after a year, I had grown to love those trees and all the birds in them and couldn't imagine the house without them."

-Anne, Vancouver, On the Living Edge

Tree Canopy and Understory

Leave the property heavily treed. Minimize removal of the natural tree canopy and add additional trees. A good canopy provides shade for us and shade for fish needing cool water temperatures for survival. Many other species of wildlife and birds will appreciate the habitat you have left for them, too. Some thinning may be advantageous to promote development of understory grasses and shrubs to provide a mixed habitat and soil stability. Contact your local county extension office if wanting to enhance the tree canopy and understory.

Caution!

Without a buffer zone you might find that your shoreline becomes an erosion zone. Whether you live beside freshwater or coastal waters, a buffer zone will protect you from the water and the water from you.

Look after your best shoreline insurance policy - a buffer strip of native plants along the shoreline. If you've got the space, make it 150 feet wide. The wider the strip the bigger the benefits!

"I used to wonder why all of these species of little fish were put on this earth, and as I got older I began to realize that they are all part of the larger plan. The one thing we all have to remember is it doesn't matter how small a creature is or how odd it looks to us humans; everything serves a purpose in the whole even if we don't know what it is." -Bill Proctor, Echo Bay, B.C. excerpted from "Full Moon, Flood Tide"

Wildlife Habitat Considerations

Watching wildlife in one's own backyard is one of the joys of waterfront living, though many of us have no idea how very important a role the various species play in keeping the waterway and its adjacent wetlands and shorelines operating as functioning ecosystems in which we can comfortably live and enjoy. However, wildlife has habitat needs. When we pursue the traditional lawn practices of manicuring our yards right down to the water's edge, we destroy the homes of many more animals than we ever realize. Birds and squirrels need trees for nests and food; fish need trees to shade and cool the water in order to survive; some of the insects need trees too.

There is also the understory, made up of small trees and woody shrubs plus plants like ferns and wildflowers. Butterflies make use of the flowers, and their caterpillars thrive on the leaves. All kinds of animals use these plants for shelter even if not for nesting and food - shelter from the hot sun, predators, and humans. Then there are the littoral plants, or those right at the water's edge. They too, provide important sources of shelter, food, temperature control, and nesting places. Planting the lacking riparian zones so that the water body has a buffer of native vegetation brings back into our lives the wildlife we love. By building buffer strips we provide the animals with corridors through which they may travel safely from one place to another, rather than exposing themselves dangerously to clear and open spaces or roads. New buffers also mean new territories, allowing populations to expand. Migrating birds make use of such places as well. The wider the buffer zone, the greater the benefits and diversity of species.

We need to minimize our impact on wildlife through our lifestyles as much as possible, for all creatures have their place in the grand scheme of things. And we humans need to live in harmony with them. The loss of even one small species resulting from careless or unknowing human activity can set off a fire storm of negative results that no one wants.

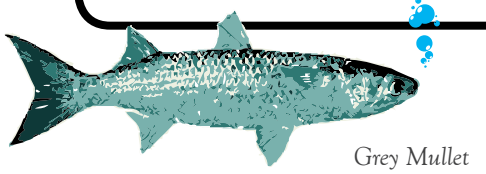
A very simple example can be illustrated by the problematic exotic Alligator Weed. The weed can form mats so dense that waterways become impassable to boaters. In its homeland the plant causes no problems, because of a lowly weevil that feeds on the plant and keeps it in check. Conversely, if the weevil had been exterminated with pesticides, for example, the Alligator Weed would have ended up causing the same problems as it did in Florida.

Another excellent example comes not from our area, but from the Pacific Northwest. The pink salmon's welfare is critical to so many species there - in salt water, in freshwater, and on land. All species of salmon are of great importance to people and whales each year, providing a critical food source for the whales. An important food source for people too, the salmon is of great economic importance to the area as well. Salmon also provide a critical food source for several species. The eagles, bears, seals, wolves, and other animals will have a tough time making it through the winter if the salmon return is not good in the fall. Many will starve. If salmon are plentiful, all feast and build up the fat they need for the winter. Some, like the eagles and bears, also carry carcasses deep into the riparian forests, and in this way contribute to the health of the forest by virtue of the nutrients the carcasses bring.

The story of the pink salmon is an example of how essential the salmon is to this system. The pinks are the first of the fish to move upstream in their natal creek to spawn and then die. Insects lay eggs on decomposing ocean protein of the spawned-out pink salmon in the stream. This ensures a good supply in spring to nourish young coho, Chinook, sockeye and other species. Without the pinks, there would be no bugs and none of the larger salmon

Did you know?

