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Best Management Practices Manual for North Carolina Marinas

Prepared by:

North Carolina Clean Marina Program

for the N.C. Department of Environment and Natural Resources
Division of Coastal Management

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This manual is intended as an educational tool for marina operators and boaters. It does not constitute a complete reference to state, federal or local laws. This manual may not be relied upon to create a right or benefit substantive or procedural, enforceable at law or in equity by any person.

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INTRODUCTION

North Carolina's waterways attract boaters. Boaters need services and accommodations like any tourist traveling away from home. Marinas and boatyards fulfill this need, and in so doing generate tourism dollars and economic enhancement to this state. Boaters rely on clean waters for maximum enjoyment of swimming, fishing, and viewing the natural resources. Unfortunately, those who most want to benefit from clean water and air can be a direct cause of environmental degradation. Due to the proximity to our waterways, the boating industry can contribute to the pollution of our waters and air if efforts are not made to minimize and control contaminants.

Marina operators are the gatekeepers to the waters, and as such have a responsibility to minimize contaminants so that the waters remain clean.

This manual is to be used as a guide and reference by marina and boatyard operators as they promote and protect clean water and air; key components of successful marine businesses. It is also intended to highlight what encompasses the business of marinas and some of the issues and conflicts that marina operators face. This manual is not intended to be used as a regulatory document since it must be recognized that not every marina will be able to implement all the listed Best Management Practices due to cost, management structure, and facility design and function constrictions.

By adopting the best management practices outlined in this manual, you will show your commitment to protect the natural resources upon which we all depend. Your facility will be a safer, healthier place to work and will be more attractive to clients who care about a healthy environment.

SITING AND DESIGN CONSIDERATIONS FOR NEW AND EXPANDING MARINAS

PROBLEM:

Waterfronts are some of the most fragile ecological systems and also the most highly desired locations for marinas. The plant and animal communities of the coastal area have multiple benefits. Wetlands provide habitat for fish and other animals that support tourism, hunting and fishing. Wetlands also minimize the effects of erosion and act as a filter, preventing upland pollution from entering the water. This creates a difficult problem where development and environment have to co-exist. However, there are means to develop waterfronts without diminishing the viability of the coastal environment. Siting and design are the most important factors in aiming to limit the marina's impact on wetlands and water quality.

RULES AND REGULATIONS:

Marina siting and design is regulated by state and local authority. Since locations can vary significantly along the coastal region, there is not a one-size fits-all answer to how a marina should be laid out and constructed. The goal for any marina, though, is to minimize environmental impact.

Federal:

Because individual states have varying topography and water frontage issues, there are few specific federal rules to guide marina siting and design. The exceptions are the Federal Endangered Species Act, Clean Water Act and Rivers and Harbors Appropriation Act. Under the first, construction cannot be permitted where it harms or interferes with endangered species. The second gives the U.S. Army Corps of Engineers (COE) the authority to regulate dredge and fill activity in navigable waters. Under section 10 of the Rivers and Harbors Act, the building of any wharfs, piers, jetties, and other structures is prohibited without Congressional approval, and excavation or fill within navigable waters requires the approval of the Chief of the COE. As most marina development would require dredging, the COE rules will play a role in the permit process.

State:

In North Carolina, the Coastal Resources Commission (CRC) establishes policies for the N.C. Coastal Management Program and adopts implementing rules for both the Coastal Area Management Act (CAMA) and the N.C. Dredge and Fill Act. Under state rule 15A

NCAC 7H.0208(b)(5)(A), the CRC outlines where marinas should be sited to minimize or prevent impacts to the surrounding environments: *Marinas shall be sited in non-wetland areas or in deep waters (areas not requiring dredging) and shall not disturb valuable shallow water, submerged aquatic vegetation as defined by the Marine Fisheries Commission, and wetland habitats, except for dredging necessary for access to high ground sites. The following four alternatives for siting marinas are listed in order of preference for the least damaging alternative; marina projects shall be designed to have the highest of these four priorities that is deemed feasible by the permit letting agency:*

