

Good Environmental Management Practices in Louisiana's Marinas



By
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The authors would like to acknowledge the invaluable assistance of two LSU graduate students, Arthur Hunter Marks III and Steven Lumpkin, in identifying good management practices among Louisiana's coastal marinas, and the Marina and Boatyard Association of Louisiana in reviewing the findings before publication.

This publication was produced by the Louisiana Sea Grant College Program, a part of the National Sea Grant College Program maintained by the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce. Louisiana Sea Grant is also sponsored by the State of Louisiana.

This publication was developed by the Louisiana Sea Grant College Program and the Louisiana State University Agricultural Center in cooperation with the Louisiana Department of Natural Resources Coastal Management Division. It was funded in part by a grant from the National Oceanographic and Atmospheric Administration to the Louisiana Department of Natural Resources. Two hundred and fifty copies were printed at a cost of \$1950. Unlimited access to the document is available on line at the Department of Natural Resources web site <www.dnr.state.la.us/crm/coastmgmt/cmdpage.html>.

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Introduction

In Louisiana, water is everywhere, and everyone wants it. Residents and visitors of all ages and a variety of socioeconomic groups seek it, use it and consume it. Water sustains life. Natural global changes like sea level rise and storms, along with human activities like industrialization, urbanization and recreation, challenge water's sustainability. To continue to have water and to sustain life, people in Louisiana try to take care of water resources.

The state's long coastline and network of bayous, ponds and lakes enhance the lives of recreational anglers and boaters while their recreational activities sometimes challenge aquatic sustainability. Each of Louisiana's 138 marinas is part of an ecosystem — a community of living things together with its environment. In fact, they depend upon healthy aquatic ecosystems to sustain business. Marinas are the choke points — places where people, activity and aquatic environment interact, sometimes affecting the ecosystem.

Degradation can happen easily, while reversing it is hard work. Stewardship — taking care of the aquatic ecosystem by preventing or controlling degradation — varies according to local circumstances. The “best” aquatic environmental management practices are the ultimate care-taking methods, successful if all circumstances are ideal. But every marina is different, so adaptation is the norm as long as it is directed at the ultimate goal — to sustain the aquatic ecosystem. Preventing or controlling nonpoint source pollution at these choke points or gateways can best do this. Such best adaptations are good environmental management practices.

In 1995, Louisiana's Coastal Nonpoint Control Program specified 15 economically achievable management measures to protect the state's coastal waters from sources of nonpoint pollution that can originate from marinas or recreational boating. These are based upon the Environmental Protection Agency's (EPA) 15 management measures to control nonpoint source pollution in coastal waters. However, the actual management practices or techniques were not specified. At the time, the marina industry and government regulators recognized site-specific variability in the choice of management practices. Thus, what is appropriate for use in

one marina is not necessarily applicable in another marina.

Simply stated, there is not a one-size-fits-all model for environmental management in marinas. Site designers and marina operators will continue to rely on their experience and knowledge to implement good, technically sound environmental management practices.

This report identifies some of the good environmental management practices that are being used in Louisiana's coastal marinas to implement those 15 management measures specified in the state's coastal nonpoint control program. The measures seek to control impacts on water quality and habitat resulting from 1) siting, design and construction of new and expanding marinas, 2) marina operations and maintenance activities and 3) boat operations and maintenance.

This project, sponsored by the Louisiana Department of Natural Resources and the Louisiana Sea Grant College Program, highlights the fact that good environmental management is to a great extent site-specific, although all good environmental practices have in common the same basic goal of sustaining the aquatic ecosystem.



Good Environmental Management Practices in Louisiana

Siting, Design and Construction

Marina Flushing Management Measure

Boating activity is often concentrated in the waters directly adjacent to the marina — the marina basin. When these waters are fresh and clean, people, water and the aquatic environment are sustained. The marina business is in a position to prosper. The opposite is true when these waters are stagnant, polluted or dirty. Flushing renews water quality through circulation and aeration. It limits concentration of pollutants and helps to maintain a healthy level of

dissolved oxygen. Some marina basin designs encourage flushing by the location of breakwaters and the establishment of more than one outlet to and from the waterway. Sometimes the shape of the basin shoreline stimulates flushing. Good design can take advantage of natural currents and tides, which can assist flushing.

The EPA management measure for marina flushing focuses on new and expanding marinas. It suggests that basin flushing be ensured through careful siting and design. Engineers

have studied various flushing configurations that can be considered in the planning stage. (See Figure 1 below.) Long-established marinas, confined to an existing design, may augment flushing in the basin by implementing a variety of other good environmental management practices to prevent various pollutants from accumulating therein.

