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KEEP IT CLEAN

A Citizen's Guide To Protecting Our Estuary

Rookery Bay National Estuarine Research Reserve
Florida Department of Natural Resources

National Oceanic and Atmospheric Administration
Sanctuaries and Reserves Division

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TD223.6 .F6 K44 1993 c.2

This guide was funded through a grant (Award # NA17OR0327-01) from the National Oceanic and Atmospheric Administration, Sanctuaries and Reserves Division. It is available through:

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We wish to acknowledge the contributions and assistance of numerous colleagues and friends:

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Jackie Jordon
Keith Kipp
John Kiseda
Eric Lovestrand
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Danny Riley
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Dr. Mike Shirley
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Heather Stafford
Steve Theberge

Special thanks go to Ginger Hinchcliff (whose idea led to this book), Susan Davis, Judy Ott, and Pam Zamora for their assistance with editing.

The Rookery Bay National Estuarine Research Reserve is part of the National Estuarine Research Reserve system, established by Section 315 of the Coastal Zone Management Act of 1972, as amended. Additional information about the system can be obtained from:

The Sanctuaries and Reserves Division
Office of Ocean and Coastal Resource Mgmt.
National Oceanic and Atmospheric Administration
U. S. Department of Commerce
1825 Connecticut Avenue N.W.
Washington, D.C. 20235

Printed on Recycled Paper

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Before You Turn The Page....

Do you use common household products such as laundry detergent, drain cleaner, air freshener, furniture polish, floor wax, paint, rust remover, glue, and batteries?

Do you water the lawn? Do you use fertilizer and pesticides in yard care or gardening?

Does your home run on a septic system?

Do you drive a car? Do you maintain your vehicles or change the oil in your car?

Do you have pets or an aquarium?

Do you have a backyard swimming pool?

Do you live on waterfront property?

Do you fish or play golf?

Do you own a boat or an all-terrain vehicle?

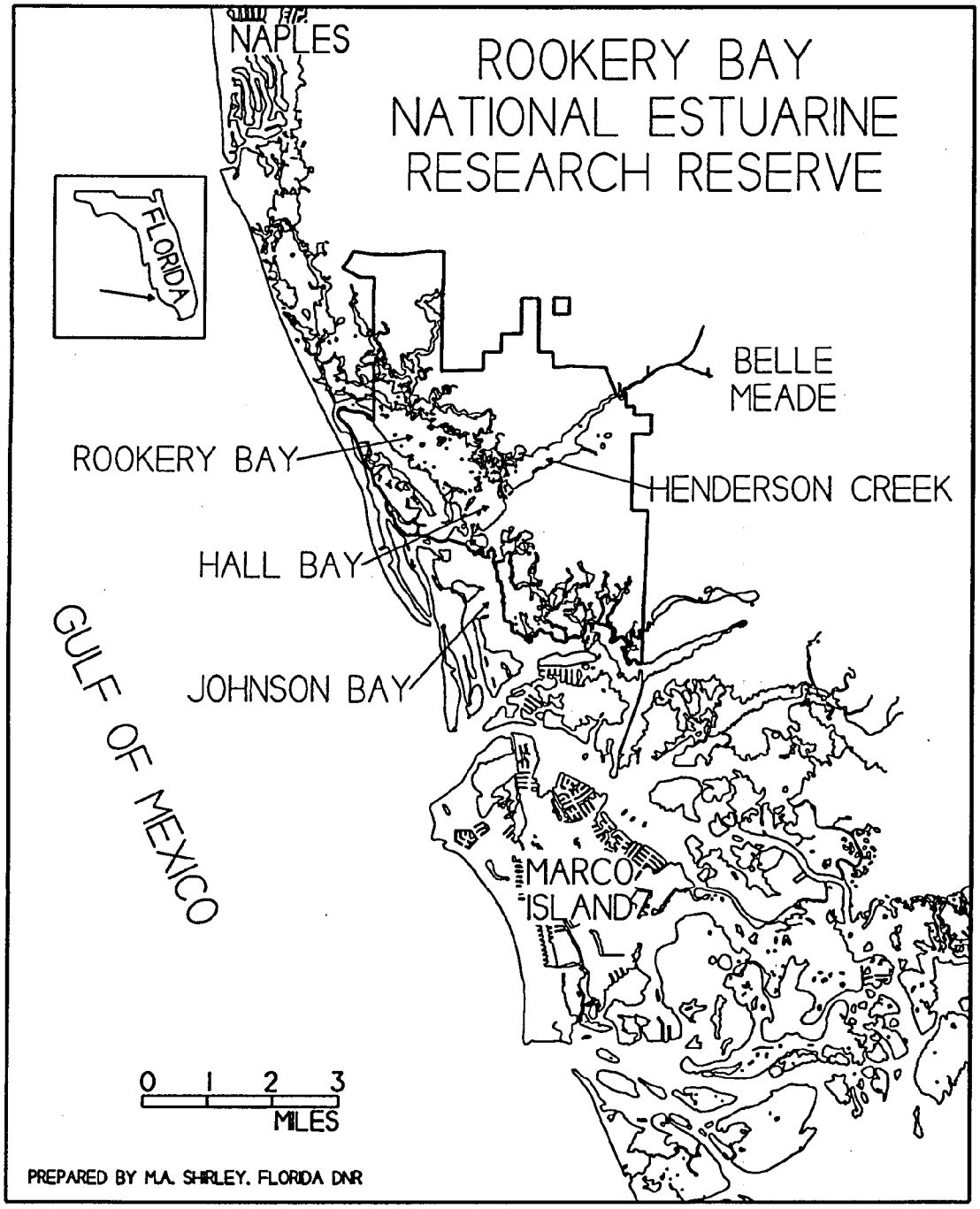
Do you enjoy going to the beach, on picnics, or camping?

Do you vote?

If you answer "yes" to any of the above questions....

The information in this book applies to all of us....YOU, TOO!

Is there a common thread to the above questions? They all have to do with what individuals can do to help prevent water pollution. Most of us would like to do more for the environment. This book gives you the opportunity to do just that! To find out more about water pollution, how individuals can make a difference, and some helpful hints on using Keep It Clean, turn to the PREFACE.


ROOKERY BAY
NATIONAL ESTUARINE
RESEARCH RESERVE
NAPLES
FLORIDA
BELLE
MEADE
ROOKERY BAY
HENDERSON CREEK
HALL BAY
JOHNSON BAY
GULF OF MEXICO
MARCO
ISLAND
0 1 2 3
MILES
PREPARED BY M.A. SHIRLEY, FLORIDA DNR

PREFACE

Water pollution is a problem that most of us are aware of, but feel comfortably removed from. The Exxon Valdez spilled millions of gallons of oil in Alaskan waters, the sewage and hypodermic needles of large eastern cities washed up along the northern shores of the Atlantic seaboard, and the groundwater contamination of Love Canal occurred in New York. However, water pollution is a problem that knows no boundaries. The water which we withdraw for use in our homes is ultimately released as some form of wastewater. Eventually it finds its way into our rivers, lakes, oceans, or the aquifers storing our groundwater.

We are all too often satisfied with the quality of water that comes out of a tap and that of our rivers, lakes, and oceans. Should we be satisfied with purifying sewage, using reverse osmosis, buying bottled water, and installing carbon filters in the kitchen sink to obtain "safe" drinking water? Should we be concerned with declining fisheries, the disappearance of once abundant species, and the deterioration of coastal Florida and the Gulf of Mexico?

Sources of Water Pollution

Most of us associate pollution with major urban centers. We think of smokestacks spewing out fumes, antiquated sewage treatment plants, and outfall pipes discharging industrial wastes directly into a river or lake. A significant amount of water pollution comes from this type of "point source" pollution, or pollution originating from a particular site such as a factory. However, if every industry and city were to shut down and stop discharging wastes for one day, over half of all of today's pollution would continue to reach our rivers, lakes, and estuaries! The U.S. Environmental Protection Agency estimates that 60% of the remaining water pollution in the U.S. can be attributed to nonpoint sources. "Nonpoint source" pollution is generated over the broader areas of our cities, towns, and suburbs rather than from one specific site. It results from the kind of everyday activities that no one thinks twice about such as driving to work, cleaning with household chemicals, and applying fertilizer and pesticides to lawn and garden. In contrast to point source pollution which occurs on a fairly continuous basis, nonpoint source pollution is carried into receiving waters at irregular intervals by stormwater runoff.

Stormwater runoff is the rainwater which runs off our roofs, driveways, and along city streets picking up oil, grease, lead, zinc, and other heavy metals, litter, and dirt from construction sites. In rural areas, runoff flows over the land carrying sediments, fertilizers, pesticides, and animal wastes. Stormwater runoff washes into storm drains, drainage ditches, our rivers, creeks, bays, and the Gulf of Mexico.

Runoff moving across the ground may also sink into the soil and contaminate groundwater resources. Pollutants found in groundwater include pesticides from agriculture, petroleum products from gasoline storage areas, heavy metals from motor vehicles, and nitrates, bacteria, and viruses from septic systems. Rainwater percolating through older, unlined landfills can leach any number of highly concentrated, toxic chemicals and carry them to the groundwater.

If Water Is A Shared Resource, Then Preventing Water Pollution Must Be A Shared Responsibility.

The waters of Rookery Bay are the primary concern of this book. The Coastal Zone Management Act of 1972 addressed the need to protect the nation's inshore marine habitats and established the National Estuarine Research Reserve system under the direction of the National Oceanic and Atmospheric Administration (NOAA). NOAA is responsible for designating estuaries as reserves and administering the system in cooperation with state governments. The two Florida reserves, Rookery Bay and Apalachicola Bay, are managed by the Florida Department of Natural Resources, Division of Marine Resources. A third Florida NERR, located on the east coast, is being considered for designation. However, government agencies, laws,

and regulations alone cannot fully ensure the future of the Rookery Bay National Estuarine Research Reserve.

Without the help of individuals and a greater community effort, Rookery Bay and the great wealth of life within its waters will decline. Nonpoint source pollution is produced unintentionally; we need to address it! It is ironic that we often end up polluting our environment by how we care for it. Carelessly using something as simple as soap in our homes or fertilizer on our lawns, affects the people who live downstream and impacts all other life downstream as well. **Individuals can make a difference**. When a whole community makes the commitment to work together, the results can be astonishingly successful. Just imagine saving 30 gallons of water in your home each day. Your new water-conserving habits are magnified enormously when 100 other people in the neighborhood get behind the project and do the same. Together you have saved over 3000 gallons of water!

Using KEEP IT CLEAN

An "environmental audit" is the first step to becoming environmentally responsible. Careful examination of our daily routines may reveal that some of the most ordinary things we do are also the most harmful! This book can assist you with your own environmental audit. Used as a guide, it can help you determine if what you are doing has a positive or negative impact on our waters. Clearly this isn't the final word on preventing water pollution. The possibilities are open and waiting to be explored. Some suggestions will be useful to you, others will not. Use what best fits your personal circumstances.

Background at the beginning of each chapter and individual sections within chapters provides information on specific pollution problems. Background information is intended to further your understanding of the environment, in your own space (inside and outside of the home) and the greater Rookery Bay area.

Key Concepts, summary statements in bold print, focus attention on the most important points of a chapter or section.

Bullets are bolded and suggest steps that the average citizen can take to help solve water pollution problems.

Safety Concepts are in bold print to alert the reader to potential health risks and safety hazards.

"How To" Concepts are shaded and highlight longer, explanatory blocks of information.

Appendices provide further information.

Resources within the Appendices list agency and organization addresses and telephone numbers to which the reader is referred throughout the book.

Self Evaluation is included at the back of the book for you to cut out, return by mail, and let us know what steps you have taken in preventing water pollution. You may come up with a few creative ideas of your own, too! Let us hear from you. Your feedback can help us evaluate the book and determine future outreach programs.

Although you may be tempted, please don't skip the INTRODUCTION! It has some startling statistics about Florida waters and how we use water. It will also introduce you to Rookery Bay, the estuary, and our watershed. You will never again think of water as only something to drink, swim in, or boat on!

INTRODUCTION

Ask anyone....yourself included, friends and neighbors, a Florida native, a northern snowbird, and even a first-time tourist to imagine Florida and make a list of the most striking images which come to mind. What are the most vivid and lasting impressions of Florida? Palm trees, orange groves, and Disney World; alligators, ospreys, snail kites and the vast expanse of sawgrass and shining waters of the Everglades; the heyday of Miami Beach and faded elegance of Art Deco hotels; fishing the black tea waters of the Suwannee River or the brilliant blue waters off the Florida Keys. The answers will be surprisingly diverse, but invariably one response will appear throughout the list.....water.

Bordered on three sides by the waters of the Atlantic Ocean and the Gulf of Mexico, the Florida coastline runs a distance of nearly 11,000 miles. Equally impressive are the more than 7700 lakes, 1700 rivers and streams, and 300 springs throughout the peninsula. With outflows ranging from less than one gallon per minute to millions of gallons in one day, springs remind us of the amazing capacity of Florida's aquifers. These vast, hidden, underground reservoirs of groundwater provide 90% of us with drinking water. Thousands of acres of wetlands (riverine floodplains, marshes, swamps, prairies, sloughs, and cypress forests) must also be included as a major part of Florida's waters. Perhaps because water has such an extraordinary, widespread presence in Florida, it is taken for granted. As Florida's population continues to soar, water resources can no longer be thought of as endless.

Based on data compiled by the U.S. Geological Survey, the U.S. Water Resources Council makes projections concerning water use in the U.S. Regarding the daily volume of fresh water withdrawn for use in the home, Florida ranks among the top ten states. The average Florida resident uses approximately 175 gallons of water per day. This amount is well above the nationwide average of 110 gallons and almost three times the amount used by Great Britain and western Europe which is only 59 gallons per person per day. Intense demand for water in heavily populated coastal areas may exceed local water supplies, particularly during the dry winter season when populations peak. Increased pumping in coastal areas can damage wetlands and lead to saltwater intrusion. We are certain to see rising costs for pumping and treating water as well as increased competition for water among municipal, industrial, and agricultural interests.

Rookery Bay....Backyard Treasure

Not so very far beyond your own backyard, there is another "backyard".... Rookery Bay. Although it is of much greater scope and harbors extraordinary wealth, it remains largely unknown to most of us. It may be surprising to think of water as having greater value than gold, oil, or a pirate's stolen cache. However, water can be equated with life. Water is essential to all living systems, regardless of whether we are considering a small forest pool with tree frogs or one of the great cities of the world. Water is the lifeblood of Florida and our most important link to the environment. It supports Florida's natural resource base, sustains wildlife and fisheries, and contributes greatly to Florida's economy.

Rookery Bay National Estuarine Research Reserve is of special interest, because it has many of Florida's ecosystems within its boundaries and is a microcosm of the greater Florida peninsula. Upland habitats within or adjacent to the Reserve include assemblages of pine flatwoods, cabbage palm, oaks and other hardwoods, and tropical hammocks. Strands and pockets of coastal scrub remain here. Rookery Bay has important wildlife values and plays a significant role in providing habitat and maintaining species diversity. Species found or sighted in the Reserve and listed by the Federal Government and state Game and Fresh Water Fish Commissions as endangered, threatened, or of special concern include the West Indian manatee, Atlantic loggerhead sea turtle, gopher tortoise, bald eagle, least tern, Eastern indigo snake, Florida scrub jay, and the

Florida panther. The cypress community, a freshwater wetland habitat, is scattered throughout the Reserve. Tangled mangrove forest, parts of which are neither land nor sea, and the fluid expanse of grasses, sedges, and rushes of salt and freshwater marsh, compose more than 90% of the emergent wetland vegetation. The many backbays and numerous islands form one of the most extensive mangrove areas in Florida. Marine and estuarine animals find food, shelter, and nursery habitat within the warm, quiet waters and dense thicket of prop roots. Herons, egrets, and other coastal birds nest within the mangroves of the overwash islands.

Estuaries.....Where Rivers Meet the Sea

Located between wave-dominated beaches to the north and a network of low energy lagoons and coastal mangrove islands to the south, Rookery Bay is a dynamic and ecologically complex estuary. Estuaries are shallow, inshore marine habitats where the waters of a freshwater stream flow to the sea and meet salty ocean waters. An estuary may be a bay, lagoon, the mouth of a river, or any other drainage area with a connection to the sea. Productivity is tremendous with over 75% of the fish and shellfish that are important in Florida's commercial and sport fisheries spending part of their life cycles within the estuary. The open waters of Rookery Bay harbor over 100 species of fishes.