- **The biggest problem facing wildlife today is "homelessness" (habitat loss and destruction). You can help by providing them with homes of their own.**
- **A natural shoreline is a haven for all wildlife, including birds, bats, and insects that prey on mosquitoes!**
- **Buffer zones provide rich and important habitat for fish and other wildlife. Scientists say that even the infrequently flooded land up above the high water mark is very important to the survival of many species of fish.**



Grey Mullet

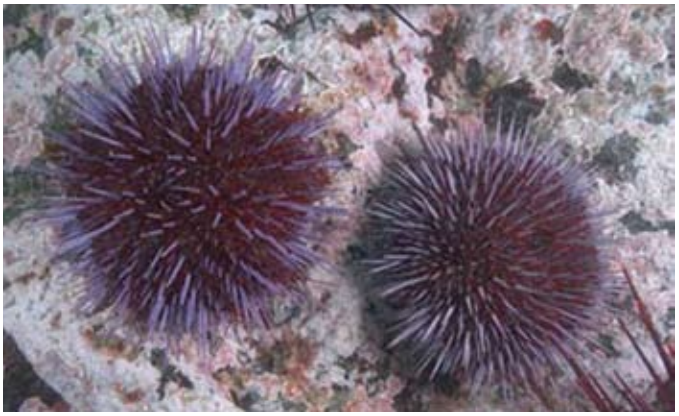
could survive. The little ouzel, a small water bird that walks along the bottom of the stream, feasts on the salmon eggs that do not get sufficiently buried in the gravel bed of the stream. The ouzel is important because if these eggs were left to decay, they would grow fungus which could kill a lot of the live eggs. The ouzel also eats invertebrates. The newly hatched pink salmon fry depend on little bugs, flies, and larvae of the innumerable insects living in the stream. If a polluted stream should kill the invertebrates, the little bird would lose its most important source of food and likely disappear. The many other species depending on invertebrates would also be adversely affected, especially the other species of salmon, which must stay in the stream and feed, unlike the pinks which head for the sea in a matter of days. And if the ouzel left the area in search of a healthier stream, the situation would become worse for the salmon too. There are few cycles in nature that we understand better than the salmon's, though undoubtedly many such tales await our discovery. Meanwhile, there is no better illustration of how important a role each species can play. Losing a link anywhere along the chain sets off a whole

Water Lettuce
Photo courtesy of the University of Florida

series of unhappy results.

A good example that initially starts off with a plant problem is that of the water lettuce in the Itchetucknee River. This weed forms dense mats that cover the surface of the water. These mats shade out the aquatic plants below so important to fish and other species. Unable to make a living any longer, the fish will leave or die. Now the otters have no food source. Neither do the manatees, because they fed on the bottom plants and will not eat water lettuce. The wild rice is also crowded out. With no place to lay their eggs, the apple snail disappears. Unfortunately, with the demise of the snails comes the limpkins' disappearance, as they leave in search of another feeding ground. Suddenly, not much lives in the river anymore other than the water lettuce. In the case of the Ichetucknee, serious efforts to remove the water lettuce have led to the rebound of all the missing species mentioned here.

Then there is the story of the sea otter along our western coasts. In the 1800's, they were nearly hunted to extinction. Now that the purple urchins had no predator to keep their population in check, the population exploded. Unfortunately, the urchin's main diet is made up of bull kelp, which grows in great aquatic forests along the northwest coast. The valuable kelp forests began to disappear. Kelp forests provide shelter and food for over 1,000 species of animals and plants that live within them. Rockfish, kelp bass and California Sheephead and other fishes hide among kelp fronds to avoid predators and to search for smaller prey. The tall fronds rising to the surface provide substrate and protection for many invertebrate species. Like the sea urchins, abalone and others are there to dine on the kelp blades.



Purple Sea Urchin

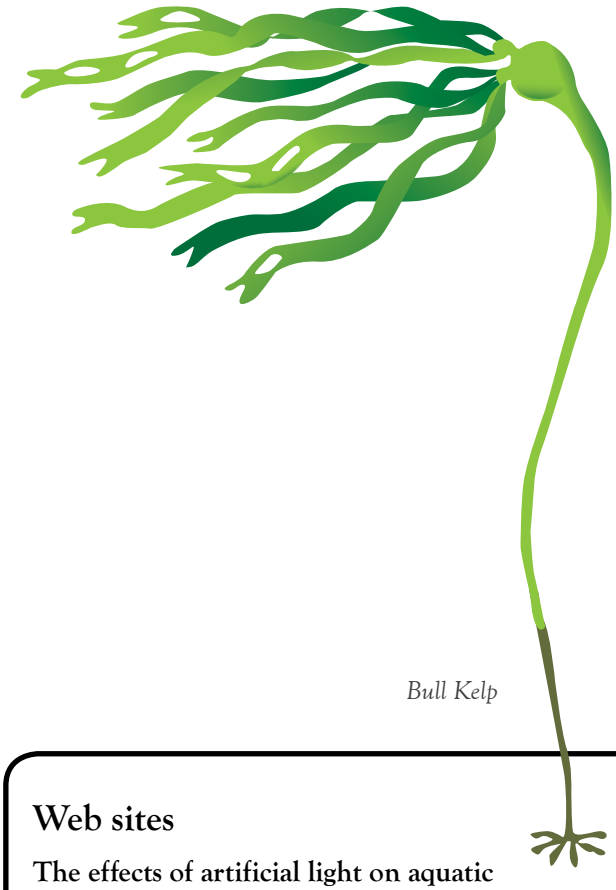
The calmed waters of the kelp beds serve as refuges for seabirds such as ducks, grebes, and gulls which also take advantage of the food reserves within, and the blades of kelp help slow water movement within the kelp forest, providing more refuges for smaller organisms such as juvenile rockfish. At the base, kelp holdfasts and other algae form a diverse understory with urchin, shrimp, fish and other creatures. Particles sloughed off the decaying ends of kelp blades provide a valuable food source for filter feeders like Pacific blue mussels. In addition, masses of dead kelp washed ashore provide food and shelter for communities of scavengers like crabs and beach hoppers, which are food for shorebirds and other life.