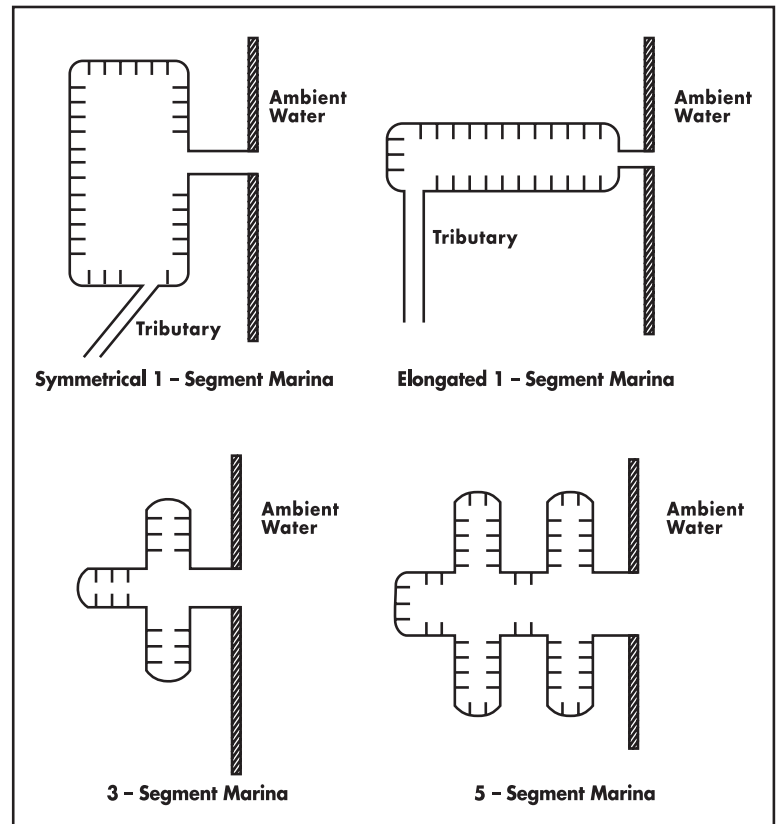


Figure 1. From U.S. EPA Final Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters.

Good environmental management practices for marina flushing during siting and design

- *Maintain channel depth higher than or equal to adjacent navigable channels*
- *Establish two openings at opposite ends of basin to promote through-flow*
- *Use wave attenuators rather than fixed breakwaters*
- *Monitor water quality periodically*
- *Maintain unobstructed, curve-free entrance channels.*

Besides marina design, the relationship to the adjacent waterbody and relative bottom elevation can contribute to marina flushing. The adjacent waterbody often naturally supports good flushing in the marina basin. For example, flushing is stimulated at Buras Boat Harbor (1) by its location adjacent to a bay and at Boudreaux's Marina by location at the intersection of two bayous. Similarly, the fast-flowing

(1)



Tchefuncte River allows regular flushing at Marina Beau Chene in St. Tammany Parish. The depth of the marina basin at Bowtie Marina is shallower than the adjacent bayou, encouraging regular outflow. Tidal flow in Lake Pontchartrain sustains flushing at South Shore Harbor.

Water Quality Assessment Marina Management Measure

Marina operators cannot always control the quality of the water in adjacent waters or in their basins. However, marina operators can control pollutants that may drain into the basin as a result of marina operations or marine construction.

Therefore, the EPA management measure for water quality assessment focuses on siting as well as operations. For new and expanding marinas, preconstruction analysis of the waters can identify existing pollution, while periodic monitoring or modeling of dissolved oxygen can indicate changes in water quality. Except for occasional nearby monitoring by the EPA, Louisiana Department of Environmental Quality (LDEQ) or the Lake Pontchartrain Basin Foundation, no group, individual marina owner or manager regularly monitors water quality. The costs are very high. Most of Louisiana's marinas strive to sustain water quality by controlling a number of activities that can produce nonpoint source pollution, assuming that such

practices will sustain local waters. In this publication, such good management practices are described with one or more other management measures.

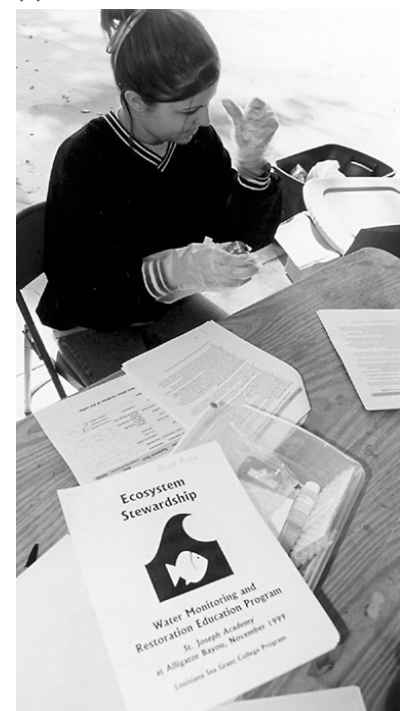
Good environmental management practices for assessing water quality during siting and design

- *Measure existing water quality characteristics before construction, concentrating on dissolved oxygen and contaminants*
- *Design and construct the marina to sustain or improve existing water quality characteristics.*

Good environmental management practices for assessing water quality after construction and on an ongoing basis

- *Use data from preconstruction assessment to develop a model*
- *Monitor water quality periodically and apply data to model as needed (2).*

(2)



Habitat Protection Management Measure

Fishes, submerged grasses and birds are all part of a marina's aquatic environment. Unless the marina is designed, sited and operated with the whole ecosystem in mind, some habitats may be degraded or even destroyed. Several management practices can affect the quality of a marina's natural habitat. For example, when poor flushing reduces water quality, it degrades aquatic and terrestrial habitats.