Other estuarine habitats found within the waters of Rookery Bay include seagrass beds, mud flats, and oyster bars. Growing submerged in shallow waters, seagrasses support a diversity of aquatic organisms including fishes, crustaceans, echinoderms, and sea turtles. Like the mangrove forest, the seagrass meadow provides a safe nursery habitat, traps sediment, and stabilizes the bottom. Mud flats and oyster bars are home to worms, mollusks, crabs, insects, and tiny organisms buried within the top layers of sediment. Though not easily visible to the naked eye, the open waters of Rookery Bay are teeming with countless, drifting plant and animal life, phyto- and zooplankton. Plankton is used as food by nearly all aquatic animals. The food web, or who eats what, is always the business at hand. A frenzy of activity is continuously taking place beneath the deceptively calm waters, where food items are being grazed on, nibbled at, shredded, munched on, filtered, speared, or swallowed whole.

Canoeing the quiet backwaters offers the unique Florida experience of observing dolphins, manatees, and birds foraging in shallow waters. Although we can easily observe these and other higher levels in the food web, we should not forget the fallen mangrove leaf floating about, beginning to decay. Bacteria and fungi are industriously working away, breaking down the leaf which will disintegrate into thousands of tiny food particles for such small critters as shrimp, snails, and worms. Eventually the finest organic matter dissolves and can be filtered or absorbed by animals in all the major estuarine groups. In addition to the food web, aquatic productivity, and fishing, other important estuarine values include flood control, storm and wave damage protection, erosion control, water supply and water quality maintenance, climate regulation, recreation, and aesthetics.

Watersheds

Watersheds are essential to the dynamics and productivity of estuaries. A watershed is the drainage basin or the land area drained by a regional creek, stream, or river system. Freshwater rivers carry dissolved nutrients from upland and wetland habitats into the estuary. Decaying organic debris referred to as detritus and sediments rich in minerals are part of this nutrient inflow. These ingredients, together with saltmarsh, seagrass, and mangrove vegetation, plankton, and bottom sediments, are warmed by the sun and stirred by the energy of wind, rain, tides, and currents. This very enriched broth is responsible for the great productivity of Rookery Bay and other Gulf Coast estuaries.

Although nutrient input is essential to the health of an estuary, too many nutrients can cause serious pollution problems. Fertilizers and malfunctioning septic systems are sources of nutrient pollution. Seasonal

weather patterns worsen the problem. During the dry winter months and times of drought, nonpoint pollutants accumulate, building up heavy loads. When it rains, pollutant loads shock receiving waters and estuarine systems. At the beginning of a storm, when the first flush of contaminants is washed into area waters, aquatic life is subject to intense stress and damage.

An area of land known as Belle Meade is the primary watershed of Rookery Bay. The Belle Meade Watershed includes most of the area which drains into Henderson Creek and the Ten Thousands Islands. Freshwater flow into Rookery Bay comes from Henderson Creek to the west and from Stopper and Sandhill creeks to the northwest. Agriculture is currently the most significant use of land in the Belle Meade area, along with single-family residences. Located approximately 10 miles southeast of Naples and comprised of over 100,000 acres, Belle Meade is largely undeveloped with a number of diverse habitats including hydric pine flatwoods, scrub, mixed swamp, pond apple sloughs, tropical hardwood hammocks, cypress domes, strands, and savannas, cabbage palm hammocks, wet prairies, freshwater marsh, salt marsh, and mangroves.

Rain disappears through the deep, sandy soils, replenishes the water table, and trickles down through cracks within the thick limestone aquifer to recharge groundwater. Wetlands store surface water and vegetation slows and filters stormwater runoff before it is channeled into Henderson Creek. Rookery Bay depends on clean freshwater inflows to dilute seawater, provide nutrients for plant productivity, and help create its unique estuarine environment. Problems arise when the quality, amount, and timing of freshwater inflows are altered. The loss of freshwater input and terrestrial nutrients can result in the deterioration of salt marsh, mangroves, and seagrass beds due to increased salinities. Clearly, the protection and preservation of the Belle Meade Watershed and Henderson Creek Basin are of critical importance to Rookery Bay.

Waters In Balance

As we have seen, Rookery Bay is a body of water that is made up of many different elements. All of the biological organisms (animal, plant, and bacteria) and physical and chemical parameters including temperature, salinity, pH, and dissolved oxygen exist together in "balance". If this estuary or any other "living" body of water is disturbed, the balance is lost, the waters begin to die, fish kills result, and other aquatic species gradually disappear.

We have to learn to think of a body of water as an ecosystem, the stability of which is proportional to the number of species that inhabit it. Consider an aquarium as the living body of water which symbolizes a much larger pond, bay, or an ocean. Imagine adding drops of oil, detergent, pesticides, or paint thinner to it with an eyedropper. Think of the eyedropper as a river draining stormwater runoff from the watershed. A penny and a nickel tossed into the aquarium are the heavy metals from automobiles. At some point, conditions in this little body of water will change for the worse so that fish, crabs, plants, and bacteria will be unable to survive. Regardless of size, rivers, lakes, estuaries, wetlands, and, yes, even oceans are vulnerable to pollution.

It is only recently that we have learned that management of water resources must protect the natural environment as well as meet our urban, industrial, and agricultural needs. Estuaries are sensitive to pollution and subject to pressures from coastal development. Southwest Florida is one of the fastest growing areas in the United States. Collier is one of four coastal counties containing 97% of the total permanent residential population in a regional group of six counties. Northern seasonal residents increase the population of this area by an additional 22% during the winter. Our presence is disturbing the "balance". Florida's history has always involved water, often with drastic ecological consequences. Ultimately, it is up to each of us to write a new chapter in Florida's water history....one for the better.

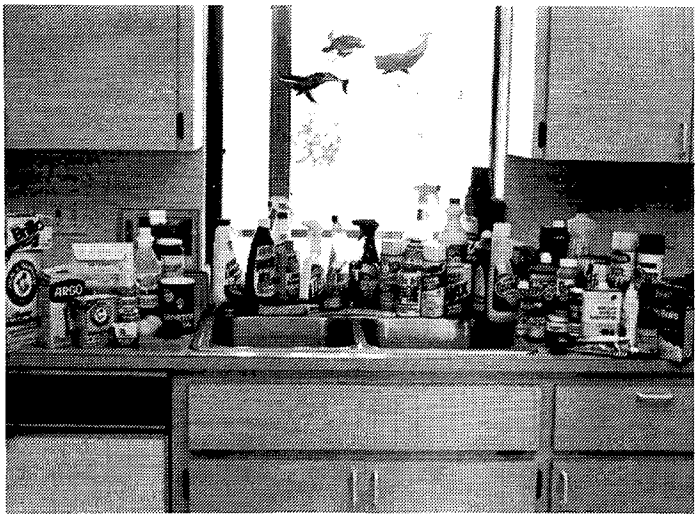
AT HOME

At Home, the beginning chapter of KEEP IT CLEAN, includes a number of different sections ranging from Household Chemicals to Aquariums. Being cautious with chemicals and the benefits of conserving water are obvious to everyone. However, you may very well wonder why a section on aquariums is included. Seemingly harmless aquariums have had a major impact on Florida waters. Reading the background information of ALL chapters and sections will give you a more thorough understanding of the pollution problems threatening our waters today. The impact of aquariums and other less obvious water pollution problems will become apparent after reading the introductions.

A young mother with a house cleaning service makes a habit of using natural alternatives to strong commercial products in her business. She helps keep surface and ground waters clean and helps reduce the solid waste stream at the landfill.

Household Chemicals

Preventing water pollution in and around our homes begins with taking an inventory of common household products and cleaners that we use everyday. Look under the kitchen and bathroom sinks, check the laundry and utility room, and survey the shelves and corners of the garage, workshop, and storage closet. Most of our homes will turn up a small chemical arsenal. Oven, drain, and toilet cleaners contain the caustic base lye (sodium hydroxide). Laundry detergents, abrasive cleansers, and mildew removers contain bleach (sodium hypochlorite). Cleaners that dissolve hard water scale deposits contain sulfamic and hydroacetic acids.



Many common household products contain petroleum-based chemicals and other non-biodegradable ingredients. Aerosols, automotive products, metal, shoe, and furniture polishes, floor care products, and bug sprays and pesticides are high in carbon-based organic compounds. Petroleum distillates make some products flammable. Some of the most toxic household products are those used in home maintenance and repair including paints, preservatives, strippers and thinners, glues, and varnishes.

The garages, basements, and attics of older homes are quite possibly storing products that have been sitting for years, and in some cases, even decades. Unknown chemicals with missing or illegible labels

Take care when buying, using, storing, and disposing of household chemicals. Cut down on the number of hazardous household products.

and banned pesticides such as DDT, whose active ingredients are now considered too risky for consumer use, may turn up. Homes with a photography, art, or ceramics studio or a swimming pool, boat, or garden add more chemicals to the inventory.

Most people take extra precautions with strong household cleaners, chemicals, and other substances that could potentially poison or harm children and pets. Few people think twice about pouring chemicals down the drain, flushing them down the toilet, dumping them on the ground, or hosing them off the driveway. We don't stop to consider the dangers when we dispose of "empty" containers by setting them out for garbage pick-up. Cans and other containers with residual chemicals that are trucked to landfills could potentially leak toxins into the air, soil, groundwater, and eventually the food chain. In the case of incinerators, gaseous emissions and other fine particulate matter have the potential to contaminate air and surface waters. The improper storage of toxic ash has the potential to pollute groundwater. We can significantly reduce the impact of hazardous chemicals in a number of ways.

When purchasing household chemicals:

- **Read the label.** It should list the ingredients, instructions for use, storage, and disposal, potential hazards and warnings. Compare a number of products, select the least toxic product, and buy only the amount needed.

- **Buy nonaerosol sprays and biodegradable products that come in recyclable containers.**

- **Buy rechargeable batteries.** Nickel-cadmium batteries are more expensive than alkaline, but can be recharged up to 100 times saving money in the long run and keeping toxic metals out of the landfill or incinerator.

- **Buy multi-purpose products.** Look for the non-phosphate, biodegradable laundry detergent that cleans and bleaches and the all-purpose household cleaner that can clean a variety of washable surfaces: walls, tiles, floors, counter tops, glass, ceramic, and wood.

- **Consider nontoxic alternatives in place of strong household cleaners and commercial products.** Simple ingredients such as soap, baking soda (sodium bicarbonate), washing soda (sodium carbonate), borax, distilled white vinegar, lemon juice, and ammonia can be safe, effective, and economical.

When using household chemicals:

- **Use the product only as directed and only when needed.**

- **Read the label carefully so potential hazards are understood.** Take appropriate precautions (opening windows for adequate ventilation, wearing protective gloves or goggles, removing food and dishes, etc.).

- **Never remove a label.** Labels should remain intact for easy referral.

- **Follow the directions for the amounts needed.** More is not better. More will not clean faster and may even create problems. Continuing to dump lye drain cleaner down a clogged drain after the initial application fails to open it can damage pipes or the septic system.

- **Keep sand, kitty litter, sawdust or some other absorbent material on hand to clean up spills.**

- **Never use chemicals around wells, septic systems, cisterns, or waterbodies.**

CAUTION: **Never mix household products together or use simultaneously. Dangerous chemical reactions can occur. The combination of ammonia and chlorine bleach produces deadly chloramine gas.**

When storing or disposing of household chemicals:

- **Store products as directed.** Products should be kept in a safe, well-ventilated place, out of direct sunlight, and in areas not subject to temperature extremes.

- **Never dispose of paints, preservatives, thinners, brush cleaners, or other solvents by pouring them down the drain, on the ground, or into a street or storm drain.** Some of these products contain the suspected carcinogen methylene chloride, toluene, and other toxic chemicals. Disposing of these chemicals carelessly could destroy the beneficial bacteria of septic systems and sewage treatment plants. Septic systems and sewage plants are not able to break down hazardous wastes completely, so some toxins are carried into area surface and ground waters.

- **Never burn or bury unused chemicals or their containers.**

- **Do <u>not</u> use wood preservatives containing creosote, pentachlorophenol, or arsenic.** Leftover wood preservatives, treated scrap wood, shavings, and sawdust should be delivered to a hazardous waste collection center.

CAUTION: **Store products out of the reach of children.**

CAUTION: **Store products with lids tightly closed. Harmful fumes may escape from an open container; acid may splash the person who reaches for the container.**

CAUTION: **Store products in their original containers. Transferring a toxic substance to a different container is dangerous and could result in accidental poisoning. Some ingredients are chemically incompatible with materials from which containers are made (certain plastics, for example), and will dissolve or melt the container.**

Resource: Refer to the Appendix for a complete list of products and the traditional cleansers and natural alternatives that can be substituted for these products.

How To

What To Do With Leftover Supplies

Unused or partially used paints and decorating supplies can be donated to local organizations such as theater groups, homeless shelters, or to a hazardous waste collection exchange program. If leftover paint cannot be used, place the opened can in a well-ventilated place (preferably outdoors). After the contents solidify, stuff the can with old newspapers, seal the lid, and set out for curbside trash collection. Paint thinner, turpentine, mineral spirits, and brush cleaners containing solvents can be recycled by storing in a closed container until particles settle out. The liquid solvent should then be filtered into a separate labeled metal container and stored for further use. The container with sludge should be taken to a hazardous waste collection center.

Home Water Conservation

Water is an essential resource.... necessary for agriculture, industry, recreation, the environment, and all life. Water conservation is the responsibility of all users including individual homeowners. Wise water use is crucial to Florida's environmental health and general well-being. Rainfall is the only source of fresh water in central and southern Florida, and it is not spread evenly throughout the year. The demand for water is greatest during the winter months when rainfall is at the lowest levels. Seasonal residents swell the population and waves of tourists arrive during the winter. The water problem is compounded in the Naples/Rookery Bay area and other points along Florida's coasts. Seasonal increases in population are greatest in coastal areas where fresh water is least available.

Reducing water consumption saves money. Residents who are on a municipal water system pay for pumping, treating, and distributing water to users. Wastewater treatment bills may be based on the quantity of water used. People in rural areas may have good well water available, but they must pay for the installation, operation, and maintenance of a pump. Most of us use far more water than we need. An average Florida household uses between 60 to over 300 gallons per person per day! By practicing water conservation, we can reduce the amount of water use in our homes between 30 to 40%!

Important ways to conserve water include the following:

- **Use water-saving, flow-restricting shower heads, low-flow faucets, toilet flushing devices, and other water-saving appliances.**

- **Reduce the amount of water used for flushing toilets.** Place two half-gallon plastic milk jugs (cleaned and partially filled with gravel or stones to add weight) inside your toilet tank where they do not interfere with flushing mechanisms. The bottles displace a certain amount of water which refills the tank and cuts down the number of gallons used per flush.

- **Repair leaky faucets, pipes, and toilets promptly.** A steady drip can waste as much as 20 gallons in one day, 600 gallons in one month! Water leaking from the toilet tank into the bowl can waste between 200 and 500 gallons of water in one day! Check your toilets by adding food coloring to the tank. If color appears in the bowl after half an hour elapses without any flushing, you have a leak. Leaking faucets and toilet tanks can

Think about water conservation before turning on the faucet. A few simple changes in our everyday habits reduce water use and add up to save water.

eventually saturate the drainfield of a septic system. Worn out faucet washers and faulty toilet valves account for 5% to 10 % of all residential consumption.

- **Run the dishwasher only when fully loaded.** Use the energy and water-saving cycles with short washes and rinses. Dishwashers can use as much as 15 gallons of water. Water-saving cycles cut the amount by almost half. Dishes can be pre-rinsed or soaked in a stoppered sink instead of under running water.

Remember the Indian Proverb: The frog does not drink up the pond in which he lives.

- **Do laundry at intervals throughout the week instead of doing several loads all at once.** The greatest volume of water exiting a home in one surge is from the washing machine. Washers use between 30 to 50 gallons for a full load. Always turn the water level control to the appropriate setting (low, medium, high) to match the corresponding size load of clothes. Permanent press cycles use an additional ten to twenty gallons of water.

- **Explore recycling "gray water".** If you have a large family requiring many wash loads, consider installing a separate gray or dual water system for bath/shower runoff. Gray water waste is non-sewage as opposed to black water waste from toilets and garbage disposals.

- **Use the garbage disposal only when needed and once at the end of meal preparation and dinner.** Garbage disposals require a large quantity of running water to operate. Garbage sorted for the compost pile and trash collection is preferable to sending it down the disposal.

- **Avoid running water continuously in the kitchen sink.** Rinse dishes, fruits, and vegetables in a bowl. Thaw frozen foods in a container of cold water, in the refrigerator, the microwave, or at room temperature. Keep a container in the refrigerator for cool drinking water.

- **Avoid letting the water run down the drain.** You can save between 10 and 20 gallons of water by turning off the water until it's time to rinse while brushing teeth, shaving, or shampooing.

- **Take shorter showers.** Take a 3 gallon shower instead of a 30 gallon shower and don't fill the bathtub so full.

- **When dining out, inform service personnel not to bring water to your table unless you order it.**

- **Sweep sidewalks and driveways rather than hosing them down.**

- **Wash the car using a bucket and hose with a shut-off nozzle.**

- **Water the lawn, garden, and plants only when needed.** For specific recommendations, see the Watering and Irrigation section in the chapter FRONT YARD/BACKYARD.