Kelps are harvested for alginates, products that are used as thickeners and stabilizers in many foods and other products from ice cream to soaps and shampoos. Kelp forests also provide the diversity, color, and structure that make them a favorite of divers and photographers. Kelp forests are now being recognized for their role in reducing beach erosion by softening the impact waves on shorelines.

By protecting habitat for wildlife, you'll gain in lots of ways. You'll be supporting the re-establishment of fish stocks in your area, or helping with their protection. You'll be encouraging natural predators of garden pests, making gardening more enjoyable. By encouraging habitat for insects, amphibians, and fish, you'll be supporting the food needs of larger wildlife like herons, loons, and eagles. Many of us (including children) enjoy watching and learning about these species. You'll even be contributing to higher water quality for swimming enjoyment. Don't forget the dragonflies and bats.

Without places for them to breed and live, your mosquito problem could be much worse.

It is hoped that these examples serve to illustrate the complex web of nature and therefore, the importance of all species to their ecosystem. Each species plays an essential role.



Bull Kelp

Web sites

The effects of artificial light on aquatic organisms (read pg. 2)
http://lakewatch.ifas.ufl.edu/PDFFolder2004/FLWVol28.pdf

Impacts of Feral and Free-Ranging Domestic Cats on Wildlife in Florida
www.floridaconservation.org/viewing/articles/cat.pdf

National Sustainable Agriculture Information Services - Pest Management Systems Guide
www.attra.org/attra-pub/farmscape.html

Swamp Dragons

JohnMoranPhoto.com

Domestic and feral cats are responsible for killing one billion *wild birds per year in North America. A cat can still kill when belled and declawed.*

Try to incorporate the following practices to do your part to help wildlife:

Vegetation

Maintain and restore native vegetation to the maximum extent possible. The greater diversity of plants you have, the more species of wildlife you will find sharing your property with you. A large area of native vegetation will also support larger populations of wildlife for you to enjoy.

Snags

Leave standing snags, if safe, as they provide valuable habitat for wildlife. Woodpeckers, insects, small mammals, and bats make use of these dead trees, for example. Our tendency to "tidy up" does these creatures no favors.

Brush Piles

As much as possible, leave fallen debris where it lays within the buffer, as it provides habitat for many species. Where pick up is necessary, designate a brush pile for your yard waste (fallen branches, leaves, trimmings, etc.) and consider leaving it as a home to attract more wildlife to your yard. Bunnies especially love these places for shelter and hiding.

Beach

Leave woody debris and rocks along the shoreline. They provide homes for macroinvertebrates, shellfish, fish, turtles, and other aquatic species, along with shoreline stabilization.

Light Pollution

Minimize the use of outdoor lighting, and reduce ambient light pollution by shrouding the edges of fixtures. Studies find that such lighting can disrupt normal cycles of some species. Ever wonder where all the lightning bugs went? Outdoor lighting is disastrous to lightning bugs, for it ruins their chances of attracting and finding mates.

Pets

Don't allow your pets to chase wildlife, and keep cats indoors or in an enclosure. Cats especially can decimate the wildlife population in an area.
The Florida Wildlife Commission has a policy of discouraging cats to be allowed to roam free due to their impact on songbirds and other wildlife. Feral cats should be trapped and turned in to Animal Control.

Invasive Exotics

Many people wonder what the big deal is over exotic, or non-native, species. Our natural systems evolved over time so that all plant and animal species work in concert to allow for a viable, beneficial ecosystem. One species serves as food for another; a different species keeps its prey, or food, from becoming a pest by over populating. Some species provide physical benefits for another, such as nesting sites found in a tree; and so it goes.