Operators of marinas in urban areas may overlook habitat concerns, assuming that little wildlife is living in the neighborhood. To the contrary, the marina basin and marina grounds support considerable aquatic and terrestrial life, even in urban locations. Good environmental management practices to sustain local habitats are long term, regular and necessary at every stage of a marina's life.

Good environmental management practices for habitat assessment

- *Survey the marina and surrounding habitat to characterize the resident species*
- *Analyze habitat functions to avoid disruption by marina activities*
- *Minimize shoreline disturbances in marina basin and adjacent waterway*
- *Restore previously disturbed areas of a marina*
- *Consider habitat and habitat functions when siting, remodeling and planning expansions.*

(3)



Wildlife habitat is naturally encouraged in some of Louisiana's marinas. Bayou Black Marina is surrounded by undeveloped land, while Pointe Au Chien is located next to a wildlife management area (3).

The management at Prieto Marina in Mandeville has encouraged wildlife habitat by developing only a portion of the property and deliberately refraining from disturbing the area surrounding the marina itself (4).

Shoreline Stabilization Management Measure

Shoreline erosion can contribute to nonpoint source pollution in marina waters. Its causes are many — runoff,

(4)



tides and currents, wave action, plant and soil degradation and activities on the water and the shore. When erosion degrades the marina basin and adjacent aquatic ecosystem, it degrades the quality of recreation in the marina, too, by affecting boater access and the overall boating experience. Erosion also increases the need for maintenance dredging and additional erosion control measures.

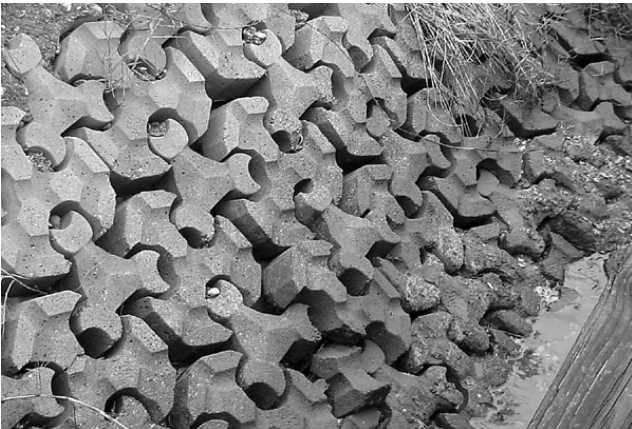
The variety of causes can be addressed by a multitude of engineering steps to stabilize the shoreline physically and sustain the shoreline operationally through siting, design, operations and maintenance. Marina operators most often use some combination of plants, grading, stone,

bulkheads, jetties, breakwaters and no-wake zones. New or expanding marinas can also address this problem through careful siting and design.

Marina operators usually select shoreline stabilization methods after studying shoreline impacts from wave action and currents. Plants most effectively and economically hold the soil along the shoreline, while bulkheads, jetties and breakwaters reduce or dissipate wave action. However, plant growth depends upon productive shoreline soil and subsoil. Environmental engineers can help marina operators design and position stabilization structures such as bulkheads and jetties to avoid scouring in front of the structure or increased erosion downstream. Grading, stone and plants can control erosion caused by heavy runoff from the marina.

The EPA's shoreline stabilization management measure uses shoreline assessment to select appropriate utilization methods. Assessment includes identifying areas that are eroding or in danger of eroding, determining whether the impacts are exacerbated by boating or marina

(5)



(6)



activities and then applying a combination of natural and structural measures to stabilize and possibly improve the marina's shoreline. Periodic assessment is necessary to assure continued erosion control.