Septic Tanks

Water pollution problems associated with malfunctioning septic systems are a major problem. Septic systems are the most frequently reported sources of groundwater contamination. There are over one million septic systems in Florida! Prior to 1970, Collier County had close to 7500 septic tank systems. Following 1976, new septic tanks were installed at the rate of 1000 per year, keeping pace with Collier County's rapid population growth. When properly designed, installed, and maintained, septic systems can provide cost-effective treatment of household sewage and many years of dependable service with little adverse impact on the environment. Whenever someone in your family showers, takes a bath, flushes the toilet, runs the garbage disposal, runs the dishwasher, or washes a load of clothes, wastewater leaves the house and carries along human wastes, dirt, oil and grease, chemicals, nutrients, and bacteria and viruses. Septic systems receive, treat, and dispose of this wastewater and all that it carries.

Whatever is rinsed down the kitchen sink or flushed down the toilet makes its way into the soil and groundwater or remains in the septic tank until it is pumped out.

Because septic systems are underground, they are often forgotten or ignored by many homeowners. Problems arise when normal maintenance procedures are neglected. A failing system becomes apparent when toilets and drains operate sluggishly, sewage backs up, or foul-smelling effluent rises to the ground. In some instances, however, a malfunctioning septic system may not show any indications of trouble. The failure goes undetected, and the system continues to quietly release pollutants into the groundwater.

When a septic system malfunctions, it loses the ability to remove pollutants and disease-carrying microorganisms from the wastewater. What follows is the pollution of groundwater and deep wells supplying drinking water and other household needs. Surface waters, near-shore areas, streams, and estuaries may also be contaminated from leaking systems. When a septic system fails, the homeowner is faced with plumbing back ups, overflows, and expensive repair costs. There is also a very serious potential threat to human health. Our domestic wastewater contains bacteria and viruses that cause hepatitis, dysentery, and gastrointestinal infections.

Another harmful effect of leaking systems is the addition of nutrients to surface waters. Nitrogen and phosphorus act as fertilizer, foster excessive growth of algae and submerged aquatic weeds and vegetation in area waters, and disturb the natural balance of aquatic communities. Dissolved oxygen can be used by the vegetation and depleted to the point where fish and other aquatic creatures are endangered. In extreme cases, fish kills result. Nitrogen in the form of nitrate poses a significant health threat. Septic effluent carries

nitrogen in the form of ammonia, which undergoes a chemical reaction to form nitrate. Nitrates move through the soil and into surface and ground waters. If nitrates are not diluted by rainwater, concentrations can reach harmful levels and contaminate groundwater and drinking wells. Nitrates interfere with the blood's ability to carry oxygen and are of particular risk to infants.

Naples is one of the fastest growing metropolitan areas in the United States. As the population continues to grow, housing needs expand and new homes are built. The consequence of one faulty septic system multiplied many times over, becomes a problem of enormous magnitude. When added together, the cumulative effect of failing septic systems is absolutely devastating to water quality.

Responsibly use and maintain your septic system:

- **Know the location of all parts of your septic system.** Check your septic tank for accumulation of sludge and surface scum on an annual basis. Most licensed septic companies will do a free inspection as a courtesy service. Sludge and scum should be removed every three to five years, although some systems may operate satisfactorily for a longer period of time. Removing sludge and scum ensures an adequate volume of wastewater in the tank and prevents solids from clogging the soil absorption field.

- **Keep the septic tank and adjacent soil absorption field clear.** Heavy vehicles can collapse drain lines and tree roots can clog lines. The drainfield needs to "breathe" and should not be covered by any hard surface such as a patio or tennis court.

- **Do not use septic tank additives or cleaning compounds.** There is no evidence that yeast, bacteria, enzyme additives, and chemical treatments improve the system.

- **Minimize or eliminate the use of the kitchen garbage disposal.** Using a garbage disposal can increase the solids load to the septic tank by as much as 50%. Never pour grease, cooking oils, fats, or gristle down the sink drain or through the garbage disposal. Grease should be absorbed in paper and put in the garbage. Solidified fats can build up and obstruct parts of the system. A kitchen sink strainer helps reduce the amount of food waste entering the septic tank.

- **Do not use the bathroom toilet or kitchen sink as a trash can.** Burdening a system increases maintenance and repair costs.

Not for septic systems:

kleenex
paper towels
hygiene products
disposable diapers
condoms
dental floss
cigarettes
coffee grounds
grease
cat litter

- **Do not pour household chemicals down the kitchen sink or toilet.** Avoid using strong detergents, solvents, and disinfectants which can destroy the beneficial bacteria actively decomposing sewage. Products are now labeled "safe for septic tanks". Dump cleaning water in the yard. Use toilet paper that has not been bleached, dyed, or perfumed.

- **Use phosphate-free laundry and dishwashing detergents, biodegradable cleaning products, and natural substitutes that will not damage the septic system.**

- **When installing a septic system, have a state-certified contractor evaluate the site.** Factors such as soil permeability, water table elevation, and the size of the drainfield should be explained.

- **Evaluate your septic system when home water requirements change.** Older homes equipped with smaller septic systems may not be able to handle the large amounts of water modern appliances use. Increase in water use may saturate the drainfield and force water to the soil surface. The system may need to be enlarged.

- **Direct rain runoff from roof downspouts and foundation drains away from the septic system to avoid saturating the soil.** Refrain from watering the lawn or vegetation over the drainfield.

- **Conserve water and reduce water flow to the septic system.** Leaking faucets and toilet tanks can eventually saturate the drainfield. For more information, refer to the section Home Water Conservation.

Signs of septic system failure:

- **Sluggish flow from drains in the house and sluggish toilet flushes accompanied by gurgling sounds in the plumbing.** If only one drain is affected, a single clogged pipe may be responsible. If all kitchen and bathroom drains are slow, the problem is likely to be within the septic system.

- **Patches of lush, green grass in the yard indicate the system is allowing effluent to rise near the surface.**

CAUTION: **Effluent rising to the ground. Wastewater forming puddles on the lawn is serious. Children might play in them by mistake. Effluent rising from trenches will appear as a gray-black liquid flowing across the ground or into a ditch or low spot. The liquid will be clearly visible and have an unpleasant smell.**

- **Soft, spongy ground underfoot and the appearance of low spots or depressions in the soil, indicate poor drainage and soil saturation.** Poor drainage due to an undersized or improperly installed system, one located in the wrong kind of soil, or a drastic increase in water use may be responsible for drainfield failure.

- **Noticeable odors inside or outside the house and plumbing back ups indicate septic system problems.**

Note: High water tables are prevalent in Florida, and they can impede drainage. If the groundwater moves into the soil absorption system, effluent can be forced up towards the surface before pollutants and organisms are removed, or the wastewater can be carried along with the groundwater and travel long distances from the absorption area. It is essential that sufficient depth of soil exist between the bottom of the drainfield trench and the seasonal high water table.

Resource: For a detailed explanation of how a properly functioning septic tank system works, refer to the Appendix.

Auto Care

Water pollution problems are associated with automotive maintenance. Many automotive maintenance products and cleaning compounds contain hydrocarbons and other chemicals which can cause water pollution problems. Even in small quantities, oil can severely damage the aquatic environment and wreck havoc on fish, invertebrates, mammals, and birds. Approximately 25% of all car owners change their own oil. According to the Department of Environmental Regulation, this accounts for approximately 180 to 200 million gallons of used oil annually. Only 10% to 14% of this amount is disposed of properly. It is estimated that 62% of all petroleum-related pollution in the United States including oil spills in coastal waterways, is used lube oil which eventually works its way into the ocean environment.

Each year in Florida alone, an estimated 7 million gallons of used oil are disposed of improperly! The used oil may end up down a storm drain, poured over a gravel road with the misguided intention of keeping the dust down, thrown in the garbage, or just discarded in a remote area on the outskirts of town. This oil may end up in a nearby waterbody, it may leach into groundwater, or it may become a source of pollution in stormwater runoff. The four to six quarts of oil from one oil change are capable of producing an eight-acre oil slick. Films of oil on the surface of a body of water prevent the replenishment of dissolved oxygen, block sunlight, and impair photosynthetic processes. A single quart of oil has the capacity to contaminate 250,000 gallons of drinking water. Individuals who dispose of used oil by pouring it down a storm sewer are sending oil into coastal waters. The U.S Coast Guard estimates that sewage treatment plants discharge twice as much oil (15 million gallons per year) into coastal waters as do tanker accidents (7.5 million gallons per year). It just makes good sense to recycle used oil. Refining used oil takes only 1/3 the amount of energy that refining crude oil to lubricant quality requires.

Auto Pollutants:

oil and gasoline
battery acid
antifreeze
transmission fluid
brake fluid
rust preventative
degreasers
car waxes

Oil is only one factor. More than 13,000 leaking underground fuel tanks have been reported in Florida since 1986! In a five county group including Collier, there are more than 900 leaking gasoline storage tanks. Water pollution problems may arise from the improper use or disposal of other auto products. Another water quality problem associated with vehicles has to do with heavy

metals. Such heavy metals as lead, zinc, copper, cadmium, and chromium are found in the tires, brake systems, and hydraulic fluids of cars, trucks, and buses. These metals, along with oil and grease, appear as dark streaks on the road, and are washed off area highways in stormwater runoff after a hard rain. Cars and trucks also pollute water indirectly through exhaust emissions. Lead and hydrocarbon pollutants exiting a vehicle's exhaust system eventually settle and are carried away from the road as runoff. Heavy metals become amassed in the bottom sediments of our streams and estuaries causing adverse impacts to aquatic life as well as contaminating the water.

Never pour oil down a storm drain. Recycling used oil and antifreeze is a must.

Specifics to follow in automobile maintenance:

- **Keep your vehicle in good operating order.** Drive a fuel-efficient car that uses unleaded gas and keep the engine well-tuned to limit pollutant emissions.

- **Check the conditions of belts and hoses.** Replace hoses before they develop cracks and repair fluid leaks immediately.

- **Never discard oil or other automotive chemicals in a careless manner.** Used oil should be taken in a labeled container to a hazardous waste collection center, a county recycling station, or to a local service station that recycles oil.

CAUTION: **Antifreeze/engine coolant contains ethylene glycol, a compound toxic to humans, fish, and wildlife. It poses a special threat to pets. Cats and dogs that encounter a puddle of antifreeze, are likely to lap up the sweet-tasting liquid and die. Used antifreeze goes to a hazardous waste collection center, a radiator specialist, or to a garage with an antifreeze storage drum.**

- **Wash your car only when necessary.** Use non-phosphate or very low- phosphate, biodegradable, mild soaps or detergents.

- **Use a bucket, sponge, and a hose with a pistol grip nozzle.** This kind of shut-off nozzle produces high pressure, uses a low volume of water, and is easily attached to any standard garden hose.

- **Hosing down the car and washing it in sections, followed by a quick final rinse conserves water and limits surface runoff.** Commercial car washes use water efficiently, recycle water, and dispose of runoff properly.

- **Homeowners with large expanses of yard, can wash the car on the lawn and water the grass at the same time.** Avoid parking near the septic tank system.

Resource: Refer to the Appendix for the location of oil and battery recycling facilities.

Pets

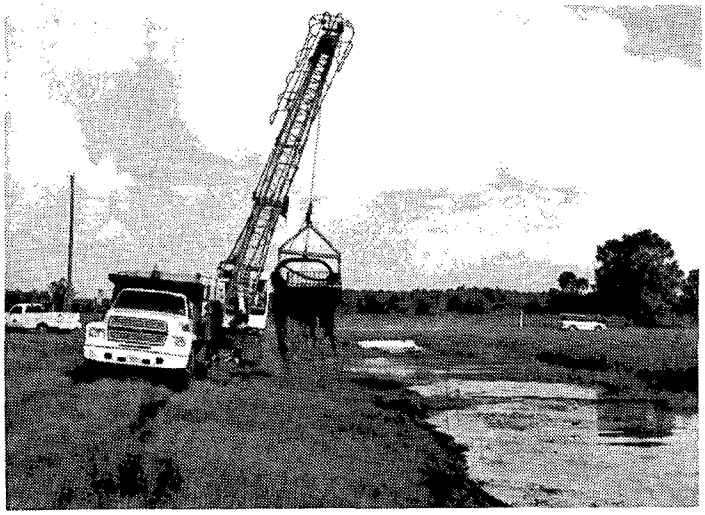
Keep animal wastes out of Florida waters.

"Curb Your Dog", once the customary rule to follow when walking the family dog, is no longer considered to be acceptable behavior because of potential water problems associated with animal wastes. Carried by stormwater runoff, the untreated animal wastes contaminate surface waters with the nutrients nitrogen and phosphorus and with bacteria and viruses. In urban areas, surface runoff flushes pet wastes off sidewalks, streets, and gutters into storm drains and ditches, then carries the wastes into surface waters. Urban ponds, lakes, and wetlands can be contaminated by wastes from Muscovy ducks and other waterfowl. In rural areas, keeping large farm animals such as cows and horses, requires the proper management of manure so that it is not carried into nearby streams by runoff.

Help keep our surface waters clean:

- **Clean up after your pet.** Pick up wastes and dispose of them in the trash. Use a "pooper scooper" when walking the dog on a paved surface.
- **Bury wastes at least 6 to 8 inches below the soil surface and away from surface waters.**
- **Flush wastes down the toilet, if doing so won't stress a septic system.**
- **People who keep horses and other large animals should store manure on higher dry ground and spread manure at least 100 feet away from waterbodies.**
- **Refrain from feeding domestic ducks, waterfowl, and wildlife in city parks and urban wetlands.**

AQUARIUMS



The presence of non-native plants and animals is another serious problem of Florida waters. Florida's sub-tropical climate, 2.6 million acres of inland waterways, thriving aquarium trade, and cattle ranches resulted in the introduction of exotic aquatic plants into state waters. In the absence of native biological controls, these plants spread aggressively, displaced native species, and are controlled at great economic cost.

The aquarium plant, hydrilla, is now part of the Florida flora, having spread throughout the state during the 1960's. A freshwater vascular plant, hydrilla grows rooted from the bottom or drifts in the water. It blocks navigation, depletes oxygen, and leads to deterioration of fisheries. Hydrilla and other aquatic plants became illegal to possess after state legislation was enacted in 1969. The importation, transportation, cultivation, collection, possession and retail sales of aquatic plants are prohibited without first obtaining a permit from the Department of Natural Resources. Other problem aquarium herbs include the sprawling hygrophila and limnophila, which grow in the water and along banks.

Water hyacinth and water lettuce are floating aquatic plants which form dense rafts in the water and mud. The mats interfere with the passage of light and the diffusion of oxygen into the water, shading out and eventually killing beneficial submerged vegetation. Torpedo grass, planted throughout Florida as pasture forage, is another problem species. It grows in both terrestrial and aquatic habitats where it forms large mats.

Exotic and/or tropical fish can present problems, too. The Nile perch and peacock bass are a problem for native sport fishes as they compete aggressively for bedding sites. The impact of the notorious walking catfish is not yet known.

Non-native aquarium plants and animals do <u>not</u> belong in Florida waters.

Help keep Florida waters free of exotic species:

- **Never empty an aquarium into a stream, canal, or any other body of water.** Aquarium plants clog waterways and impede the flow of water. Aquarium fish may displace native fishes. Fish may be returned to pet stores.

Resource: Refer to the Appendix for aquatic plant control information.

Pools

Keep chlorine and pool chemicals out of Florida waters.

Many Florida residents enjoy the pleasures of a backyard swimming pool. Pools require substantial chemical treatment, particularly chlorine, to keep the water bacteria-free. Chlorine and other pool maintenance chemicals should never be drained directly into a street or waterbody.