When a non-native species is introduced, very often it has no predators of any kind in Florida to keep its population from taking over, destroying the very species needed for the survival of many of our native plants and animals. Eradication of an exotic that has established itself in Florida is pretty much impossible, upsetting the balance of nature forever. The water lettuce infestation at the Itchetucknee is a good one to illustrate this problem. At the date of this writing, a total of 24,710 hours (staff + volunteers) were invested in the manual removal project at Itchetucknee Springs State Park. Of these, 14,820 were volunteer hours. The project took eight years to complete. This is a section of the river that is only 3.5 miles long! Plus, a maintenance regime to prevent the return of water lettuce will be required forever. There are two sources of exotics that are of serious importance to our state, which must be given constant attention.

Invasive Plant Species

Avoid introducing invasive plant species to the property through unnecessary clearing, fill dirt, sod, or intentional planting. Careless disposal of yard waste and seed disposal is another means by which invasive species are unwittingly spread. Such disposal is one of the main ways in which exotics are first introduced into the wild. Disturbed soil and reduced competition from natives provides an opening for the establishment of exotic species. Consult with experts for the best methods of control or eradication. Also, be sure to check to see if a permit is required for removal!

Caution!

It is easy to inadvertently do more good than harm when working with non-native species. Check on the best control method for the specific plants you are dealing with. For example, pulling some plants may disturb the soil and expose it to invasion by other plants, or stimulate expansion of roots.

Take special care not to dispose of exotic plant yard waste in wild areas. This is how invasive pest plant species usually begin their march to become naturalized and eventually a problem pest plant.

Air Potato

Invasive plants and animals are considered to be among the most severe worldwide causes of habitat destruction, loss of biological diversity, and exinction of native species.

Invasive Animal Species

The deliberate introduction of non-native fish and terrestrial species is prohibited by Florida state law. Like plants, non-native animal species can devastate Florida's natural systems. A species prohibited in Florida, the Georgia Giant - a hybridized sunfish - was introduced in a damned up canal on a North Florida lake. The fish was nearly released into the lake, which would have had devastating impacts on the lake's ecosystem, and eventually the entire Suwannee Basin. The Channeled Apple Snail, which completely strips waterways of vegetation, similarly threatens the Suwannee Basin. Currently it is within ten miles of the Okeefenokee Swamp, the headwaters of the Suwannee River. It is usually inadvertently introduced by aquarium owners. In some areas of Florida the snail has become very established, wreaking havoc on the affected water bodies it inhabits. Unfortunately, it is still legally available in pet shops.

Channel Apple Snail laying eggs
Photo Credit: Katasha Cornwell

Avoid spreading plants or animals from one waterway to another:

- Remove plants and animals from your boat, trailer, and accessories before leaving the boat ramp.
- Drain your livewell and bilge before leaving the water.
- Empty your bait bucket on land, never in the water. Never dip your bait bucket into a water body if it has water in it from another and never dump live bait from one water body into another.

Please do not purposely plant pest plant species even if they are still legal to purchase! Coral Ardisia is one example of a pest plant. In many cases it takes years before a species is dubbed illegal to sell.

Coral Ardisia

Web sites

Florida Exotic Pest Plant Council
http://www.fleppc.org

Plant Management in Florida Waters
http://plants.ifas.ufl.edu/guide/

Florida Department of Environmental Protection/ Bureau of Invasive Plant Management (obtain permit for removal of invasives here)
http://www.dep.state.fl.us/lands/invaspec/

Information and Pictures of Invasive and Exotic Species
www.invasive.org

Article about the Georgia Giant Lakewatch Newsletter
http://lakewatch.ifas.ufl.edu/PDFFolder2004/FLWVol28.pdf

Stormwater Considerations

Stormwater Enhancement Ecological Project,
University of Florida
Gainesville, FL

We tend not to think of stormwater as being so "everywhere". Most of us think of it as water that runs down the street gutter to the nearest stormwater drain. But whether we're talking about that type of urban runoff, or the rain that works its way to the nearest river, lake, or stream directly from your yard or roof, it's all stormwater - and very important when it comes to the well-being of your waterway, we might add. In other words, the rainfall runoff from your yard and personal property is very much stormwater, too. Riparian vegetation, or the buffer zone, plays an extremely important role in keeping surface waters healthy and free of contaminants from our lawns and the home front.

Here are a few suggestions to help minimize your stormwater problem:

Protect the natural drainage features

Rather than filling low spots, rain gardens are recommended. Let these depressions be periodically wet and plant species that tolerate and thrive under these conditions. The water that collects in these depressions will then percolate into the ground, replenishing the aquifer. We send much more water to sea than nature intended with our drive to drain the land for our convenience.

Water Access

Make use of docks that end out past the grass beds or a narrow winding path to gain access to the water. Straight paths downhill soon become rivers during a storm and result in sediment erosion. Properly build docks to minimize impacts on vegetation and to reduce bottom

Did you know?

The silt that enters surface water from runoff and erosion can:

- **Destroy plant habitat for aquatic creatures by blocking sunlight**
- **Make swimming less enjoyable**
- **Cover fish spawning beds**
- **Clog fish gills, suffocating the fish**

Practice the 3 D's of runoff control

- **DECREASE the amount of runoff you cause.**
- **DETAIN water to decrease flow.**
- **DIVERT the runoff to less erosion prone areas.**

Rain barrell

disturbance during boat launch or landing. Be sure to have the necessary permits before building a dock.