Good environmental management practices for shoreline stabilization management

- *Use plants, wetlands, beaches and natural shorelines along the marina basin*
- *Use bulkheads or riprap along steep shorelines*
- *Retain and sustain natural shorelines*
- *Limit development near steep shorelines*
- *Grade marina areas to reduce the flow velocity of and direct runoff to catch basins rather than directly to shoreline.*

Louisiana's marinas use a variety of techniques to protect and stabilize their shorelines. Because of tidal wave action, many of the marinas surrounding Lake Pontchartrain, like Mariners Village and South Shore Harbor, use structural stabilization to maintain their shorelines. Mariners Village uses

interlocking concrete blocks on a slope to absorb energy from wave action, effectively protecting the shoreline from waves up to four feet high (5). Oak Harbor and Mariner's Village use steel encasing riprap in a perpendicular bulkhead (6). The bulkhead at Bowtie Marina will last many years because it is $\frac{3}{8}$ -inch steel plate supporting a wood platform surface. At Coco Marina, a wooden bulkhead encases gravel to preserve the shoreline. Lake End Marina protects some of its shoreline with a beach and other portions with stone riprap and a jetty. Buras Boat Harbor stabilizes a steep slope behind an extra-tall bulkhead. The top of it extends about six inches above the shore's surface to redirect runoff away from the marina basin.

Storm Water Runoff Management Measure

Storm water runoff is not site specific; it can flow toward a waterbody from a number of places many miles away. As it flows, it picks up everything in its path, including oil, grease, litter and contaminants. Falling

rain picks up pollution from the air, carrying pollutants into runoff already washing the ground. By the time the runoff reaches a marina shoreline, it can combine pollutants from many outlying areas with pollutants in the marina's parking and working areas. The resulting runoff can degrade the marina basin for boaters and wildlife and contaminate adjacent waterbodies. Runoff can hurt business as well as the ecosystem.

Louisiana waters are also susceptible to pollution from specific sources. The National Pollutant Discharge Elimination System (NPDES) permit program regulates direct discharges from identifiable sources. It does not regulate storm water runoff.

The EPA's runoff management measure emphasizes the need to separate pollutants from runoff before the water flows into adjacent waterbodies and the need to reduce or eliminate pollutants in the marina that can be scooped up in the flow. In the marina, these contaminants come from buildings, access roads, vehicles and boat trailers and from boat maintenance activities. Good environmental management measures to control pollution in runoff include grading, using plant or sand filtration, grass swales and catch basins and confining parking and hull maintenance to specific marina areas. In most cases, do-it-yourself boat repair and maintenance is not permitted dockside or in the marina basin.

Parking areas may be sloped to direct runoff into the marina's drainage system rather than the marina basin.

Sometimes, parking areas are gravel or grass-covered, providing natural filtration. Gravel access roads also provide some filtration. Curbs, slopes and grading direct runoff from buildings and access roads toward grass-covered areas, marina drainage systems or catch basins.

Marinas with designated repair and maintenance areas away from the basin take precautions to prevent pollutants from being picked up by runoff. A roof over the designated area prevents rain from picking up maintenance waste, and a sloped, impervious floor (such as concrete) can prevent runoff from washing pollution into the marina basin. Designated maintenance areas may be sloped to direct the flow into grass swales, catch basins or drainage systems. In some cases, repair and maintenance services are provided by the marina. In others, marina operators require and/or provide tools like vacuum sanders to capture or reduce pollutants from in-marina hull cleaning, scraping and sanding, as well as engine maintenance.

Good environmental management practices for storm water runoff

- *Restrict types and amounts of boat maintenance and repair in the marina*
- *Restrict activities to properly protected and drained boat maintenance and repair areas*
- *Clean debris from access roads and parking areas regularly*
- *Plant and maintain grassy swales to filter runoff and direct flow away from the marina basin*
- *Plant and maintain grassy buffer for natural filtration adjacent to marina basin*
- *Use porous pavement or materials like gravel on access roads*
- *Use impervious surfaces in maintenance areas, sloped to direct runoff into catch basins or drainage system*
- *Capture pollutant runoff in catch basins before it flows into the marina basin*
- *Place absorbents in catch basins to capture oil and grease in runoff.*

The effects of storm water runoff depends upon marina design. The highest point on the boat ramp at Sportsman's Paradise was constructed to exceed shore level just before the slope into the basin (7).



(7)

This design redirects runoff back into the marina rather than down into the marina basin. At Bayou Black, the grassy parking area adjacent to a gravel roadway filters runoff from vehicles and boat trailers (8). Vegetative buffer

includes methods to contain fuel hoses, avoid leaks during fueling and protect fuel pumps from accidental vehicular contact within the marina.

trate all pumping activities in one area (11). Others store spill response equipment close to fueling stations as well.

(8)



strips at the edge of the marina basin, designed for aesthetic reasons, reduce the volume of contaminants entering the marina basin by filtering runoff. Hidden Harbor Marina is deliberately landscaped, incorporating aesthetics into a management practice (9). Many marinas, like Hebert's, maintain a separate area for boat maintenance and repairs with a catch basin and sewer system to capture runoff.