Follow these precautions when draining swimming pools:

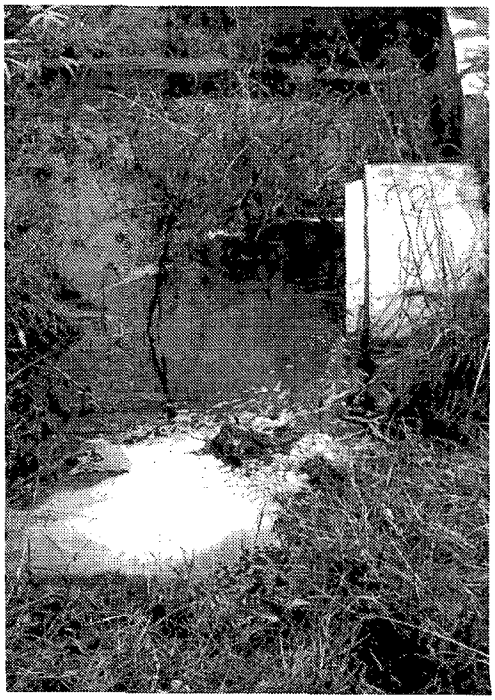
- **Drain your pool only when necessary.** Never drain a pool when water restrictions are in place.
- **Allow pool water to stand for several days without any new addition of chemicals before draining, as chlorine dissipates rapidly.**
- **Drain the pool slowly over a large expanse of yard.** The water can filter evenly down through the ground and be absorbed by the soil.
- **Swimming pool chemicals and containers should be taken to a hazardous waste collection center.**

FRONT YARD BACK YARD

Stormwater runoff is responsible for more than half of Florida's water pollution! It is a problem in both urban and rural communities. Urbanization brings paved roads, buildings, parking lots, tennis courts, homes, and driveways. Rain cannot soak into these hard surfaces, but pollutants can accumulate on them. The pollutant load is large and includes oils and heavy metals from cars and trucks, chemicals used in lawn care and agriculture, a flush of nutrients from septic systems, sewers, and storm drains, and sediments, litter, and other suspended solids from streets and construction sites. During hard rains, stormwater runoff and all that it carries is flushed out to Florida's coastal waters via creeks, canals, and weir systems. Aside from environmental impacts, there are economic impacts. When natural and engineered systems are unable to safely carry and store flood waters, property damage may result. Stormwater pollution may close shellfishing, fisheries suffer, and the cost of providing clean drinking water increases.

A county Principal Environmental Planner teaches Native Landscaping in a community adult education program. By using native plants, homeowners conserve water and keep surface and ground waters free of fertilizer and pesticides.

In the past, areas of scrub, pine flatwoods, and cypress forest were more extensive throughout Florida and Collier County. Runoff moved in wide sheet flow patterns following the natural contours of the land. Vegetated areas allowed rainwater to soak gradually into the ground where it filtered through soils, recharged groundwater, or freshened stagnant surface waters of wetlands and was taken up by plants or slowly evaporated.



Rapid population growth accompanied by continued urbanization interferes with natural drainage processes. We have all experienced driving through flooded areas after a torrential summer downpour. All of this water must go somewhere....into a drainage ditch along the side of a road, down a storm drain into a sewer system, and into creeks or canals which eventually empty into estuaries, bays, and the Gulf.

Although we may think that land use management and stormwater management are the responsibility of city and county governments, what we do in our yards, on our driveways, and in our gardens directly impacts water quality and the health of our lakes, creeks, and estuaries. Our everyday outdoor activities may contribute to stormwater pollution. A thorough examination of a home's exterior, driveway, yard and landscaped areas after a hard rain may reveal problems of drainage, soil erosion, or rapid runoff. How we plan our homes, landscape our property, and care for our

lawns and gardens can greatly reduce surface runoff and help keep surface runoff clean. Creative landscaping has both environmental and economic benefits. In addition to filtering rainwater and preventing erosion, it cleans the air and minimizes dust. By providing natural cooling, it reduces electricity and utility maintenance bills. Landscape screening increases privacy and reduces noise pollution. It provides habitat for wildlife and supports natural communities. Finally, creative landscaping provides beautiful green spaces for family use and enhances the appearance, liveability, and the value of home and property.

Being environmentally healthy does not always mean having the greenest yard on the block!

Lawn And Landscape

Cutting the grass too short, overwatering, and using too many fertilizers and pesticides are the most common mistakes in yard care. A manicured, weed-free, emerald green lawn is not always environmentally sound.

Adopt a sensible lawn care program and landscape plan:

- **Limit the amount of lawn.** Trees, shrubs, ground cover, and other native vegetation absorb many times more rainfall and require less maintenance than a mowed lawn.

- **Avoid cutting the grass too short.** Increased blade height avoids stressing the grass and allows the development of a deeper root system. Adjust frequency of mowing to the time of year, the amount of rainfall, and how high the grass has grown. The general recommendation is to mow so that no more than 1/3 of the blade height is removed with each mowing.

- **Leave grass cuttings on the lawn.** Grass cuttings quickly decompose and are a natural fertilizer returning nitrogen to the soil. Be aware that chemically treated lawns slow the decay process.

- **Keep your lawn mower serviced.** Dull blades do not cut properly and weaken the grass, making it susceptible to pests. Dense, healthy grass eliminates weeds and the need for herbicides.

- **Landscape around your home and throughout the yard.** Strategically planted vegetation will promote water infiltration into the soil. Plants soften the impact of rain and their roots take up water. Leaf debris, mulch, grass clippings, and other decaying organic matter recycle nutrients, build up the organic content of the soil, and improve the capacity of the soil to retain moisture.

- **Preserve existing native vegetation.** Established natural plant communities are self-maintaining and provide benefits including shade, storm and erosion protection, and visual screening. Landscaping can easily complement existing native vegetation.

- **Consider native plants when designing a landscape.** Plants that grow naturally in Florida are heat, drought, salt tolerant, and pest resistant. Native species withstand common disease, weather the occasional cold spell, and eliminate the need for extensive watering and the use of chemicals.

Common Natives:

Trees

live oak
laurel oak
slash pine
cabbage palm
buttonwood

Shrubs

wax myrtle
myrsine
sea grape
cocoplum
lantana
firebush
silver buttonwood

Ground Covers

leather fern
coontie
beach sunflower
sea oxeye
woodbine
gaillardia

- **Remove invasive exotic plants.** Brazilian pepper, Australian pine, and melaleuca grow rapidly, overtake habitat, and prevent the recovery of disturbed land and ecosystems.

- **Recycle unused horticultural waste.** Dispose of grass clippings, leaves, palm fronds, and tree and shrub trimmings on designated yard waste collection days. Horticultural debris accounts for about 15% of all wastes disposed of in Collier County. Solid Waste processes these materials into a weed-free natural mulch which is available at all Collier County waste facilities free of charge.

- **Use a professional lawn care service with a customized service to meet your lawn and landscape needs.** The service should use fertilizers and pesticides as needed, not on a mass-production base with a set number of treatments to deal with potential problems.

Watering And Irrigation

Landscapes can demand as much as 50% of the water used in home consumption. Water-efficient landscaping practices must be adopted now. Wise water use helps to avert emergency water conditions.

Practice water conservation through creative landscaping:

- **Arrange plants in groups according to their cultural needs.** Know the conditions of a plant's natural community. Plant native species that exhibit wide latitude in adaptation to different conditions.
- **Water only as needed, instead of on a fixed schedule.** Heavy summer rains revive lawns overnight. During the fall and winter when there are periods of infrequent rain or cool, cloudy weather, water once every two or three weeks if at all.
- **Irrigate in the early morning, late evening, or during the night to avoid hot sun and a strong breeze.** Water is lost to evaporation or scattered by wind during the day.
- **Direct water sprinklers away from paved areas such as streets, sidewalks, and driveways.**
- **Turn off automatic watering systems during periods of heavy rains.**
- **Explore new technology.** Super-absorbent water polymers form a transparent gel, capture gravitational water from rain or sprinklers, and absorb many times their own weight in water releasing it to plants as the soil dries out.
- **Avoid overwatering the lawn.** Water the yard when the grass fades to a dull blue-gray. Soak the grass and soil in the root zone, not just the top of the blades. Frequent light sprinklings can cause shallow rooting and open the yard to disease pathogens.
- **Observe water use restrictions which are administered through local municipal and county government agencies.**

HOW TO

Irrigating Efficiently

Sprinklers and pop-up spray heads which cover larger areas are best for lawns. Soaker hoses can be used in narrow areas such as borders and areas of ground cover. Low volume drips are suitable for areas where annuals are planted. Micro-jets and bubblers can be used to water individual trees and shrubs. Water is kept at the base of the plant so the root zone is soaked. Bubblers are also useful in smaller areas around patios and pools.

HOW TO

Grouping Plants By Water Need

Create a water-wise landscape by planning the following zones:

1) a very low water zone where native and drought tolerant plants thrive with no irrigation. Watering is needed for a limited time to establish new plantings. Existing native vegetation is included here. 2) a low water zone where plants occasionally require irrigation. Watering is needed only during extended drought. Plants in this zone can survive for a long time without rainfall. A mulched/planted border around a house is an example of a low water zone. 3) a moderate water zone which is functional, limited in size, and easily maintained. Lawn is one of the main parts of this zone. 4) a zone where plants that need more frequent irrigation are grouped closely together including smaller areas such as vegetable gardens, flower beds, and fruit trees. 5) zones with specific sets of conditions. Examples include areas with sandy soils, terrain where water drains off rapidly, and areas of the yard that are too far to reach with irrigation devices. Areas of poor drainage or low wet areas should be planted with trees, shrubs, and ground covers that thrive in wet soils.

HOW TO

Watering The Lawn

Water lawns by applying 3/4 to 1 inch of water per irrigation. This will moisten the soil to a depth of 4 to 6 inches. To determine how long it takes your sprinkler to deliver one inch of water, place several cans at spaced intervals in the spray pattern and run the system until the water level in the cans averages one inch. To water efficiently and for a more exact calibration, follow these steps: 1) For hose-end sprinklers, set 5 to 10 cans (3 to 6 inches in diameter) out at equally spaced intervals in a line from the sprinkler to the far edge of the water pattern. For in-the-ground systems, place the cans at random within one zone and repeat for each zone. 2) Turn on the water for 15 minutes. 3) Measure the depth of water in each container to the nearest eighth- of-an inch. 4) Calculate the average depth of water by adding up the sum of all the depths and dividing by the total number of cans. 5) Multiply the average depth of water by 4 to determine the irrigation rate in inches per hour. This is the amount of water soaking into the soil in one hour. Use the table as a reference for how long your sprinklers should run. If your system operates at a rate of 1 inch per hour and you want to apply 3/4 of-an-inch of water, you would have to turn it on for about 45 minutes.

Irrigation Rate (inches per hour)

	1/2"	1"	1 1/2"	2"
Amount of water to be applied	Time in minutes to run each zone			
1/4"	30	15	10	8
1/2"	60	30	20	15
3/4"	90	45	30	23
1"	120	60	40	30

Erosion And Sediments

Stormwater runoff carries sediment loads from construction sites and eroding stream banks into our estuaries. The resulting turbidity stresses the seagrass community as sediments muddy the water, block sunlight, and settle on grass beds.

Help prevent soil erosion by addressing the following:

- **Land adjacent to a home should slope away from it.** This prevents water from seeping through the foundation.

- **Disperse rainwater from the roof of a house with eave troughs and drain spouts.** Install Dutch drains (gravel-filled seepage pits) at the base of a downspout to drain water into the soil for gradual infiltration. Plant a dense ground cover in problem areas.

- **Plant ground covers where soil is exposed and re-sod bare patches in the yard.**

- **Mulch the exposed soil of heavily trafficked areas.** Mulch gardens, flower beds, and shaded areas with organic leavings such as straw, grass clippings, leaves, pine needles, and melaleuca wood chips.

- **Cover exposed soil or small mounds of dirt with a tarp.** Contain larger piles of dirt from landscaping and construction activities with bales of hay, screening, or a filter cloth fence.

Permeable Pavements

Hard, paved surfaces force rainwater to run off at very fast rates. Erosion, flooding, and stormwater pollution are recurring problems.

Help reduce surface runoff:

- **Limit the amount of paved surfaces around your home.**
- **Consider alternatives to slab concrete when planning or replacing a driveway or walk.** Pre-cast concrete lattice facilitates soil stabilization and permeability allowing slow filtration of rain.
- **Consider the use of interlocking pavers.** Water drains between the stones and down through the ground as no binder is used. Refer to Paving in the yellow pages of the telephone directory.

Permeable Alternatives:

porous asphalt
interlocking pavers
bricks and tiles
flat stones
wooden decks
crushed shells
bark chips

Contouring, Terracing, And Infiltration Devices

Contouring, terracing, and infiltration devices should be considered in areas where stormwater runoff is a problem. Rainwater that is captured, spread, and allowed to infiltrate the soil slowly loses its erosive force. It is important to watch where runoff is directed to be sure that it does not become a neighbor's problem.

Control stormwater runoff and reduce erosion:

- **Use a swale and berm system to slow down runoff or move excess water from one area to another.** Swales are low depressions that collect water. Berms are ridges bordering the swales which direct water into and through them.

- **Channel rainwater across the natural contours of a slope instead of down.** The soil can absorb more water and susceptibility to drought is decreased.

- **A subsurface drainage system may be the answer to extreme drainage problems that cannot be corrected by using a swale and berm system or contouring.**

- **Use a series of terraces to promote gradual absorption over a wider area by distributing runoff in a fan pattern across terrain.**

- **Consider installing a gravel-lined detention basin to hold runoff.** Soil filtration is gradual. Be aware of limiting conditions which can lead to saturation, poor drainage, and standing surface water including compacted soil, clay hardpan, a short depth (1 to 2 feet) to bedrock, or a seasonally high water table.

GARDENING

Gardening in southwest Florida can be something of a challenge. Having to deal with sterile sandy soils, nematodes, and wilting heat can lead to overfertilization, reliance on pesticides, and overwatering.

Basics to follow for successful gardening include:

- **Select an appropriate location for your garden.** A good site should receive at least 6 hours of direct sunlight on a daily basis, be located close to a source of water for irrigation purposes, and have good natural drainage.

- **Analyze the soil.** Determine the soil pH, organic content, and the texture which affects water absorption and drainage. The pH of a soil influences the availability of nutrients to plants and the activity of soil microorganisms. An ideal pH range in sandy soil is between pH 5.5 and 6.3. If soil is too acidic, powdered dolomitic limestone can be added to raise pH. If soil is too basic, garden fertilizers containing essential micro-nutrients can be used. If the soil has a naturally high pH, grow plants that can tolerate alkaline conditions.

- **Develop a garden plan based on the different growing seasons.** Spring is preferable for many vegetables. Southern species and tropicals flourishing in damp heat continue a garden through the summer. Vegetables that thrive in colder weather should be planted in fall and winter.

- **Prepare soil thoroughly by adding topsoil, a soil mix, and organic materials.** Mulch, compost, grass cuttings, and other organic matter should be mixed into the soil at least a month before planting. Well-composted materials can be applied when planting.

- **Use mulch in gardening and for other landscaping needs.** Mulch, a layer of organic material applied to the soil surface, protects plant roots from extremes of heat, cold, and drought. Mulch retains soil moisture, discourages the growth of weeds, slows erosion, and helps prevent soil compaction. Mulching materials include vegetable trimmings, moldy fruit, grass cuttings, wood chips, and a layer of newspaper minus the glossy inserts.

- **Control nematodes by raising the organic content of the soil.** Organic matter encourages a population of beneficial insects, worms, bacteria and fungi which discourages nematodes. In severe cases, pest populations can be reduced through soil fumigation or soil solarization. In solarization, the garden lot is prepared, raked over, and covered with a clear plastic sheet for one month or more. Heat from the sun penetrates the earth and destroys the nematodes.

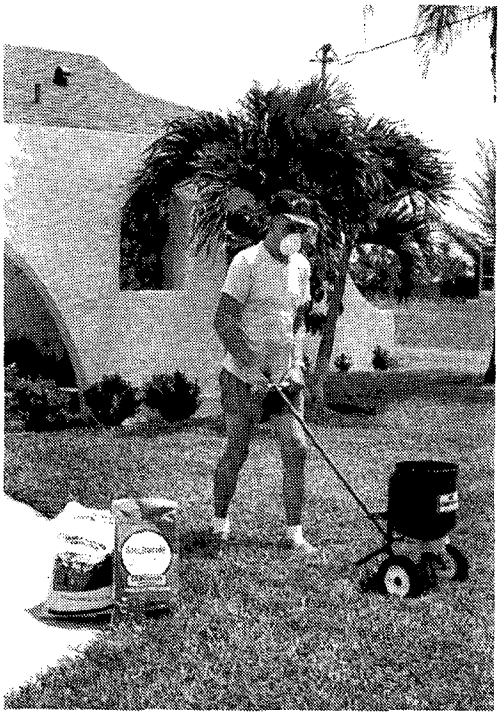
HOW TO

Home Composting

Compost is organic fertilizer manufactured by mixing organic materials such as kitchen scraps (no meats, bones, dairy products, or fats) and non-woody yard wastes with topsoil, manure, fish scraps, and biodegradable paper. Benefits are a continual source of organic materials for mulch and recycling as an alternative to landfill disposal. Composting can be as simple as building a heap (3 x 3 x 3 feet minimally) in a corner of the yard or more complex using a series of turning units or a barrel composter which tumbles the waste for aeration. Composting can be speeded up by shredding wastes, achieving a good carbon to nitrogen ratio through mixing wastes high in carbon (paper, straw, leaves, wood chips, saw dust) with wastes high in nitrogen (food scraps, grass cuttings, manure), providing adequate moisture (damp sponge consistency), and adequate aeration (sufficient air passage) throughout the pile. Turning on a weekly basis can prevent the pile from being smothered so that bad odors don't develop.