Driveways and paths

Create drives and paths that are diagonal or winding in layout. Porous surfaces should always be used for both. Identify points of discharge and attempt to spread these points of discharge out.

Harvest rainwater

Place rain barrels at downspouts to collect water you can use for plants. Much of the impervious surface on your yard is your home and deck. Harvesting this water for reuse reduces runoff volume during a storm.

Wetlands

Leave any and all wetland areas undisturbed, with a well vegetated buffering area along the edges. Even isolated wetlands contribute to water quality, storage and recharge, and to wildlife habitat.

Web sites

A Guide to Rainbarrels
www.rainbarrelguide.com

Rainbarrel Resources and DIY
http://dnr.metrokc.gov/wlr/PI/rainbarrels.htm

How to Build a Rainbarrel
Garden Gate Magazine
www.gardengatemagazinecom/tips/40tip11.html

2005 Minnesota Stormwater Manual
www.pca.state.mn.us/publications/wq-strm8-14z.pdf

On-site Solutions for Your Local Stormwater Issues
www.raingardennetwork.com

Publications relating to stormwater runoff
http://clean-water.uwex.edu/pubs/storm.htm#storm

Contaminants

Home and Garden Chemicals

There are no simple, safe disposal methods for many hazardous products. Since they cannot go down the sink or into your garbage, the best solution is not to purchase them in the first place. Evaluate whether there are more effective and safer alternatives to the way you have been doing things.

Many products which you use on a regular basis probably have safer alternatives.

Naturally enough, if you swim in your waterway you will want to do all you can to keep harmful contaminants out of your water body. Likewise for fishing; no one wants to eat fish or shellfish that might be harmful. However, we need to keep contaminants at bay for the wildlife just as much as ourselves. Remember, they play an important role in the overall health of the waterway on which you live and enjoy so much.

We list a number of contaminants that you will want to address. The elimination of all these from our water bodies is of great importance to the health of our water resources, wildlife, and us!

The following suggestions are very important to reducing contaminants in our waters:

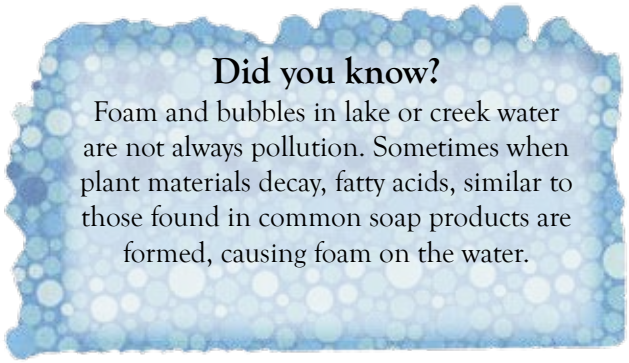
Pesticides and Herbicides

As mentioned earlier, these chemicals should not be used on waterfront property except where absolutely necessary to eradicate an invasive exotic species, and then only with the advice of agency experts. Check in with your extension agent and the Bureau of Invasive Plant Management to make sure you use the proper chemical and use it correctly.

Septic Systems

Maintain your septic system regularly. Seriously consider upgrading to a high-performance based system to further decrease nutrient levels. This would go a long way toward protecting waterways from harmful algal blooms. If possible, test your system to determine if it is doing its job. Consider switching to composting toilets, or at least low water volume toilets as many septic system failures are caused by overloading the system with too much water.

Conserve water with a low flush toilet. Also, follow the old-fashioned advice of "if it's yellow let it mellow; brown, flush it down."



Fertilizer Use

Use of fertilizer should be avoided on waterfront property to prevent nutrient loading to the water body, which can ultimately lead to harmful algae blooms, decreased water quality, lower dissolved oxygen levels and harm to the fish, and changes to the natural native plant community.

Compost Garbage and Yard Waste

Locate piles as far as practical from the water. These piles are yet another source of nutrients that need to be kept out of the waterway.

Hazardous Materials

Never flush hazardous or toxic materials down your drains. Harmful compounds include medications. This is an important rule whether you are on a septic system or a municipal sewage system. Make every effort to avoid and to clean up any spills of such contaminants on the ground.

Avoid Discharges to the Waterway

Discharges into waterways from car washing, pool draining, erosion, and other means must be prevented. Make use of swales or rain gardens. Discharges may contain nutrients, metals, particulates, hydrocarbons, and other undesirable contaminants. In a swale or rain garden these contaminants can be filtered out by the soil as water percolates, or taken up by the plants, and kept out of the waterway itself.

Laundry and Dishwasher

Choose detergents containing no phosphates. Phosphates contribute to those unhealthy algal blooms.