Good environmental management practices for fuel station design

- *Locate and design fueling stations in an area of the marina that is easy to contain*
- *Design and use a spill contingency plan for the station*
- *Design fuel stations to avoid accidentally transferring fuel to marina waters.*

At Myrtle Grove Marina, fuel pumps are mounted on concrete blocks and surrounded by concrete posts to prevent accidental vehicular contact. Because Pointe Au Chien Marina's fuel pumps are located near vehicular traffic as well as the shoreline, they are surrounded on all sides by pole barriers. Several marinas, like South Shore Harbor, store fuel hoses on a spool to prevent dragging in the basin during the fueling process (10). Some, like Marina Del Ray, concen-

Fuel and Oil Spill Control Management Measure

Petroleum products can contaminate marina waters as a result of normal boating activities, that is, when fuel tanks are topped off, bilge water pumped or engines maintained. Such contamination can range from sheen on the water's surface to a visible layer of oil or other petroleum products. The EPA's fuel station management measure assumes that spills will occasionally happen and emphasizes storage and use of cleanup equipment and designating specific areas of the marina for boat maintenance activities. The latter precautions also are associated with reducing contamination in storm water runoff. In addition, many marina operators educate boaters about the use of bilge pillows to regularly absorb petroleum products before bilge water is automatically released and about

Operations and Maintenance

Fuel Station Design Management Measure

The fueling process can contaminate the surrounding environment. Because boats occasionally purchase gasoline or diesel fuel at dockside, spills are possible hazards to the marina basin. Fuel stations, therefore, need to be located and designed to contain fuel and fueling equipment. Design

(9)



(10)



fuel/air separators and vent line surge protectors that retain fuel when tanks are topped off. Some provide bilge pillows for all marina members, passing on the cost in the marina membership fee.

Good environmental management practices for petroleum control management

- Use automatic shutoff nozzles on all fuel pumps
- Promote boater use of fuel/air separators and vent line surge protectors on inboard motors
- Promote boater use of oil-absorbing bilge material
- Provide absorbent pads, booms and liquid dispersal agents near the marina basin to quickly and efficiently contain all petroleum product spills.

Cypress Cove Marina is one of several marinas that provides oil booms to absorb petroleum from spills (12). Many Louisiana marinas promote the use of vents and other products to avoid spills. Orleans Marina and South Shore Harbor have strategically placed drums full of spill cleanup equipment throughout the facilities. Signage is common to remind boaters of their responsibility

to keep waters clean. Besides designating separate marina areas for boat and engine repair and maintenance to

Hazardous Material Management Measure

The remote location of many marinas increases the possible number of liquid materials that must be stored to support routine marina operations. Oil, solvents, paints, antifreeze, petroleum and propane are some of

(11)



reduce contamination by storm water runoff, marinas often provide waste receptacles for used engine oil and oil filters.

the most common. The needs are frequent and large enough that many of these potential contaminants are most efficiently stored in bulk tanks.

Use of these products generates wastes that may also contaminate the



(12)



marina basin, creating the necessity of temporarily storing such wastes until they are properly removed from the marina or recycled. Because mixing these materials may result in hazardous accidents, all of these materials should be stored in separate containers.

The EPA liquid material management measure focuses on preventing spills or releases of liquid contaminants during storage and use and on properly disposing of the wastes and used products. This measure also encourages marina users to participate in recycling such products. Because some liquid materials can become gases at certain temperatures, their management must be flexible to cover such conditions. To protect from vehicular traffic and normal marina activities, as well as accessibility for delivery and removal, marinas use curbs, berms, solid

surfaces and other barriers to control leaks, as well as curbs, poles and foundations, to protect liquid-material containers from vehicular impacts.

Good environmental management practices for liquid material management

- *Build storage areas to control leaks and spills from liquid-material containers*
- *Provide separate, clearly labeled, proper containers to dispose of waste oil, gasoline, antifreeze, diesel, kerosene and mineral spirits*
- *Arrange for proper pickup, disposal or recycling of these materials, including compliance with all applicable hazardous materials regulations*
- *Have spill response equipment and fire extinguishers available near liquid materials storage facilities*
- *Provide education to staff and clients on the hazards of such materials and*

the proper way to use and dispose of them in order to protect the marina and its ecosystem.

Cypress Cove Marina provides separate, well-marked receptacles for motor oil and for waste cooking oil from the marina's restaurant. At many marinas, such as Hebert's Marina, fuel tanks are contained by cement block barriers (13). South Shore Harbor is one of several marinas that stores used liquids in locked areas until they can be taken to a recycling center (14). For additional safety, most open the storage area only during specific hours or restrict admission to marina employees. Some of the more remote marinas, like Myrtle Grove, also store propane fuel tanks on concrete slabs and surround them with pole barriers (15).

(13)



(14)

Boat Cleaning Management Measure

Most of Louisiana’s coastal marinas allow hull scrubbing and scraping, as well as painting and cleaning boat topsides, while the vessels are moored. Marina and boatyard employees, as well as boat owners, use a variety of boat cleaners, which can pollute and contribute nutrients to the water. Excess nutrients can degrade water quality by promoting nuisance aquatic plant growth and reducing dissolved oxygen levels needed for aquatic life. Scrubbing surfaces coated with antifoulant paint can release toxic metals into the water, which may contaminate bottom sediments.