FERTILIZERS

Serious water problems result from application of synthetic fertilizers to lawns, gardens, and agricultural fields. Approximately two million tons of fertilizers are applied in Florida every year! Plants can only use a certain percentage of what is applied leaving excess fertilizer to be washed away by stormwater runoff into area waters. Fertilizers containing nitrogen and phosphorus end up feeding our streams and estuaries as well as our lawns and gardens. A creek, canal, or pond enriched by nutrient pollution can be suffocated by excessive growth of vegetation and dense blooms of algae. The rapid mushrooming of vegetation disrupts the balance of aquatic communities and stresses fish and other aquatic organisms by robbing them of vital oxygen, sometimes to the point of kills.



Fertilizer that is not washed off the surface of the yard or leached from the soil during a hard rain, percolates downward into the groundwater. Nitrate concentrations can build up, contaminate drinking wells, and seriously threaten human health. Other problems related to overfertilization include the accumulation of inorganic chemical residues in the soil, the decline of humus content and soil microorganisms, and soil deterioration.

Fertilize wisely:

- **Feed the soil, not the plant; build your garden's soil.** Know what your soil requires before applying fertilizer. Monitor soil fertility by testing on a regular basis, and don't fertilize if it isn't necessary.

- **Use the minimal amount of fertilizer required.** Overfertilization can damage roots, cause excessive top growth, burn lawns, and lead to water pollution problems.

- **Read labels carefully.** Select a fertilizer that has little or no phosphorus and approximately 60% of the nitrogen in slow-release water insoluble form. Be wary of words such as "natural" and "organic". Some organic fertilizers have too high a content of phosphorus for watershed nutrient control standards.

- **Fertilize during the dry season, generally from October to May.**

- **Avoid applying fertilizer on windy days, prior to a forecast of heavy rains, or near paved surfaces.** Sweep up spilled fertilizer so it doesn't wash off in the next rain.

- **Never apply fertilizer within 50 feet of a waterbody.**

- **Use fertilizer according to package instructions.** Never use a fertilizer formulated specifically for gardens on the lawn or vice versa. Fertilizer is generally applied when the soil is moist. Watering lightly helps it sink into the root zone.

Pesticides

The use of pesticides has created another set of environmental problems. Home gardeners use more pesticides per square foot in their gardens than farmers do in their fields! Pesticides are polluting our streams, lakes, and aquatic ecosystems. Chlorinated hydrocarbons and other chemicals are produced to resist breaking down under normal conditions. After application they may be leached from the soil through precipitation or carried off the surface by runoff.

Chemicals formulated to kill specific organisms regarded as pests have unintentionally killed or damaged other plant and animal species. The insecticide DDT was commonly used throughout the United States until the late 1960's. Now banned, DDT washed into waterbodies and entered aquatic food chains. Bald eagles that ingested contaminated fish were unable to nest successfully.

Insecticides used to control specific pest populations may end up killing predatory spiders, insects, and other beneficial organisms which could have controlled the pest population naturally. Other problems resulting from widespread pesticide use include the development of resistance to pesticides and resurgence by a pest population, secondary pest outbreaks in which a non-target organism becomes a pest, and accidental poisoning by swallowing, inhalation, and absorption through the skin.

Although DDT and other dangerous pesticides (Chlordane, Lindane, Dieldrin, etc.) have been banned or are under strict regulation, information on pesticide toxicity is limited The Environmental Protection Agency is responsible for the registration of pesticides. Detailed examination of data on short-term and long-term environmental impacts, health, and safety is a continuing process. The availability of a product at your local hardware store or garden center does not guarantee that it has undergone a thorough evaluation.

Integrated Pest Management reduces pesticide use:

- **Buy disease and pest-resistant varieties of plants.**

- **Time planting with an awareness of insect life cycles.** It is possible to avoid specific pests and peak infestations. Keep records of dates when problems occur for reference.

- **Avoid monoculture gardening techniques.** Spot planting or growing a certain type of plant in several sections of the garden can allay total destruction if pests move in.

- **Use intercropping or planting alternate rows of complementary plants.** Planting herbs between vegetables will attract beneficial insects that prey on pests. Examples are herbs belonging to the mint family and some members of the carrot family.

- **Use mixed or companion planting to discourage insect pests.** Some herbs and flowers can be used as borders to effectively repel insect pests.

- **Use rotation.** Shifting the growing locations of vegetables inhibits the stabilization of pest populations. Giving the land a rest helps reduce fertilizer use, too. Divide the garden into sections and leave one part fallow.

- **Include perennial beds and mulched paths in your garden plan as habitat for pest-eating critters.** Allow annuals and perennials to go to seed before pruning them to provide food and cover.

- **Plant trees, shrubs, and groundcover of varying heights to accommodate birds, lizards, toads, and other wildlife.** Diversity is a part of the stability of natural systems. A balanced ecosystem will include natural enemies as a check on the explosion of pest populations and the overexpansion of all species.

- **Encourage the presence of beneficial insects by growing a number of insect-attracting plants that will provide both nectar and larval food.** Dragonflies, ladybugs, and green lacewings are helpful. Spiders are voracious predators. Caterpillars are parasitized by some species of wasps. Have patience as there will generally be some lag time between the appearance of a pest population and the point when natural enemies move in. Any measures taken prior to their arrival should not kill off the natural predators.

- **Use physical barriers and mechanical means to prevent and control pests.** Cover seedlings with a fine mesh cloth or wrap aluminum foil around the plant base. Mites and aphids are knocked off with a burst of water from the garden hose. Homemade traps can be made by collecting leaves of the plant to which the target insect is attracted. Flat wooden boards placed on the ground next to plants can end a slug problem.

- **Care for your garden.** A properly watered and fertilized garden is less susceptible to disease or pest infestation. Keep the garden and yard free of insect-attracting debris such as fallen fruits and vegetables, old sacks, baskets, and other rubbish. Remove pots, watering cans, and other containers which hold water as they are breeding places for mosquitoes.

- **Inspect the garden at least twice a week for insect damage.** Examining seedlings and plants early each morning for potential problems can prevent a major infestation. Remove egg clusters, larvae, and adult pests by hand. For assistance in identification or control recommendations, take a specimen of the pest or evidence of its damage to the Collier County Extension Service.

- **Use biological controls WITH CAUTION.** Bacillus thuringiensis (BT) kills leaf-eating caterpillars by paralyzing the digestive tract, but is not appropriate for use in areas where butterflies are attracted. Synthesized hormones can be used to alter the growth, development, and reproduction of an insect.

- **Use chemical pesticides only as a last resort.** Pesticides labeled "CAUTION" are less toxic than those labeled "WARNING" which are less toxic than those labeled "DANGER". Safer insecticidal soap and dormant oil sprays are less toxic than conventional synthetic pesticides. Choose synthetic pyrethroids over organophosphate- or carbamate-based products. Pyrethroids remain in the environment for a shorter time.

- **Treat all pesticides as potential poisons.** Follow directions and safety precautions. Refer to the Household Chemicals section and the Household Hazardous Waste Chart for more information.

- **Apply pesticides in late afternoon or early evening to avoid killing bees and other pollinators.** Stop applications during harvesting season.

- **Never apply pesticides near wells, streams, canals, marshes, or other bodies of water unless the instructions specifically allow for such use.** Never apply pesticides on a windy day.

- **Never apply pesticides to bare ground or eroded areas.** Many pesticides bind to the soil and would wash into storm drains and waterways along with sediments during a heavy rain.

HOW TO

Using "Safe" Pesticides

Natural insecticides derived from plants can be used. Pyrethrum, derived from the chrysanthemum, should only be sprayed directly on the pest as it is non-discriminatory and will kill beneficial insects as well as harmful species. Quassia, derived from the bark of the Picrasma quassidoes tree, is effective against sawfly, leaf miners, and soft-bodied aphids and caterpillars. One of the safest botanical insecticides, Quassia doesn't harm bees, ladybugs, and other "good" insects. Other low-toxicity pesticides include mild soap solutions such as Ivory liquid. Insecticidal soap has a potassium salt base which destroys pest membranes. Soaps should be applied directly on the insects and are effective against aphids, mealy bugs, scale, white flies and red spider mites. Homemade plant sprays such as table salt spray, tomato leaf spray and other recipes using a variety of ingredients (onion, garlic, hot peppers, pungent herbs) can all be tried. Effectiveness will vary. Consult an organic gardening reference for more information.

- **Never hose down pesticide leaks or small spills.** Cover the spill with an absorbent material such as sand, sawdust, or kitty litter, and sweep it into a sturdy bag. Double bag this and take it to a hazardous waste collection center. Wash down the area (if a hard- surfaced floor or driveway) with a solution of water and bleach or a strong detergent.

Resource: Refer to Resources in the Appendix for more information concerning native plants, lawn care, landscape management, gardening, integrated pest management, and pesticide spills. The Collier County Extension Service provides educational materials and offers advise and workshops. The South Florida Water Management District has important educational materials about xeriscape, water conservation through creative landscaping.

WATERFRONT PROPERTY

Special responsibilities come along with the pleasures and advantages of living on the water. Waterfront property owners living along a bayfront, creek, or canal have access to these waters and the opportunity to protect and monitor them. Florida's economical well-being and ecological health are tied to fisheries, wetlands, and estuaries. The loss of submerged lands to private development and the construction of finger canals have resulted in the destruction of estuarine habitats and the loss of aquatic life along the Florida coast. Progressive siltation from these activities contributes to the reduction of the rich biological productivity associated with our estuaries.

A retired couple from up north regularly canoe the creek behind their home and keep an eye out for pollution problems. The banks are kept clear of debris and the waters are protected.

Another source of sedimentation is shoreline erosion. The removal of mangroves and other vegetation including salt tolerant grasses contributes to increased erosion and the destabilization of the shoreline. Red mangroves, with their characteristic prop roots, help prevent natural wave and tidal erosion along the shoreline. The mangroves absorb and diffuse the impact of boat wakes and act as a buffer in the event of hurricanes or tropical storms. Removal of the mangroves breaks the food web at its base and interrupts the natural cycling of detritus (decaying leaves and other organic debris) into the estuary and offshore waters. Detritus is an essential food source for fish, shrimp, crabs, other invertebrates, and plankton.

Natural shoreline vegetation, particularly the red mangrove, has the ability to absorb nutrients and pollutants found in stormwater runoff. Excessive amounts of nutrients and pollutants are prevented from entering the waterbody. With so many septic systems and package sewer plants seeping into drainage ditches, coliform bacteria counts in area waters can only increase as vegetation is removed. Cutting vegetation to lower the height causes a decline in filtering efficiency and nutrient absorptive capacity.

Shoreline vegetation provides shade along waterfront banks and acts as a water temperature regulator. Cooler waters have the capacity to hold more oxygen, a factor critical to the survival of

aquatic plants and animals. Removing or trimming vegetation can result in rising water temperatures and decreased amounts of dissolved oxygen. Warmer water temperatures do not support the diversity of fish that cooler temperatures do, and less desirable fish become more abundant.

When mangroves and native shore grasses are replaced with a hardened shoreline such as a seawall, the benefits of a once naturally winding shoreline are lost, shoreline length is shortened, and stormwater runoff problems are greatly exacerbated.

Help preserve natural shoreline and protect our estuaries:

- **Protect the natural slope and native shoreline vegetation.** Modification of shoreline structure through changing natural contours and removing or cutting vegetation, can eliminate benefits including productivity, water quality maintenance, shoreline stabilization, flood controls, and feeding, breeding, and nursery habitat for marine species and birds.

- **Revegetate areas with native plants.** Take into consideration the existing vegetation (find out what the original vegetation was before removal or alteration), water depth fluctuations, tidal activity, water salinity, shoreline slope, drainage characteristics and any other site specific factors. Refer to an environmental consulting business that specializes in shoreline vegetation.

Waterfront property owners have the unique opportunity to preserve natural shoreline and maintain native vegetation.

- **Plant shoreline vegetation along a gentle slope from higher ground seaward.** Plants will be able to filter pollutants efficiently.

- **Use biodegradable paper, sisal nets, or a tarpaulin when planting on a steep bank or eroded area.** This prevents erosion and helps stabilize the bank until vegetation covers and holds the soil.

- **Regrade the shoreline landward of mean high water with a gradual slope.** Recommended slope measurement is between six to three feet horizontal to one foot vertical. Variances may be needed.

- **Place a swale and berm system in areas where stormwater runoff is a major problem.** Swales should have gradually sloping sides to be able to catch runoff. Pollutants can then filter through the soil.

- **Create a percolation basin or pond to retain stormwater runoff.** Basins are appropriate in spaces with natural contours forcing runoff to drain into one or two locations.

- **Use terracing to help control erosion and runoff problems on waterfront property with steep backyards.** A series of tiers with the last tier meeting the water's edge could incorporate a swale and berm system, a ground covering that would not require mowing or fertilizer, and native shoreline vegetation.

- **Use native plants in landscaping the backyard near the bank. Plants should be suited to site specific drainage features.** Non-native species may require fertilizer or pesticides which damage water quality and harm the ecosystem.

- **Remove exotics (Australian pine, Brazilian pepper, and melaleuca) and replace them with native vegetation.** These species spread aggressively and become established along coastal zones, canals, banks, and drainage ditches. They shade out, displace, or exclude desirable native species which stabilize the shoreline and are part of the estuarine food web.

- **Keep the adjacent waterway free of organic yard debris such as grass clippings, shrubbery trimmings, and palm fronds.** Debris lodged in a creek bend or rotting at the end of a canal uses up dissolved oxygen in the process of decomposition, depriving fish and aquatic plants of needed oxygen.

- **Dock planning:** Design the dock access ramp and the main platform in accordance with Florida Department of Natural Resources regulations. Use the smallest possible area and a plan which is environmentally sensitive. Consider sharing a dock with your neighbor. Consider alternatives to building docks.

- **Plant native vegetation seaward of a hardened shoreline or a seawall.** The soil must be at mean high tide or higher.

- **Consider the building and maintenance expenses as well as environmental concerns before hardening a shoreline.** Sloped riprap is preferable to a seawall. Vertical seawalls are more vulnerable to erosion, wave, and storm damage.

HOW TO

Taking A Stream Walk

Monitor the creek, canal, or waterbody adjacent to your property. Walking, canoeing, or boating along the waterway behind your home on a regular basis can alert you to any number of problems. Look for erosion, stormwater runoff, and turbidity problems generated by road and bridge construction. Are turbidity screens in place and functioning properly or are the waters near the worksite disturbed and muddy? Get to know your waterway and keep an eye out for algal blooms, fish kills, and discharge of sewage. Debris in waterways can interfere with natural flow and block fish migration. Be aware of areas along the stream where dumping has occurred. Trash, derelict vessels, and white goods such as old washing machines and refrigerators should be removed. Mark the location of potential problems on a map. Refer to Resources in the Appendix for a list of government agencies that should be notified in the event of finding a derelict vessel, large obstructive trash, or oil and other hazardous waste.

CAUTION: **The toddler or young child who wanders off is far less likely to drown in the shallows along a natural shoreline. Mangrove prop roots and other vegetation give a child something secure to grasp hold of. A vertical seawall is a steep drop and a child would never be able to climb the slick concrete slab.**

MANGROVES AND PERMITS

Mangroves are native trees of inherent value to Rookery Bay and the Florida coast. Mangroves contribute to marine ecology in a number of ways. They provide feeding, breeding, and nursery habitat for a large assemblage of species, filter nutrients from stormwater runoff draining uplands, maintain water quality, and protect shorelines from erosion and flooding. Mangroves, along with all trees and woody vegetation, are protected in Collier County. Violations of these regulations may result in fines and criminal prosecution.

Red mangroves grow at the water's edge and are easily identified by their characteristic, tangled prop roots. Black and white mangroves are the two other local species. If you are uncertain whether or not a tree is a mangrove, bring sample leaves to the Collier County Extension Service, DER, or DNR. Mangroves should not be pruned, cut, removed, or altered in any way unless a vegetation removal permit has been obtained. This applies to freeze-damaged mangroves, too. For more information concerning permit applications, requirements, and fees, contact Collier County Project Review Services. Upon obtaining a permit, notify an environmental inspector in Compliance Services. A courtesy call helps to inform field staff that the property owner is not in violation of mangrove regulations.

Resource: For more information concerning projects requiring variances, boat docks, and vegetation permits, refer to Resources in the Appendix for a listing of government agencies, addresses, and telephone numbers.