Pets

Be sure to pick up pet waste and dispose of in the toilet. Pet waste is one more nutrient source to encourage problem algae.

Burning

If you must burn, never burn on the beach or extremely near shore. Ashes contain phosphorous and other fertilizers that can leach into the water. Better to use these ashes as an alternative fertilizer on your lawn or flower bed. Better yet, make use of a brush pile and let nature decompose it. Certain wildlife species can make good use of these brush piles.

Yard Waste

Put yard waste to good use through use of a chipper. The chips can be used for mulch or to cover paths and drives. Another alternative is a brush pile as mentioned above. Be sure not to dispose of yard waste in wetlands or waterways, for their decomposition causes the oxygen level of the water to decrease - not good for aquatic life. In fact, this can cause fish kills.

Automotive vehicles

Clean parking areas as needed to remove oil, antifreeze, etc. Vehicle repairs should be performed to minimize leaks.

Web sites for Septic System Information

Optical Brighteners and Water Quality
http://www.longwood.edu/cleanva/images/Sec5.opticalbrightlesson.pdf

Use of Dyes and Tracers to Confirm Septic System Failures
http://www.abe.psu.edu/extension/factsheets/f/F167.pdf

Environmental Protection Agency (search: septic)
http://www.epa.gov/OWOW/info/NewsNotes

Construction Considerations

There is much you can do in the planning stages to make the least impact on the water body possible when building your new home. Construction sites can be a real problem to the adjacent water body when proper consideration and care are not given to several important factors. The fairly new concept of Low Impact Development (LID), offers the homebuilder many opportunities to build on their sensitive waterfront site with the least impact possible. Make sure you look into LID and incorporate as many of the ideas as you can at your property.

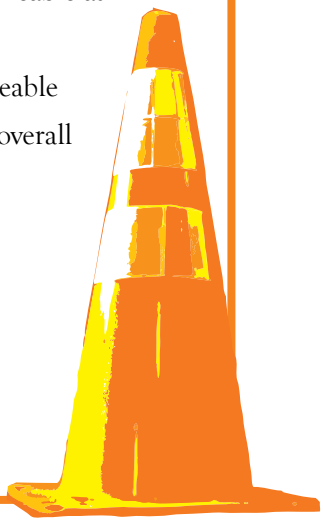
During construction, block off the shoreline with a temporary construction fence to prevent damage from heavy equipment and construction activites.

TIPS

Be on site to monitor your contractors whenever heavy equipment is involved. A lot of damage can be done in a few minutes!

If you have undisturbed, natural shoreline, the best thing you can do is leave as much of it alone as you can.

The biggest impact on streams is runoff from paving over lots, roads, and parking areas. Make your lot as permeable as possible by using alternate groundcovers such as permeable pavement and minimizing overall hard surface area.



A Word About Dock Construction

Unprotected polystyrene (EPS) foam is a poor choice for dock flotation. Unless it's completely encased, sun, gasoline, and animals can cause it to break apart, littering the shoreline with bits of EPS foam. Turtles, birds, and fish often mistake the foam pieces for food.

You can help reduce your impact when building through the recommendations below.

Erosion Control

Follow FDEP's recommended practices for avoiding any erosion caused by the construction process. Let your contractor know you expect these practices to be followed.

Protect trees and other vegetation from damage

Builders need to know how important this is to you. A neighbor actually put up a chain link fence to keep heavy equipment out of areas he did not want damaged. The construction workers may not like it, but the extra time and effort will save your valuable trees and other plants.

Clear the absolute minimum needed for your building project

Clearing the minimum area required for your building and site access reduces stormwater runoff, soil compaction, erosion, and destruction of wildlife habitat.
Do not allow the entire lot to be bulldozed for expedience sake. A clean slate is not necessary and only makes erosion control more difficult. Your county may also have a tree removal ordinance.

Avoid Unnecessary Compaction

Compaction results in stormwater runoff. In addition establishing plants in your landscaping efforts is more difficult because compaction inhibits root growth.

Stormwater Runoff

Provide for potential problems, especially to control erosion caused by stormwater runoff.

Materials

Use environmentally sensitive or less toxic construction materials. Consider alternatives like concrete siding, for example. If possible, request alternatives to ground poisoning in termite problem regions.

Building Footprint

Aim for the smallest footprint you can in the design of your building. Go up rather than out. A small footprint helps to avoid unnecessary soil compaction and reduces runoff from impervious surfaces.