For these reasons, boat owners are encouraged to bring their boats ashore and cautiously clean and scrape hulls on land in areas designated for such use. “Cautiously” because soapy water used to rinse salt and scum off of hulls before placing in dry storage can add nutrients to the waterbody. The oils, greases, paint chips and barnacles removed by pressure washing can degrade water quality and bottom sediments. Associated organic matter can also add to the biochemical oxygen demand (BOD) of the waterbody, and suspended solids may reduce available sunlight for aquatic plant life.



Good environmental management practices for boat cleaning

- *Use methods that prevent or contain pollutants when cleaning anchored or moored boats. The methods include hand-washing decks and hulls above the waterline, and using phosphate-free and biodegradable cleaners*

- *Discourage pressure-washing*
- *Prohibit in-water sanding and scraping*
- *Contain rinse water wherever possible*
- *Recycle wastewater (from pressure washing) or direct it into wastewater treatment systems.*

(15)



(16)



Although boat cleaning in the marina basin or dockside is not encouraged, those marinas in Louisiana that permit this practice encourage the use of phosphate-free and biodegradable detergents. The three major marinas on the south shore of Lake Pontchartrain — South Shore Harbor, Orleans and Municipal — encourage their patrons to land their boats for cleaning purposes. A few, like Hebert’s Marina, provide a designated boat cleaning area with a catch basin to capture pollution in the wash water (16).

Cypress Cove Marina in Venice and Bowtie Marina in Lake Charles

provide valet service for their clients. Cypress Cove uses high water pressure without detergents to remove debris and saltwater from trailerable boats (17). A grassy area to filter resulting wastes has been designated for this purpose. Biodegradable products are furnished for boats that remain in their slips. Bowtie’s staff uses biodegradable degreasers and phosphate-free cleaners in a paved, dedicated upland area (18).

Sewage Handling Management Measure

Releasing or discharging raw or poorly treated sewage can be harmful to human health and water quality, and it is, therefore, illegal to discharge raw sewage from a vessel within U.S. territorial waters. Skin rashes, gastroenteritis, cholera and other waterborne diseases may be passed directly to people who swim and water ski in contaminated waters. Furthermore, those who eat contaminated raw oysters may experience gastrointestinal problems or suffer even more life-threatening diseases caused



by viruses and other microorganisms contained in sewage discharge.

In addition to threatening public health and possibly causing closures or other losses to the recreational and seafood industries, raw sewage can disrupt environmental systems by degrading water quality. For instance, the contaminants contained in raw sewage use oxygen needed by fish populations and other forms of aquatic life. Furthermore, heavy nutrient loads can promote excessive



(18)

algal growth and result in blooms that further decrease the levels of dissolved oxygen.

Good environmental management practices for sewage handling

- *Provide a convenient, reliable sewage disposal facility, i.e., a pumpout system*
- *Discourage the discharge from Type I and Type II marine sanitation devices (MSDs) at the boat slip or mooring. Offer free inspections to ensure that MSDs are functioning properly*
- *Provide shoreside restrooms*
- *Design and maintain septic systems to protect public health and water quality*
- *Maintain an onsite holding tank or operate an onsite wastewater treatment plant where appropriate.*

Happy Jack Marina has clean, functional restrooms (19) to encourage use before and after boating. Adequate signage directs boaters and other guests to them. (19)



South Shore Harbor, Orleans and Municipal marinas in New Orleans, Mariner’s Village, Marina Del Ray, and Bowtie Marina encourage use of self-serve or staff-assisted pumpouts. Posters advertising the facilities are placed at strategic locations, and clear instructions for operating pumpout equipment are provided. South Shore Harbor has a pumpout unit that is located on a trailer in the marina. When full, its wheels facilitate transport to the city sewer system (20).



from the marina’s pumpouts and hotel. The facility is secured behind a 10-foot, chain-link fence and certified contractors remove the waste on a monthly basis (21).



In addition to a pumpout system, Cypress Cove Marina has an above-ground sewage treatment plant on the premises. The tank has a capacity to treat approximately 24,000 gallons per day and is used to process sewage

Maintenance of Sewage Facilities Management Measure

Marina sewage disposal facilities exist at 16 marinas in coastal Louisiana. Most of these modern facilities were built with Clean Vessel Act (CVA) grant funds from the U.S. Fish and Wildlife Service (USFWS). Under the CVA, boaters need access to

(22)



pumpout units and portable toilet washdown stations to properly and legally dispose of boat sewage (22). Without pumpouts and washdown stations, raw sewage could be released into marina basins or adjacent waters, degrading the most important areas of marina business.

The grant program, administered by the Louisiana Department of Wildlife and Fisheries, reimburses marina operators up to 75 percent of the cost of installing or renovating boat sewage disposal systems. Most costs associated with the installation of pumpout and/or washdown stations,

including design and engineering, permits, equipment, electrical/water/sewer hookups and construction/installation, are eligible for reimbursement. The only expenses not eligible are those associated with the purchase and installation of sewage treatment plants or systems.