RECREATION

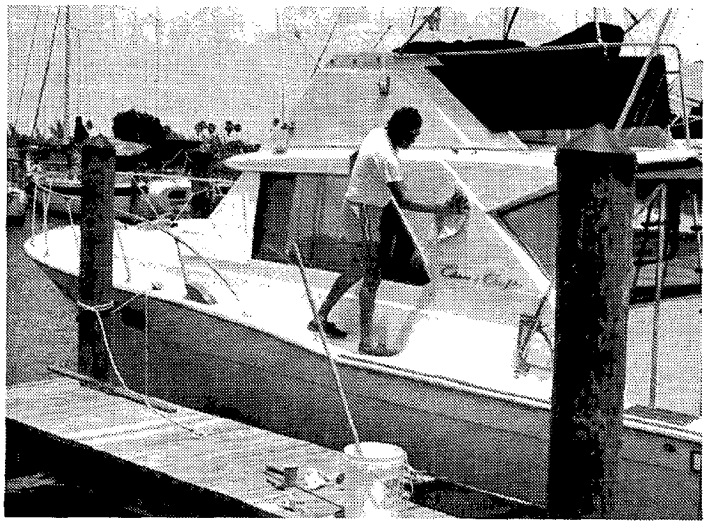
Florida's coasts offer a bountiful, seemingly infinite number of wonderful recreational opportunities. Further inland, Florida has a large number of rivers, lakes, and springs where visitors stop and enjoy recreational activities. Boating, fishing, swimming and diving are the activities that are most often thought of in connection with coastal ecosystems. People are out on the water in all manner of ways from large sailboats and cabin cruisers to the lone windsurfer or jet skier. Golf, along with so many other outdoor activities, is available all year round. Windswept beaches of coastal strand and barrier islands beckon us to take long walks at the water's edge. These activities which provide relaxation and bring so much pleasure can adversely affect Florida's waters, when carelessly undertaken.

Well aware that plastic items and other marine debris can harm or kill marine mammals, the scout troop meets at the beach and collects litter as part of an Adopt-A-Shore program.

BOATING

There are one million registered boats in the state of Florida. This number dramatically increases seasonally. A total of 15,140 boats registered in Collier County between June 1, 1991 and May 31, 1992. Boating directly impacts the health of our waterways and Rookery Bay. By understanding the potential negative impacts of boating activities and observing precautions associated with boating, boat owners can help ensure the health of Rookery Bay and preserve it for future generations.

Shoreline erosion, a major source of sediment, is a complicated problem. Erosion and deposition are naturally occurring geological processes, continuing over time to reshape topographical features of the earth. A river channel changes, a beach erodes, and a new pass is cut through the mangroves. Boat wakes amplify the problem of shoreline erosion. Erosion is a particular problem in narrow creeks, canals, the Intracoastal Waterway, and inlets where wakes wash heavily against the banks. The extent of shoreline erosion caused by a boat's wake depends on the energy of the wave, which in turn, is related to the hull size, boat speed, the distance from shore, and the depth of the water the boat is operating in.



Rookery Bay, like many of Florida's estuaries, harbors and bays, is shallow. Eroded sediments

may cause further shallowing or create an unwanted shoal. In addition to narrow erosion-prone areas, seagrass beds are subject to sedimentation. Highly productive seagrasses grow in shallow depths where they receive adequate light. Seagrasses are particularly sensitive to turbidity. When there is increased turbidity, sunlight is cut off to the grass beds, seagrasses die off, and algae become more abundant, creating more problems for estuarine and marine ecosystems.

The other major problem associated with boats has to do with the release of chemical pollutants into area waters. Fuel, cleaning agents, and chemicals used in boat maintenance are toxic and contribute to the degradation of bay waters. Cleaners contain acids, alkalies, and petroleum distillates. Paints, paint removers, lacquer thinners, and solvents contain substances such as chlorinated hydrocarbons, ketones, toluene, and xylene, which are not only toxic to aquatic life, but present health risks to humans as well. Fuels and chemicals used in the operation, cleaning, and maintenance of a boat should be used with extreme care.

Boat Operation

Reduce the impact of your boat's wake on shoreline erosion. Slow down before, rather than after, the speed limit marker.

- **Observe posted speeds and NO WAKE signs.** Narrow areas should be navigated at low idle. Along with being a safe boater and helping to minimize shoreline erosion, you may also prevent a manatee tragedy. Be aware of manatees.

- **Operate your boat in appropriate water depths.** Leave adequate clearance (at least 12 inches) between the boat propeller and the submerged bottom. Avoid shallow areas to keep from churning up the bottom. The turbulence caused by a propeller exceeds beyond the depth of the motor's lower unit, causing damage to benthic or bottom-dwelling communities.

- **Avoid cutting through seagrass beds.** Become familiar with areas where seagrass beds are abundant. If you inadvertently enter a shallow seagrass area, follow these steps: cut your engine and back out of the vegetation with a pole or paddle. Seagrass beds are vital to the health of the estuary. They suffer extreme damage from propeller scarring and take years to recover.

- **When fueling the boat, avoid spilling fuel or overfilling the gas tanks.** Learn to estimate fuel consumption relative to your boat's tank capacity. Tighten the cap and clean up any spilled fuel. Fuel overflow is dangerous to people as well as aquatic life.

- **Bilge water should be discharged offshore in deeper waters when possible.** Fuel, oils, and chemicals that are spilled in a boat are discharged with the bilge water. It is important to keep your boat clean and free of spills.

Boat Maintenance

- **Maintain your boat engine to avoid any oil leaks.** Many area marinas recycle motor oil. If you change the oil in your boat, bring used oil to a marina which provides a used oil drum for recycling or to a hazardous waste collection center. Never dump oil into a waterbody, a storm drain, or roadside ditch.

- **Rinse and scrub your boat with a brush and water.** When soap is necessary, use one that is biodegradable and phosphate-free. Cleaning your boat on a regular basis will help to avert the need for stronger cleaning agents.

- **Avoid products with "WARNING" or "DANGER" on the labels; they can kill marine life if washed overboard.** Always select the least toxic product available.

- **Limit the use of cleaning, dissolving, and painting agents in maintenance; they are toxic to aquatic life.** When working on your boat during the annual haul, be conscious of the materials used and the toxicity of each. Take care in following the manufacturer's directions. Hazardous wastes and their containers should be taken to a hazardous waste collection site. Refer to the Appendix for more information.

- **When scraping or sanding the bottom of a boat, place a drop cloth underneath for safe disposal of the scrapings.** Anti-fouling boat paints containing copper or tin inhibit the growth of barnacles and are extremely toxic. Use of tributyltin (TBT) bottom paint is now restricted by federal legislation.

- **Thoroughly clean the boat's hull, propeller, and trailer after using the boat in other waters.** Never discharge bilge or ballast water from foreign waters into Florida harbors or marinas. Boats have been responsible for the accidental introduction of exotic aquatic plants and animals into U.S. waters, causing stress and damage to native species and changing the ecosystem.

- **Consider dry storage.** Benefits include lower maintenance costs and reduced environmental impacts.

Air Boats, PWC's, And ATV's

Recreational crafts and vehicles should avoid environmentally sensitive areas:

shallow waters
bird rookeries
mangrove islands
erosion-prone areas

The operation and maintenance of air boats and personal water crafts have some of the potential negative impacts associated with boating. Because of special features or compact size, air boats and PWC's have access to areas that naturally restrict most boats. Many of these areas are environmentally sensitive. As an air boat skims over the water's surface, the weight of the boat pushes down, producing a pressure wake. In shallow waters air boats leave a trail, pressing down vegetation, disturbing bottom sediments, and damaging bottom- dwelling organisms. Personal water crafts run on an impeller system which has the potential to create turbidity in shallow waters, and they use a gas/oil fuel mixture.

All-terrain vehicles provide outdoor experiences for some individuals, but if driven indiscriminately, they can damage the environment. All-terrain vehicles can traverse any number of habitats including fresh and saltwater marshes, pine flatwoods, scrub, and cypress swamp. Over a period of time vegetation is killed, areas are left bare and subject to erosion, and a set of tracks becomes an unwanted road. Tearing up areas of land can alter the natural flow of rainwater runoff and drainage patterns. All-terrain vehicles can be very disruptive to wildlife, especially those creatures which are buried in the mud at the sediment-water interface or the top layers of the soil.

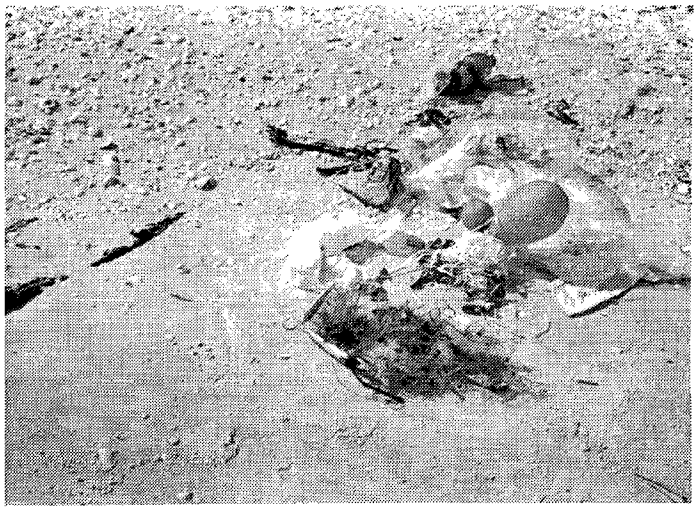
Air boat and PWC operators should observe the following boating precautions:

- **Observe posted speeds and NO WAKE signs.**
- **Avoid cutting through seagrass beds.**
- **Avoid spilling fuel and clean up any spills immediately.**
- **Clean the air boat or PWC with a brush, sponge, water and a biodegradable, phosphate-free soap.**

All-terrain vehicle operators can help protect water quality and native plant and animal communities as follows:

- **Avoid environmentally sensitive areas including marshes, cypress swamps, and scrub.**
- **Operate all-terrain vehicles at moto-cross parks, cross-country courses, and other areas reserved for all-terrain vehicles.**

Marine Dumping And Debris



Dumping untreated sewage into coastal waters may contaminate shellfish. Severe gastrointestinal illness or infectious hepatitis can develop in the unlucky individual who consumes contaminated shellfish. Human wastes also contain the nutrients which contribute to algal blooms and oxygen depletion in shallow, inshore waters.

Marine debris will not disintegrate, has the potential to harm aquatic life, and has the potential to damage boat engines by clogging intake valves and ports and becoming tangled around propellers. Plastic bags are mistakenly ingested by sea turtles as jelly fish, a common food item. Monofilament fishing lines and six-pack plastic rings can entrap pelicans and other seabirds, and ultimately strangle or starve the birds. Whales, dolphins, and other marine mammals are at risk through ingestion or entanglement of plastic refuse.

Help protect Rookery Bay, offshore waters, and marine life:

- **Regarding sewage disposal, use onshore sanitary facilities whenever possible.**
- **Use marina pump-out stations to empty your boat's marine sanitation devices or holding tanks.** The U.S. Coast Guard requires the use of sanitizing gear or an onboard holding tank within three miles of shore.
- **Marine sanitation devices use chlorine and disinfectants.** Chlorine degrades water quality and negatively impacts aquatic life. Discharge of treated waste is strongly discouraged and should occur only when necessary and in offshore waters deeper than 20 feet, where tidal movement will disperse waste.
- **Designate an area where trash can be stored on board the boat.**
- **Secure any loose items so they do not blow overboard when the boat is in operation.**
- **Never throw anything (cans, plastic objects, leftover food, etc.) overboard.**

Eliminate marine dumping and debris:

sewage discharge

plastics

monofilament line

old nets and hooks

- **Know the procedures for the safe removal of fish hooks, monofilament line, and other fishing apparatus.** Know the procedures for rescuing injured birds.

- **Follow appropriate "catch and release" practices when fishing.**

Resource: Refer to Resources in the Appendix for the agency or organization to contact concerning boating and fishing violations, injured manatees, or for assistance in dealing with an injured bird or animal.

Beach Outings, Picnics, Camping, And Community Events

Trash is the most visible kind of pollution we encounter at the beach, in our parks, forests, wildlife sanctuaries, and on roadsides. Large public events drawing crowds of people create potential litter problems unless trash disposal facilities are easily accessible and arrangements for collection and removal are well-orchestrated.

Trash is easily removed and even more easily prevented.

Balloons, often sold or given away at fairs, festivals, grand openings, and other large community events can be fatal to wildlife. Balloon releases are now unlawful in the state of Florida. Balloons are commonly made from latex or Mylar plastic. Keep in mind they can quickly turn into a form of plastic litter and are capable of killing or debilitating sea turtles, seabirds, migratory waterfowl, and marine mammals.

Help keep public recreational areas clean:

- **Carry a bag to remove any trash at the end of an outing.** Involve all family members in trash collection. Allowing the kids to participate will help instill responsibility in young children.

- **Use public restroom facilities.** Do not allow children or pets to urinate in the water or defecate on the beach.

- **Encourage your municipality or county to provide clean, adequate restroom facilities and maintain them.** These public areas should also have an adequate number of readily accessible garbage cans.

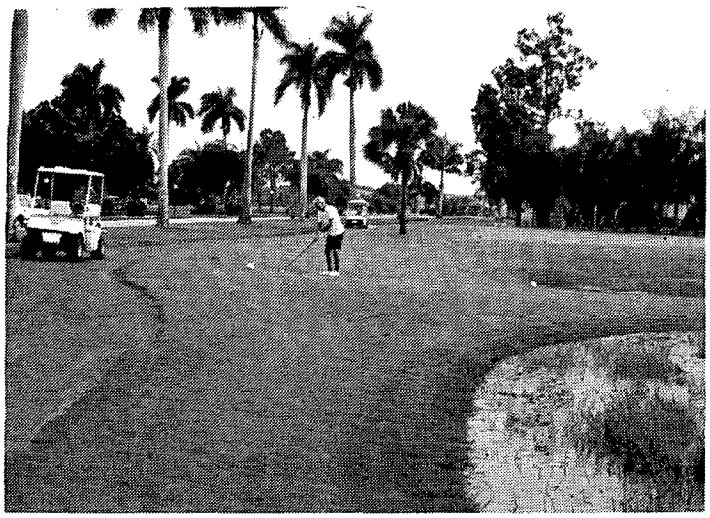
- **Recover lost or downed kites.** Kite flying is a popular beach activity. Lost kites may drift offshore. If not recovered, kites and other plastic items pose a serious hazard to sea turtles, birds, and marine mammals.

- **Be responsible for food and drink containers, balloons, and other items acquired at fairs and other public events.**

- **Participate in Beach Clean-Ups and Adopt-A-Shore programs.** Beach Clean-Ups are a treasure hunt turning up some fascinating items as well as trash. Participants enjoy the community spirit and the satisfaction of a job well done at the end of the day. The local Adopt-A-Shore is run through The Conservancy, Inc. and is a part of the state's "Keep Florida Beautiful" program. Refer to the Appendix for more information.

Golf

Naples is known for its many beautiful golf courses. Pesticides and fertilizers are used in the care and maintenance of golf courses. Pesticide is a general term and includes insecticides used to control insects such as fire ants and mole crickets, herbicides to keep the course free of weeds and aquatic weeds that would proliferate in ponds and water traps, and fungicides to control fungi. The potential problems related to pesticide usage at golf courses are compounded by pesticide use at nearby tomato farms, throughout the canal system, and areas under mosquito control. Agriculture relies on the use of pesticides. Florida's citrus groves, tomato fields, and spring and fall vegetable crops use another group of pesticides. The herbicides Garlon 3-A, Aquathol-K, and Glyphosate are used to control aquatic vegetation as part of canal maintenance, and Baytex and Malathion are used in mosquito control. Pesticides often contain toxic organic or inorganic chemical compounds. Depending on their purpose, pesticides may be specifically formulated to resist natural decomposition processes, or they may be formulated to break down quickly.



There is considerable controversy surrounding the use of pesticides and a continuing debate over potential health risks. Both the short-term and long-term effects of pesticide use and exposure with respect to the health of humans and the health of ecosystems need to be addressed. Five to ten years ago, it was a routine practice to station the rental equipment used for pesticide application at a golf course maintenance facility. The result of locating the equipment in the same spot year after year resulted in pesticide accumulation and groundwater contamination.

Environmentally compatible maintenance of local golf courses can help protect Rookery Bay and area waters.

After application, pesticides may leave residues of poisonous active ingredients, inert ingredients, additives, or impurities. As chemicals decompose, a substance may be broken down into a different compound, one that may be more or less toxic than the original pesticide. A residual constituent may be harmless in and of itself, but in reaction with another substance forms something even more toxic.

Pesticides targeting and controlling one pest, may have devastating effects on another non-target group of organisms as an unwanted side effect. Even for those pesticides which are relatively weak, the

cumulative effect building over ten, twenty, or fifty years, may have serious consequences for the quality of area waters as well as certain species. The factor of the unknown will always be a risk and can no longer be ignored.