Silt fence

Web sites

Low Impact Development Guide
http://www.psat.wa.gov/Publications/LID_tech_manual05/lid_index.htm

Low Impact Development Center
http://www.lowimpactdevelopment.org/home.htm

Natural Resources Defense (LID/Stormwater Council page
http://www.nrdc.org/water/pollution/storm/chap12.asp

LID Case Study in the Madera Community, Gainesville, FL
http://www.pathnet.org/si.asp?id=1627

Non-Toxic Termite Control
http://www.greenbuilder.com/sourcebook/termite.html

Green Boating

Web sites

GSA Green Boating Program
http://www.georgiastrait.org/?q=node/34

On the Living Edge - Your Handbook for Waterfront Living

to order see:
http://www.livingbywater.ca/prodservices.html

We only list a few green boating practices that are not commonly mentioned, but they are important to water quality and wildlife. You are urged to check one of the many publications available that go into the green boating topic in depth. Adopt these practices to lessen your impact on water quality and wildlife when boating.

No Wake Zone

A no wake zone of 100 feet is recommended to lessen shoreline erosion and the disturbance of nesting sites of certain waterfowl species. It is important to operate your boat in such a manner as to decrease wake height. Avoid the speed range between "no wake" and "planning" as this is the range that throws the highest wave. Bladder systems designed to enhance wave height for wake boarding should not be used, and especially not during nesting season. Some species' nests are right at the water line, and large waves will swamp the nest and possibly drown new hatchlings.
Examples are the black rail, king rail and pied billed grebe.

Keep away from nesting sites.

Avoid disturbing nesting sites of birds and other animals by not approaching them. If the animal shows signs of having noticed you, you are already too close.

Shallow waters

Avoid using your propeller in shallow water so as not to stir up bottom sediments or harm bottom plants. Raise your motor high if you must use it. Using a pole or paddle is better.

Boat Access

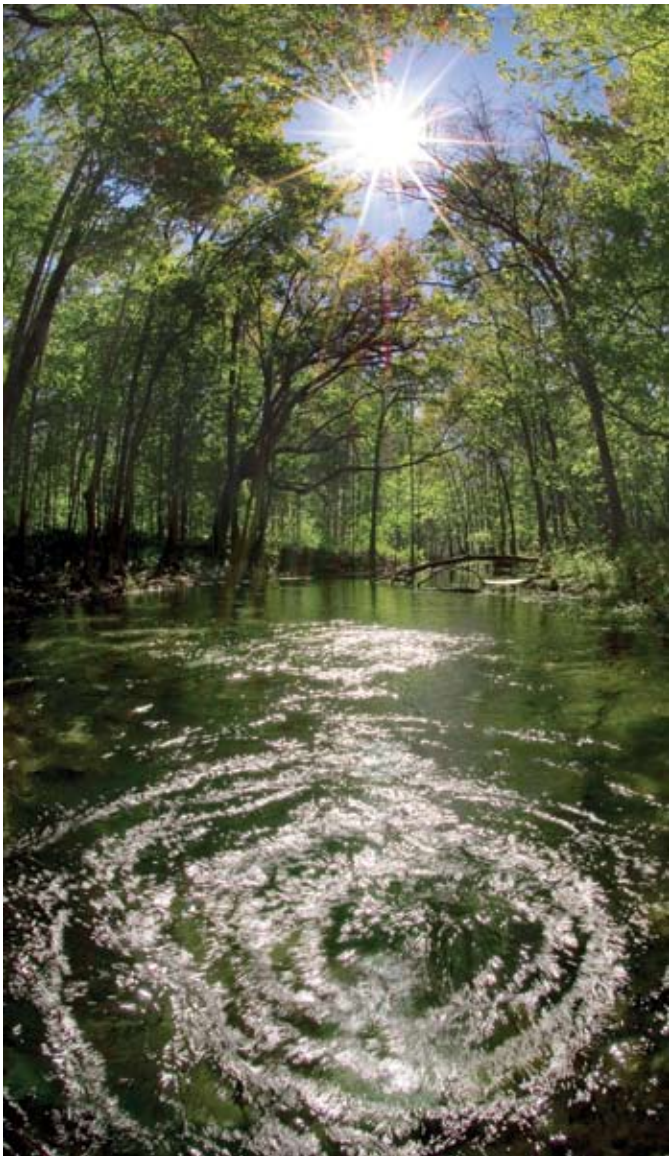
Beach or access a boat in a manner that does not damage the shoreline.

Contaminants

Even small amounts of gas, diesel, and oil can kill or harm aquatic plants and animals, especially those that live in the surface layer. Juvenile fish and shellfish depend on this "microlayer." Surface active agents, or surfactants, are in all soaps and detergents to create suds. They attach to fish's gills, destroying their ability to breathe.

Don't spill a drop!
Oil or fuel spills on the water harm wildlife by: preventing the water from absorbing oxygen - vital to many water organisms; poisoning microscopic organisms living in surface water; damaging the water-protective feathers and coats of animals, and poisoning them as they groom or preen.

Closing Thoughts by Tom Ward



There's Magic in the Water / Ichetucknee Springs
JohnMoranPhoto.com

Waterside living on *any* type of water body is a great privilege. It is important for us to accept and act on the great responsibility that goes with that privilege. As a waterfront resident you have a unique opportunity to make a great impact on preserving and protecting the water body you love and chose to live beside. Embrace that opportunity; put nature's needs ahead of your own convenience. Such actions on your and your neighbors' part will keep your waterway the special place that lured you to settle there.