Nationwide, marina managers are justifiably concerned that once the sewage disposal facilities are installed, their long-term operation and maintenance may become a challenge to marinas. Costs, while not excessive, are of particular concern for smaller

and private marinas that are subject to seasonal and often cyclical fluctuations in business. For this reason, marina sewage disposal facilities built with CVA grant funds are allowed to charge up to \$5 per use to cover operational and maintenance costs.

Good environmental management practices for the maintenance of sewage facilities

- *Arrange pumpout facilities maintenance contracts with competent services*
- *Develop regular pumpout facilities inspection schedules*
- *Maintain a dedicated fund for the repair and maintenance of pumpout facilities*
- *Include a requirement to use the pumpout facilities, specifying penalties for failure to comply, in all slip leases (23)*
- *Place dye tablets in boats' holding tanks to discourage illegal disposal.*

Solid Waste Management Measure

Marinas and their boating clients generate various solid wastes that can be a nuisance and an eyesore. Improper disposal of solid wastes can pollute waters and pose hazards to wildlife. For these reasons, solid wastes must be contained and kept out of the water. There are many documented instances where plastic articles, in particular, have affected wildlife, posed a hazard to navigation

(23)

RULES AND REGULATIONS FOR THE ADMINISTRATION AND OPERATION OF SOUTH SHORE HARBOR AND MARINA AND ORLEANS MARINA

18. ENVIRONMENTAL

Boat/vessel owner shall not discharge oil, oily water or raw or untreated sewage into the water. All permanently installed sewage systems on boats/vessels must be either approved Type I or II Marine Sanitation Devices and must be locked off while the boat/vessel is docked. All spills of gas, diesel fuel, oil or other hazardous materials must be reported immediately to the Marina Manager. Boats/vessels may only be washed with biodegradable soaps and the amount of soap used must be kept to a minimum. Removed paint chips, sanding debris, hazardous chemicals, including water, oil, engine coolant, hydraulic fluids, gasoline, diesel, paint and mineral spirits, may not be allowed to enter the water or the ground and may not be left where it might be exposed to rain water.

XII. DEFAULT PROVISIONS

It is particularly agreed and understood that, should LESSEE fail to comply with any of the provisions or conditions of this Lease (except failure to pay rent, failure to pay those costs or charges indicated elsewhere in this Lease by reference to paragraph XI, and failure to keep on file with Marina proper insurance certificate), or violate any Rules or Regulations established for the Marina, shall be cause for the termination of the Lease agreement.

and detracted from beach usage. The same qualities that make plastic popular — light weight, strength and durability — also make it a marine pollution problem, and improper disposal may lead to state and federal fines. Aluminum cans and cigarette butts are also a solid waste concern for marinas. They float, are unsightly and can remain in the waterway for years. Sunken boats, discarded vehicles, large household appliances and other underwater obstructions can cause deadly accidents, leak pollutants and are unsightly when visible. Proper authorities should be contacted to help remove and dispose of such dangerous items.

Good environmental management practices for containing and disposing of solid waste

- *Develop a waste management strategy that strives to reduce the waste stream and, therefore, disposal costs*
- *Provide convenient and properly covered trash receptacles, Dumpsters and recycling containers throughout the marina*
- *Install adequate signs identifying proper solid waste management practices at the marina*



(25)

- *Contract to remove and sell recycle materials*
- *Train marina personnel in proper solid waste management handling and disposal.*

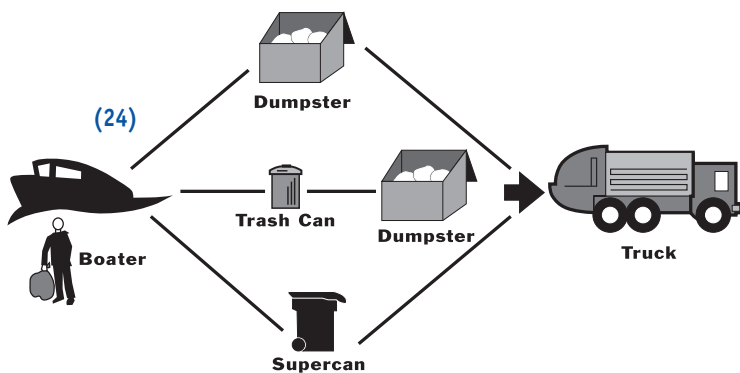
mobile trash collector to take solid waste from boats to trash barrels and Dumpsters (26).