South Florida's weather patterns of hard spring and summer rains coming after a long dry season, send a huge pulse of pesticides, fertilizers, oils, greases, heavy metals, and other pollutants into creeks, canals, and estuarine waters. Stormwater runoff channels into drainage ditches. Low areas that were bone dry are turned into wetlands overnight. Wading birds forage in these temporary, seasonal wetlands, and their food chain may be affected detrimentally. In areas where stormwater runoff and other sources of extra nutrients such as sewage effluence exist, nematode parasites can proliferate and infect fish populations. Although adult wading birds can tolerate some parasites, feeding infected fish to their young may cause some of the nestlings to die as a result of organ damage or secondary infections caused by the nematodes.

Avid golfers help protect area waters and wading birds by taking an active interest in the management of local courses:

- **Encourage the use of Integrated Pest Management (IPM), as an alternative to the complete reliance on pesticides.** IPM monitors pest problems, takes into consideration environmental factors, and uses synthetic pesticides only as needed.

- **Encourage the minimal use of pesticides, herbicides, insecticides, and fertilizers where older pest control practices are still being used.**

- **Encourage the use of an "all-natural fertilizer mix".** Bone meal, feather meal, wheat germ, soya, muriate of potash, enzymes, and soil microorganisms are some of the ingredients found in a natural fertilizer. Natural fertilizers help to reduce the number of applications, may prolong the length of time the course remains green, and work to increase the soil's ability to hold water.

- **Encourage the use of a no-phosphorus fertilizer or a low-phosphorus formula fertilizer, if phosphorus must be applied.** Example: a 12-4-8 formula indicates 12% nitrogen, 4% phosphorus, and 8% potash by weight.

- **Encourage the use of a fertilizer that releases slowly despite the presence of water.** A high percentage of the nitrogen (at least 60%) should be in the form of Water Insoluble Nitrogen (WIN). Slow-release fertilizers benefit the golf course and downstream bodies of water. The greens receive a steady input of nitrogen. Slow-release fertilizer washing into area waters will not be immediately available to the plant life, thus preventing algal blooms and uncontrolled aquatic weed growth.

- **Encourage the periodic testing for pesticide contamination in golf course waterbodies, adjacent creeks, and groundwater.**

Pesticides used at local golf courses:

MSMA 6.6
Illoxan
2,4-D Amine
Amdro
Dursban
Manzeb
Acephate
Ansar 6.6
Kerb 50-W
Baygon
Proxal
Direne
Pre-M
Sencor 75
Glyphosate
Oftanol 2
Sevin

COMMUNITY

A community can mobilize for water pollution prevention, clean-ups, environmental planning, and growth management. Although they may not be fully aware of it, ordinary citizens do have the power to exert influence and bring about change. Our consumer decisions have considerable leverage. We can make a significant impact by reducing our demand for water and electricity, petroleum products, paper, wood, metal products, and land. It naturally follows that we can also reduce the amount of toxic, non-biodegradable wastes which we produce and discard and in the process create serious water pollution problems that are injurious to all life.... humans included.

A businessman works on implementing a recycling program in his condominium. He belongs to a local conservation organization and keeps abreast of community environmental issues.

We need to ask ourselves if we really need a particular product and weigh the benefits vs. the potentially harmful effects. Using environmentally friendly products and changing the timing of activities in order to minimize environmental impacts can make a difference. We have seen from the preceding chapters that what each of us does individually has an enormous impact when taken collectively. By developing an awareness of our everyday actions, seriously examining those actions, and practicing new non- polluting, water-conserving habits we can protect and preserve Rookery Bay, the watershed, adjacent lands, and our aquifers, waterways, estuaries, and natural resources in general. Working together, we can all move towards a more sustainable Florida.

Actions we can take to become an "environmentally wise" community:

- **Vote.** Elect officials who support environmental protection. Attend community election forums and town hall meetings where candidates discuss their views and find out how they stand on local, regional, state, national, and global environmental issues. Monitor a candidate's voting record and compile voting charts on officials running for re-election to help inform the general public. Request first-time candidates, who are without a voting record, to complete an environmental survey.

- **Make your views known to elected officials.** Letter writing to local, state, and federal officials and to environmental regulatory agencies, is one of the simplest and most effective ways to

influence public policy. The best time to call or write is when decisions are being made. Write legislators before a vote on a bill. Write environmental agencies when a regulation has been proposed. Follow the news to keep track of legislation. Field offices of state agencies can also provide information.

- **Garner support by writing a brief, concise letter to the newspaper editor.** Suggest actions that others can take to assist your cause. Elected officials and decision-makers scan the letters-to-the-editor section to follow public opinion on current issues.

Help spread the word. Share this book with friends and neighbors. Working together to prevent water pollution makes far more sense than cleaning up pollution.

- **Become knowledgeable and involved with local comprehensive planning.** Obtain a copy of the county comprehensive land use plan, local zoning ordinances, and natural resources inventory. Attendance at planning meetings can help you assess what is happening within the community and public presence can be influential. Collier County Planning Commission Meetings are held the 1st and 3rd Thursdays of each month at 8:30 a.m. in the Board of Commissioners meeting room on the third floor of Building F of the Collier County government complex. The agenda for each meeting can be picked up at the Collier County Community Development Services building, on the Friday before the following Thursday meeting.

- **Attend city council and county commission meetings.** Let officials know that you are concerned as an individual or as a member of an organization (homeowner's association, conservation group, etc.). Become involved and work to influence decisions. Tackle an issue, become informed on the specifics, challenge the experts, wage a publicity campaign, and submit "best management practice" strategies as solutions to water quality problems.

- **Join an organization.** "Think globally--Act Locally" and become active in the local chapters of The Audubon Society, Sierra Club, The Nature Conservancy, the Naples Chapter of the Florida Native Plant Society, area sea turtle monitoring programs, The Friends of Rookery Bay, Inc., The Conservancy, Inc., or local land trust organizations. Even if you don't have time to participate, membership dues are well-used and newsletters keep you informed.

- **Networking with affiliated groups on a statewide basis can provide valuable information and may yield solutions to similar problems.**

- **Join or form a water association addressing water conservation, pollution problems, and watershed and wetlands protection.**

- **Find strength in numbers.** Form alliances with groups and agencies sharing common concerns. A coalition of environmental groups, civic associations, and service organizations has more influence than one single group. Take your group's concerns to other professional, academic, and civic organizations, too.

- **Involve civic associations, service organizations, churches, scout troops, and other community groups in water quality and natural resource protection.** Arrange speaker/slide presentations, panel discussions with local officials, and half-day workshops on wetlands, estuaries, and water quality issues. Track down speakers from area colleges, retired scientists, staff from state field offices and board members of environmental organizations.

- **Learn first-hand about water quality problems and issues.** Arrange for tours of sewage treatment plants, landfills, large agricultural operations, local creeks, and other areas of special concern. Invite local government officials to attend and initiate discussions on improving water quality. Propose constructive measures to solve pollution problems and protect estuaries.

- **Deal with specific issues.** Concentrate on one particular problem in the community. Avoid tackling many different problems and diluting resources and volunteer manpower. Local environmental groups should use scientists, physicians, engineers, attorneys, teachers, and technicians from within the community to set environmental priorities and help with community actions.

- **Develop educational water quality projects in which students can participate.** Creating and monitoring wetland habitats or planting vegetation at restoration sites are examples. Parents and teachers can encourage water quality projects in school science fairs, 4-H fairs, and other area events where environmental displays would be welcome. Agencies and organizations have many fine educational materials available.

- **Inform your state and federal government representatives about important community projects to protect and preserve our water resources, Rookery Bay, the watershed, and coastal waters.**

- **Request local TV and media coverage of water quality projects, community events, and environmental programs to promote greater public awareness.** Thank them when they cover these issues.

- **Use press releases to local newspapers, posters on public bulletin boards, library boards, and announcements in local calendar listings and organization newsletters to publicize events.**

- **Start a citizen volunteer monitoring program.** Scientific water quality monitoring involves volunteers collecting and analyzing water samples from designated sites. They can document pollution problems (nitrate levels), identify pollution sources, raise public awareness of water quality issues, and educate the public about preventing and reducing water pollution.

- **Organize a stream clean-up and other water quality projects in which all members of the community can participate.** Walk, canoe, or boat local creeks, canals, and designated areas of Rookery Bay to remove trash and check for specific problems including erosion, algal blooms, fish kills, sewage discharge, stormwater runoff, and highway and construction debris. Participate in Beach Clean-Ups, Adopt-A-Road programs, Estuary Day, and other local environmental activities and events. The Conservancy, Inc. organizes "Adopt-A-Shore" in Naples.

HOW TO

Effective Letter Writing

Follow Congressman Morris K. Udall's suggestions (adapted from The Right to Write) for effective letter-writing:

Address it properly.

Identify the bill or issue by number or popular name.

The letter should be timely. Mail so the letter arrives while there is still time for officials to take action.

Focus on your representatives.

Be reasonably brief and concise.

Ask for a response, don't hesitate to ask questions, and request clarification to an equivocal response.

Write your own views. A personal letter incorporating your own experiences and observations is far more effective than a form letter or petition.

Give your reasons for taking a stand. Your legislators may not know all the effects of the bill and what it may mean to an important segment of their constituency.

Show understanding. Indicate an awareness of the proposed bill or ordinance and its potential impacts within your community.

Be constructive and offer alternative solutions.

Ask for specific actions to be taken such as co-sponsoring a bill or supporting an amendment.

Share expert knowledge with your representatives. Well-researched information is appreciated.

Use a personal or business letterhead with a complete return address.

Say "Well Done" when it is deserved. Remember to thank representatives for their efforts. Expressing disagreement politely may help on a related issue later.

Some don'ts include: Making threats or promises, berating your representatives, pretending to wield vast political influence, and writing on every single issue.

Are You Up To The Challenge?

Along with the opportunity to make a significant difference comes the responsibility of making our homes, yards, neighborhoods, workplaces, and the greater Rookery Bay community environmentally wise and environmentally responsible. Everything we do from the way we clean our homes to how we care for our lawns to how we maintain our automobiles can substantially add to or lessen the amount of pollution reaching our surface and ground waters. As long as there is a Florida, our communities are going to continue to grow. We cannot wait for the "next generation" to solve environmental problems, clean up the pollution which we all create, and improve the quality of life.

Aside from holding government and industry accountable for the health of our environment, we must begin to hold ourselves responsible, too. Becoming involved can help our community to more effectively manage water pollution and other environmental problems. Encouraging environmental awareness among friends and neighbors involves talking to people: the neighbor who hoses down the driveway, your friend with the drainage problem in the front yard, and the new family that moved in across the canal and is planning to put in a dock. Teachers, scout troops, and church youth groups looking for a worthwhile community project can benefit from this book as well as homeowner, neighborhood, and civic associations. And most importantly YOU can make a difference.

Following even one or two of the suggestions can make a difference in your home, community, and ultimately the waters of Rookery Bay. In most instances, the greatest requirement of taking the steps outlined in this book is making a conscious decision to change. Some steps require very little effort and considerably less cost, as in making our own cleaning products. Others may have to be implemented over time and at greater cost, as in the case of waterfront property owners restoring a natural shoreline. Most of the actions will make very little difference in the ways we conduct our lives, involving only minor inconvenience, if any, and will simplify our lives in the long run. These actions, however, will have a resounding impact in our corner of the world....Rookery Bay, one part of the great heritage of Florida waters. The greatest tragedy would be to do nothing as a result of thinking that our actions don't count. Each person who does something individually becomes a part of a larger collective effort, which can have a walloping effect when everyone participates! We are counting on your help. Are you up to the challenge?

APPENDICES

NATURAL ALTERNATIVES TO COMMERCIAL PRODUCTS

Oven Cleaner

Avoid the use of harsh chemicals by wiping away grease and spills after use. For spills, let oven cool slightly, sprinkle salt on the spill, wait a few minutes and wipe area clean with a wet cloth. For scouring the oven, use baking soda (do not let baking soda touch wires or heating elements) and a damp sponge. Scour racks and burner inserts with steel wool.

Drain Cleaner

For clogged drains, try a plunger first. Dissolve 4 ounces baking soda and 8 oz. vinegar in a small amount of boiling water. Pour down drain and wait for fizzing to stop. Flush with tap water.

Toilet Bowl Cleaner

Sprinkle baking soda around the bowl followed by vinegar. Scrub with a toilet brush. Vinegar is a mild acid and should remove hard water scale.

Abrasive Powder Cleanser

Sprinkle any of the following on the surface to be cleaned: baking soda, borax, or dry table salt and scour with a damp sponge. Rinse thoroughly with water to remove grit.

Basin, Tub, and Tile Cleaner

Cut a lemon in half and dip it in borax. Rub surfaces with lemon and rinse.

Ceramic Tile Cleaner

Mix 1/4 cup vinegar in 1 gallon of water. Scrub with a brush.

Mildew Remover

Dissolve 1/2 cup vinegar and 1/2 cup borax in warm water. Apply to tiles and grout with a sponge or brush. Wipe and rinse clean.

Glass and Window Cleaner

Wipe away surface dirt with a paper towel or soft cloth. Window Cleaner 1: Mix a solution of 2 tablespoons vinegar to 1 quart water. Apply with a wad of newspaper. Window Cleaner 2: Mix 3 T ammonia, 1 T vinegar, 3/4 cup water in a spray bottle. Wipe down with a squeegee to prevent streaking. Avoid spilling cleaner on painted or varnished woodwork. Window Cleaner 3: Mix 1/2 cup cornstarch in 2 qts. warm water and apply with a sponge. Wipe windows dry with a soft cloth.

Dishwasher Soap

Mix 1 part borax and 1 part washing soda. Depending on how hard the water is, adjust proportions to avoid soap film on dishes.

Furniture Polish

Furniture Polish 1: Mix 1 part lemon juice with 2 parts olive or vegetable oil. Furniture Polish 2: Mix 2 teaspoons lemon oil and 1 pint mineral oil in a spray bottle. Furniture Polish 3: Mix equal portions of denatured alcohol, fresh strained lemon juice, boiled linseed oil, and gum turpentine in a labeled jar. Shake before each use.

Liquid Floor Polish

Melt 1/4 cup paraffin in a double boiler. Stir in 2 qts. mineral oil. Transfer to labeled containers.

Silver Polish

Clean silver items with toothpaste, mild dishwashing liquid, and warm water using an old toothbrush on tarnished areas. Silverbrite Silverclean is a self-acting cleaning plate and cleans gold, silver, bronze, brass, copper, and jewelry.

Brass and Copper Cleaner

Combine 1 pint of soap jelly, 1 cup whiting, and 1 teaspoon ammonia into a paste and beat together before soap jelly congeals. Rub the paste on metal articles. Wash them in hot sudsy water, rinse, and dry with a soft towel. To make soap jelly: dissolve 1 cup of soap shavings or soap flakes in 1 qt. of boiling water. After the soap is entirely melted, pour it into a jar with a wide mouth and place it in a cool place until the mixture jells. Copper can be cleaned by rubbing a mixture of salt dissolved in hot vinegar. Rinse and wipe with a clean rag.

Aluminum Cleaner

Scour with soap jelly and whiting using fine steel wool. Brighten discolored pans by boiling in a solution of 1 T vinegar and 1 qt. water.

All-Purpose Cleaner

General Cleaner 1: Mix 1 T baking soda, 1/4 cup vinegar, 1/4 cup ammonia and 1 gallon hot water. General Cleaner 2: Dissolve 1/2 cup borax in 1 gallon warm water. General Cleaner 3: Mix 1/2 cup ammonia, 1/2 cup baking soda, and 1 gallon warm water into a bucket. After cleaning, rinse with clean water. Unused cleaner can be stored in a labeled bottle or jar. Other general cleaners include: # 1 vinegar, salt, and water, # 2 vinegar in water, # 3 baking soda and water, and # 4 soap pads.