Many of us are not the original homeowners of our property. Therefore, much of the adverse impacts to your water body might have been the result of the previous homeowner's activities. This situation provides you with the opportunity to correct past mistakes. Given proper attention, many of these impacts can be reversed. It should be the goal of all homeowners to reduce the impact of their properties on their waterway. Those homeowners who have pristine shorelines should be praised and encouraged to continue to be good stewards of our streams, lakes, and springs. Hopefully if they sell their property, they will impress upon the new owner the need to maintain this pristine condition for the good of the water resource.

Some of the things written here may disturb the reader. No one wants to hear that the way they live could be causing harm to a waterway they love. We live in a world where few people are willing to take responsibility for their actions. If you watch TV, the message is consume and be happy, don't worry about the consequences.
However, most of us know deep down that all actions do have consequences. Denying the facts will not change them.

However, we must all realize that nobody is perfect, and none of us can live on waterways without having some effect upon them. Even the Native Americans that lived here likely had some impact on the health of the surface waters. Many adverse things may also happen (such as new development) around the water body that are beyond our control. Hopefully, the information offered in this guide will provide inspiration for all who read it to think about what things they can do to help keep our water resources beautiful and peaceful places for everyone. We should concentrate on setting a positive example for our neighbors, not passing judgement on them. We all love our water resources and want them to continue to provide inspiration for future generations. Thank you for taking the time and caring enough to read this guide. Let's all try to take responsibility for our actions and do the right thing!

Your efforts to protect and preserve water quality, wildlife habitat, and ecological biodiversity will indeed be appreciated by area citizens, but especially by future generations and our beleaguered wildlife.

Tom Ward is a former wetlands biologist who worked for the St. Johns River Management District for many years.

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Elizabeth A. Guillette, Maria Mercedes Meza, Maria Guadalupe Aquilar, Alma Delia Soto, and Idalia Enedina Garcia, 1998
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2. *Beyond the Whales*, Alexandra Morton, 2004, Touchwood Editions, Victoria, B.C.
pp. 6, 7

3. *Full Moon, Flood Tide*, Bill Proctor and Yvonne Maximchuk, Harbour Publishing Company Ltd., Madeira Park, B.C., 2004
p. 6,7

4. *Heart of the Raincoast*, Alexandra Morton and Billy Proctor, Horsdal and Schubert Publishers Ltd., Victoria, B.C., 2001

5. *On the Living Edge*, Sarah Kipp and Clive Calaway, Federation of British Columbia Naturalists, 2002
Much of this booklet was directly excerpted from *On the Living Edge*. We especially appreciate the authors allowing us to borrow extensively and model our Florida version after their wonderful book.

6. *Vegetated Buffers in the Coastal Zone - A Summary Review and Bibliography*. Desbonnet, A., P. Pogue, V. Lee and N. Wolff. 1994. Coastal Resources Center Technical Report No. 2064. University of Rhode Island Graduate School of Oceanography. Narragansett, RI 02882. 72pp. Washington, D.C.
p. 4

7. *Waterfront Property Owner's Manual*, Scheinkman, M., Livingston, E., Knecht, G.; 2001, Florida Department of Environmental Protection, Tallahassee, FL

Web Resources

http://assets.panda.org/downloads/fact_sheet__alkylphenols_food.pdf
Chain of Contamination: The Food Link ~Alkylphenols (octylphenol and nonylphenol isomers)
p. 2

http://www.ourstolenfuture.org/Commentary/News/2002-press.htm
British men
p. 2

http://pubs.acs.org/subscribe/journals/esthag-w/2004/sep/tech/mb_endocrine.html
U.K. To Tackle Endocrine Disruptors In Wastewater

Japan and Great Lakes examples
http://www.oag.state.ny.us/pcb/pcb_longer.pdf
Office of the Attorney General Fact sheet on PCBs
PCB Health Effects with Reference Citations
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http://protectingourhealth.org/newscience/infertility/2003/2003-0617swanetal.htm
Midwest men exposure to atrazine, etc.
p. 2

http://www.ourstolenfuture.org/newscience/humanhumepi.htm
Midwest men exposure to alachlor, etc.
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http://crd.dnr.state.ga.us/assets/documents/GGG2AA.pdf
Vegetated Buffers in the Coastal Zone - A Summary Review and Bibliography, A. Desbonnet, P. Pogue, V. Lee and N. Wolff, 1994, Coastal Resources Center Technical Report No. 2064, University of Rhode Island Graduate School of Oceanography, Narragansett, RI 02882
buffer chart p. 4

http://www.nps.gov/chis/naturescience/kelp-forest.htm
p. 8

http://www.whatcom-mrc.wsu.edu/Fact_Sheets/bull_kelp.htm
p.8

CURRENT PROBLEMS