The proper maintenance of the marina’s property is good for business and good for the environment (24). Many marinas, like Hidden Harbor Marina, place a trash barrel at each slip (25). Covered trash containers, like the ones at Delta Marina and South Shore Harbor, are well-placed dockside, at ramps and at multiple locations throughout the marina, and Dumpsters are readily accessible to the staff and boating public. South Shore Harbor and Orleans Marina provide a



(26)

Recycling is a solid waste management practice that has proven very effective in communities where governments and other organizations help promote such programs and where items such as used batteries, aluminum, glass, paper products, some plastics, etc. are recycled or reused by businesses. Recycling is seldom supported in Louisiana’s marinas, possibly because recycling is not actively promoted outside of the metropolitan areas.



(24)

Fish Waste Management Measure

Coastal Louisiana is a fishing mecca. Approximately 328,000 recreational boats are registered in Louisiana, and nearly 500,000 fishing licenses were issued statewide in 2001. Saltwater fishing is particularly popular in the region, and during that same year, nearly 300,000 resident saltwater licenses and about 80,000 non-resident saltwater licenses were issued by the Louisiana Department of Wildlife and Fisheries. In sufficient quantities, fish wastes can produce foul odors and decrease levels of dissolved oxygen. The marinas that are most vulnerable to water quality problems stemming from the improper disposal of fish waste are those with large numbers of fish landings and/or poor flushing.

Good environmental management practices for fish waste

- *Establish fish-cleaning areas and set restrictions*

- *Adopt proper disposal methods such as grinding and/or composting fish waste. Disposal in waterbodies is only advisable with adequate flushing*
- *Educate anglers about importance of proper fish-cleaning practices.*

Well-constructed, conveniently located fish-cleaning areas are available at Delta and Coco marinas. Delta's cleaning station contains sinks, hoses, cutting boards and waste disposal boxes. These are an option when the introduction of fish waste into marina waters may degrade water quality. Fish waste collected in boxes should be emptied frequently into Dumpsters for eventual landfill disposal.

A fish grinder is conveniently located at fish cleaning stations at Cypress Cove Marina (27). The marina basin around the docks housing the cleaning stations is well-flushed, and thus the large amounts of fish wastes that are ground and released into the basin pose no water quality problem. The steel grate

flooring at Cypress Cove's cleaning stations allows smaller fish wastes to pass through, reducing accumulations of such wastes underfoot. Slippery, wet wastes can be a safety hazard.

Boaters

Boat Operations Management Measure

In certain parts of coastal Louisiana, boating activities can impact shallow-water habitats. In Lake Pontchartrain and Chandeleur Sound, for instance, shallow, ribbon-like beds of eel grass or turtle grass provide high-quality habitat for numerous fish species and are a unique ecosystem in the state. Operating boats in these grass beds may cause serious damage to them. In addition, boat wakes can pose a threat to the stability of smaller boats, contribute to shoreline erosion and increase turbidity.

When marina operators remind boaters about the problems associated with these and other careless boat operations, they help to conserve the aquatic playgrounds and their businesses.

(27)



Good environmental management practices for boat operations

- *Exclude motorized vessels from areas that contain important shallow-water habitat*
- *Help establish, inform and enforce no-wake zones*
- *Provide marina clients with information about nearby vulnerable habitats and safe boating operations.*

Marina signage such as these in Mariner’s Village remind boaters that slow operation reduces an erosion-causing wake (28).

Public Education Management Measure

The most effective, long-term method to prevent pollution from contaminating marina waters and degrading boating activities is to educate owners, operators, employees and boaters about the causes and effects of pollution and methods to prevent it. Marinas and boaters are highly visible users of shores and the aquatic environment, and, thus, constantly under scrutiny as possible polluters. There is no denying that boats and people onboard contribute to the problem. Litter, small fuel leaks, sewage discharges, noise, wave-induced erosion, antifouling paints and marina-related construction projects can alter an ecosystem. It, therefore, makes good business and

environmental sense for marinas to become involved in public education/outreach/training programs in advance of criticism. Proactive marinas can either (1) link with existing proaquatic environment activities and events organized by other user groups and not-for-profit organizations or (2) undertake such activities on their own or as an association of marinas.

Good environmental management practices for boater and other public education

- *Post interpretive and instructional signage strategically throughout the marina*
- *Include information on good environmental practices in training for marina staff*
- *Organize marina-based litter reduction programs and participate, where practical, in community recycling and clean-up campaigns*
- *Prepare printed materials to distribute in mailings, at public gathering and in public relations campaigns*
- *Prepare presentations for marina professional meetings and to present to interested groups (civic organizations, neighborhood associations, boater education courses, school groups, etc.).*

Marinas use signage as a primary educational tool. At Nalmar Marina and South Shore Harbor, signs provide instructions for fueling, using pumpouts and for safety precautions.



(28)

South Shore Harbor, Municipal and Orleans marinas, Mariner’s Village, Marina Del Ray, Oak Harbor, Slidell Marine, Chamalé Cove and Rigolets all post environmental policies. Marinas also distribute publications and videos produced by numerous government and nongovernment agencies to inform those using Louisiana’s waters of their responsibilities to protect them from pollution (29).

(29)