Ant and Roach Sprays

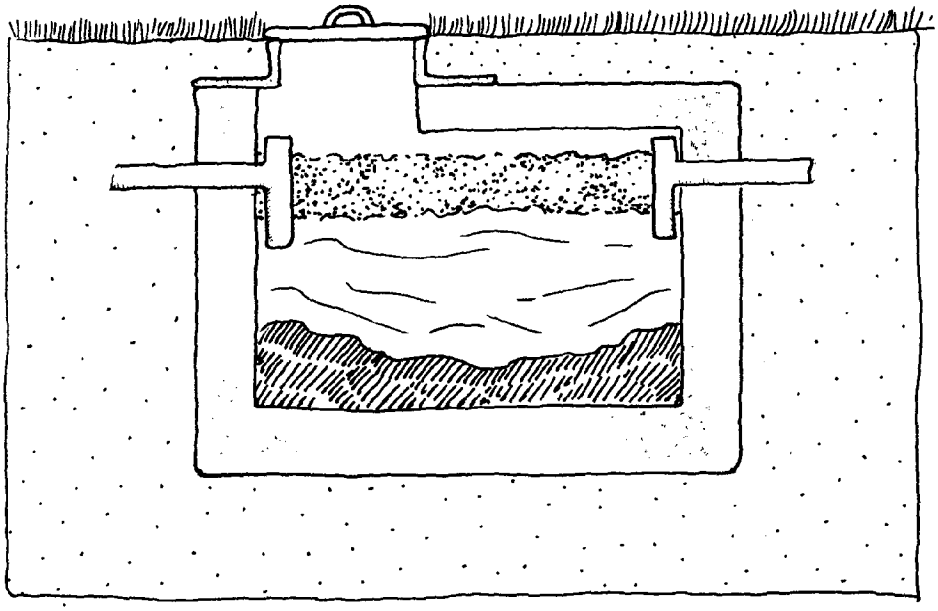
Roaches: Mix 16 oz. boric acid, 1 cup flour, 1/4 cup sugar and pieces of finely chopped onion. Add water a little at a time to make a soft dough. Shape into small balls and place these where roaches travel and hide. Ants: Mix 1 egg white, 2 T sugar, 1 T boric acid, and 1/2 cup water together until boric acid is dissolved. Spoon into jar lids and set lids in areas where ants appear and travel. Refill the lids when solution dries out. Allow three to four weeks for poison to take effect. **Keep out of the reach of children and pets.**

Moth Balls

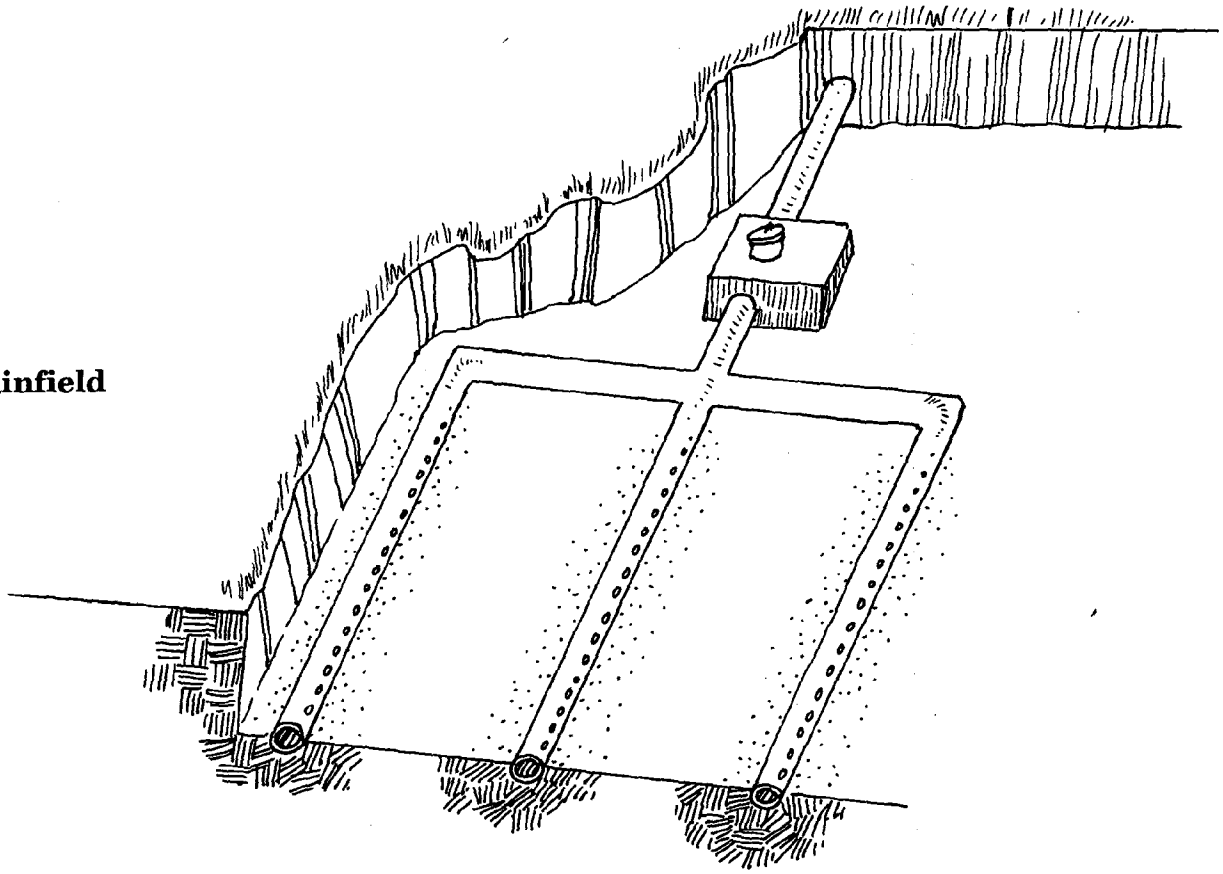
Place cedar blocks, lavender sachets and other dried herbs in closets and drawers.

Note: The common alternatives including baking soda, washing soda, borax, boric acid, and ammonia can be purchased at supermarkets and pharmacies. Linseed oil, turpentine, and whiting can be purchased at hardware and/or paint stores.

Septic Tank



Drainfield



HOW A SEPTIC TANK SYSTEM WORKS

By understanding how a properly functioning septic system works and treating it with the same importance as any other major household utility, homeowners can avoid septic system failure, unnecessary expenses, health risks, and surface and ground waters contamination. A septic system is a sewage treatment and disposal facility. Home septic systems consist of two basic parts: 1) a septic tank for the treatment of wastewater, and 2) a soil absorption system for the disposal of wastewater. The tank, which is generally prefabricated from concrete or fiberglass, receives wastewater from the home through an underground pipe. Baffles regulate the flow of incoming wastewater and prevent sewage from flowing directly through the tank and out into the soil absorption field.

Heavier solids including feces, soil, and food particles settle on the bottom of the tank and form a layer of sludge. Lighter materials such as grease, foam, and paper products float on the surface of the wastewater which fills the tank, and form a layer of scum. Anaerobic bacteria within the tank break down some of the heavier organic solids into smaller particles and liquefy other waste products. The scum layer is also worked on by bacteria. Between the bottom layer of sludge and the top layer of scum is a body of cloudy wastewater with many dissolved substances and minute particles. The wastewater remains in the tank and is conditioned over a period of time. When additional wastewater enters the septic tank from the house, the partially treated wastewater or effluent flows out of the tank and into the soil absorption system.

The soil absorption system or drainfield consists of a distribution box, a series of perforated pipes buried over gravel-filled parallel trenches, and a large area of soil. Effluent leaves the tank through an outlet pipe and travels to the distribution box, dividing the flow between the lines of pipe. Older homes may have systems made of drain tile or cement blocks. Wastewater seeps out of holes in the pipes or through tile seams, filters down through the coarse gravel layer, and into the soil. Soil texture and soil permeability are critical factors in the operation of a septic system.

Treatment of wastewater is accomplished as it percolates through the soil. If wastewater drains too quickly as through a coarse sand, the soil does not have sufficient time to filter out harmful materials. Soils unable to absorb wastewater, such as fine silt, clay, or compacted fill, are not suitable for a drainfield. Wastewater entering the drainfield in one of these soils may fill the trench with effluent and eventually rise to the ground surface or back up into the house. The wastewater may quickly drain out through cracks in compacted soils, without the benefit of soil treatment. The soil acts as a natural filter and removes very small particles, disease-causing microorganisms, organic materials, and nutrients. Plant roots take up nutrients, and the nutrient phosphate is removed through adhesion to soil particles. The effluent continues to move downward through the soil and eventually reaches the groundwater. Septic systems perform a valuable service by cleansing wastewater, recycling it to the ground, and recharging groundwater.

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RESOURCES

Contact the following agencies and organizations.

For information about household hazardous waste and recycling:

Solid Waste Department
Collier County Environmental Services Division
3301 E. Tamiami Trail
Building H
Naples, FL 33962
(813) 732-2507

Safely dispose of household hazardous waste:

Household Hazardous Waste Collection Center
Collier County, Naples Landfill
Landfill Road (off County Road 951)
(currently open 8:00 am - 12:00 pm Saturdays)
(813) 455-2830

Recycle motor oil and car batteries at the following facilities.
Recycled yard waste mulch is available in commercial and residential quantities at these same locations.

Naples Transfer Station
W. Enterprise Avenue (off Airport-Pulling Road)
643-3099

Carnestown Transfer Station
County Road 29 and East U.S. 41
695-4331

Marco Island Transfer Station
Elkcam Circle (next to the fire station)
394-2134

Immokalee Landfill
700 Stockade Road
657-6566

To report the discovery of oil or hazardous waste in a waterbody or a large pesticide spill or one directly into water:

Emergency Management Naples
Collier County Emergency Services Division
3301 E. Tamiami Trail
Building F
Naples, FL 33962
(813) 774-8444

For information about home water conservation and conserving water through creative landscaping:

South Florida Water Management District
Big Cypress Basin
6167 Jane Lane
Naples, FL 33942
(813) 597-1505

For information about lawn care and landscape, gardening, and integrated pest management:

Collier County Extension Service
14700 Immokalee Road (10 miles east of I-75)
Naples, FL 33964
(813) 353-4244

For information concerning variances and vegetation removal permits:

Project Review Services
Collier County Community Development Services Division
2800 N. Horseshoe Drive
Naples, FL 33942
(813) 643-8471

To inform field staff after receiving a vegetation removal permit:

Compliance Services
(813) 643-8458 or 643-8459

For information concerning boat dock permits:

Customer Service
Collier County Community Development Services Division
2800 N. Horseshoe Drive
Naples, FL 33942
(813) 643-8400

For information about aquatic plant control:

Water Management Department
Collier County Environmental Services Division
3301 E. Tamiami Trail
Building H
Naples, FL 33962
(813) 732-2501

Florida Department of Natural Resources
Bureau of Aquatic Plant Management
300 Business Parkway Suite B-100
Royal Palm Beach, FL 33411
(407) 793-5666

To report mangrove violations, excessive turbidity, prop dredging through seagrass beds, and damage to submerged natural resources:

Florida Department of Environmental Regulation
South Florida District
2269 Bay Street
Ft. Myers, FL 33901
(813) 332-6975

Florida Department of Natural Resources
Bureau of Submerged Lands and Preserves
2295 Victoria Avenue Suite 166A-D
Ft. Myers, FL 33901
(813) 332-6996

To report derelict vessels, injured manatees or marine mammal strandings, boating and fishing violations, illegal dumping from boats, and other law enforcement matters:

Florida Marine Patrol
Division of Law Enforcement
District 5 Office
2423 Edwards Drive
Ft. Myers, FL 33901
(813) 332-6966
1-800-DIAL FMP (1-800-342-5367)

For assistance in dealing with an injured bird or animal and for information about the Adopt-A-Shore program:

The Conservancy, Inc.
1450 Merrihue Drive
Naples, FL 33942
(813) 262-0304

For information about the Adopt-A-Road program:

Road and Bridge Facility
Collier County Transportation Services Division
2901 County Barn Road
Naples, FL 33962
(813) 774-8925

For information about sea turtle monitoring:

Natural Resources Department
Collier County Environmental Services Division
3301 E. Tamiami Trail
Building H
Naples, FL 33962
(813) 732-2505

For information about land trust organizations:

Southwest Florida Land Preservation Trust
P.O. Box 2721
Naples, FL 33939
(813) 597-1001

Note: Telephone numbers and addresses are subject to change.

Using The Household Hazardous Waste Chart

The Household Hazardous Waste Chart is a reference to safe, effective disposal of wastes in the home.

Water Drop: indicates materials which can be poured down the drain with plenty of water for dilution.

CAUTION: Some chemical substances cannot be used with septic tanks. Read labels carefully. Products are now required to carry warnings if damage to septic systems can occur. Such materials should be taken to a location where the wastewater is sent to a secondary wastewater treatment plant or to a hazardous waste collection center. Treat older, unlabeled products and unknown chemicals as materials to be taken to a hazardous waste collection center.

CAUTION: Never pour a succession of different household chemicals down the drain one after another.

CAUTION: Do not use strong cleaning agents such as chlorine bleach or drain openers immediately before or after hazardous waste is poured down the drain.

Garbage Can: indicates materials which can be set out for curbside trash collection for disposal in a sanitary landfill.

X Symbol: indicates materials and their empty containers which

Recycling Symbol: indicates materials which are recyclable.

Resource: Refer to Resources in the Appendix for recycling locations. Call the Collier County Solid Waste Department at 732-2507 for more information.

HOUSEHOLD HAZARDOUS WASTE CHART

6 Pour with caution ❐ Trash can it ✖ Save for hazardous waste collection ❖ Recycle it

TYPE OF WASTE	6	❐	✖	❖
KITCHEN				
Aerosol cans (empty)		❐		
Aluminum cleaners	6			
Ammonia based cleaners	6			
Bug sprays			✖	
Drain cleaners	6			
Floor care products			✖	
Furniture polish			✖	
Metal polish with solvent			✖	
Window cleaner	6			
Oven cleaner (lye base)		❐		
BATHROOM				
Alcohol based lotions (aftershave, perfumes, etc)	6			
Bathroom cleaners	6			
Depilatories	6			
Disinfectants	6			
Permanent lotions	6			
Hair relaxers	6			
Medicine (expired)	6			
Nail polish (solidified)		❐		
Nail polish remover (solidified)		❐		
Toilet bowel cleaner	6			
Tub and tile cleaners	6			
GARAGE				
Antifreeze	6			
Automatic transmission fluid			✖	❖
Auto body repair products		❐		
Battery acid (or battery)			✖	❖
Brake fluid			✖	
Car wax with solvent			✖	
Diesel fuel			✖	❖
Fuel oil			✖	❖
Gasoline			✖	❖
Kerosene			✖	❖
Metal polish with solvent			✖	
Motor oil			✖	❖
Other oils			✖	
Windshield washer solution	6			

WORKSHOP				
Paint brush cleaner with solvent			✖	❖
Paint brush cleaner with TSP	✓			
Aerosol cans (empty)		☐		
Cutting oil			✖	
Glue (solvent based)			✖	
Glue (water based)	✓			
Paint-latex		☐		
Paint--oil based			✖	
Paint--auto			✖	
Paint--model			✖	
Paint thinner			✖	❖
Paint stripper			✖	
Paint stripper (lye base)	✓			
Primer			✖	
Rust remover (with phosphoric acid)	✓			
Turpentine			✖	❖
Varnish			✖	
Wood preservative			✖	
GARDEN				
Fertilizer		☐		
Fungicide			✖	
Herbicide			✖	
Insecticide			✖	
Rat poison			✖	
Weed killer			✖	
MISCELLANEOUS				
Ammunition			✖	
Artist's paints, mediums			✖	
Dry cleaning solvents			✖	❖
Fiberglass epoxy			✖	
Gun cleaning solvents			✖	❖
Lighter fluid			✖	
Mercury batteries			✖	
Moth balls			✖	
Old fire alarms			✖	
Photographic chemicals (unmixed)			✖	
Photographic chemicals (mixed and properly diluted)	✓			
Shoe polish		☐		
Swimming pool acid			✖	

The Household Hazardous Waste Chart is based on information from the United States Environmental Protection Agency's Hazardous Waste regulations. The chart has been reprinted with the permission of the Water Environment Federation, formerly the Water Pollution Control Federation, 1987. Telephone· 1-800-666-0206.

SELF EVALUATION

Please answer the following questionnaire (anonymously, if you like) and return it within six weeks to three months to:

Ginger Hinchcliff
DNR/ Rookery Bay NERR
10 Shell Island Road
Naples, FL 33962

We would like to know if Keep It Clean has been useful to you.
Please be as concise as possible. Your responses will assist staff in evaluating the guide and help us develop future educational outreach programs. Answer those questions that are relevant to you. Leave non-applicable areas blank. Thank You!

Do you have a better understanding of Florida's water pollution problems, Rookery Bay and estuarine resources, and watersheds?

AT HOME

Comment on the steps you have taken or plan to take regarding: household chemicals, home water conservation, septic tanks, auto care, pets, aquariums, pools, and other areas involving the home.

FRONT YARD/BACKYARD

Comment on specific actions that you have taken or plan to initiate in the future to limit surface runoff and help keep surface runoff clean, particularly with respect to lawn and landscape, erosion and sediments, permeable pavements, contouring, terracing, and infiltration devices, gardening, fertilizers, and pesticides.

✂ *Cut along the dotted line*

Waterfront Property

Comment on specific plans to maintain or restore the natural slope of the shoreline and native vegetation. Comment on actions or plans regarding coastal structures such as seawalls.

RECREATION

Comment on steps you have taken to lessen the impact of recreational activities on our waters. We are especially interested in actions regarding boating, recreational crafts and vehicles, marine dumping and debris, beach outings, golf, and any other relevant activities.

COMMUNITY

Comment on actions you have taken or plan to take to increase your community involvement and help the community become "water wise".

Additional comments, criticisms, suggestions, ideas, and points not raised that need to be addressed.....

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