- (i) an upland basin site requiring no alteration of wetland or estuarine habitat and providing adequate flushing by tidal or wind generated water circulation or basin design characteristics;*
- (ii) an upland basin site requiring dredging for access when the necessary dredging and operation of the marina will not result in the significant adverse impacts to existing fishery, shellfish, or wetland resources and the basin design shall provide adequate flushing by tidal or wind generated water circulation;*
- (iii) an open water site located outside a primary nursery area which utilizes piers or docks rather than channels or canals to reach deeper water; and*
- (iv) an open water marina requiring excavation of no intertidal habitat and no dredging greater than the depth of the connecting channel.*

In addition, state rules also limit the amount of public trust waters that can be covered by a residential marina (marina of 11 or more slips that serves a residential community and not the general public) to 27 square feet for every one linear foot of shoreline. Marinas that require other than maintenance dredging are also prohibited from being located in primary nursery areas, and marinas cannot be located in or near areas where shellfish harvesting is an existing use if the marina will cause the area to be closed to shellfishing.

BEST MANAGEMENT PRACTICES:

When considering sites to build a marina, assess the water quality to find out if there are existing threats to human, plant, or animal life, which a marina would compound, or if the area can sustain the development. Proper marina siting is valuable in determining how future construction and activities at a marina would affect water quality. It can also make future permitting issues less complicated.

On the Dock:

- ⚓ Minimize need for dredging and impacts of dredging.
- ⚓ The marina basin and entrance channel should not be deeper than the adjacent waters. This is to prevent “dead water” within the marina. That is, water with too little oxygen to support marine life.
- ⚓ Create as few segments as possible in the basin to allow for free circulation of water.
- ⚓ Design and locate entrance channels to promote flushing.
- ⚓ Avoid waters designated by the Environmental Management Commission as Outstanding Resources Waters.
- ⚓ Avoid submerged aquatic vegetation and shellfish beds.
- ⚓ Minimize disturbance of wetlands.
- ⚓ Learn migration nesting and spawning periods for native species to avoid working during these critical times.
- ⚓ Limit the number of covered slips since the covers block sunlight critical to bottom dwelling organisms.
- ⚓ For floating docks, use buoyant foams that have been coated or encapsulated in plastic or wood to prevent buoyant debris, which may be mistaken as food by birds or fish.
- ⚓ Use wave attenuators instead of fixed breakwaters to allow for flushing of the marina basin.
- ⚓ Design fixed breakwaters so they do not extend completely to the basin bottom, and no farther below the water’s surface than necessary so adequate flushing of the marina is maintained.
- ⚓ Use environmentally neutral materials and that will not leach hazardous materials. Avoid exotic and tropic timbers.

In the Yard:

- ⚓ Expand storage capacity by creating drystack or other land storage rather than increasing the number of wet slips.
- ⚓ Locate buildings and workshops in upland areas to minimize impacts on wetlands and the water.
- ⚓ Locate parking and land storage in upland areas.
- ⚓ Minimize impervious surfaces.
- ⚓ Boat ramps tend to channel and drain water from large surfaces of the marina including parking lots, fuel storage and repair and maintenance areas. Any spill or accumulation of pollutants will often find its way directly to the water through the boat ramp. Ensuring that the ramp rises to an elevation above the surrounding area and maintaining this elevation along its edges will prevent stormwater from carrying pollutants directly to the marina basin. Consider input of BMP drain or filtration system (see Stormwater BMP Supplement).
- ⚓ The typical practice of draining boat bilges once they are hauled up a boat ramp causes any accumulated bilge oil to run directly

into the adjacent waterway. Post signs advising users not to drain their bilges until the boat is off the ramp. Consider providing an alternate inclined surface where bilge oil can be contained or channeled to an acceptable receiving location.

FOR MORE INFORMATION:

N.C. Division of Coastal Management 252-808-2808 or 888-4RCOAST. The division's website, www.coastalmanagement.net, has downloadable permit applications, rules and policies.

States Organization for Boating Access. 1996. *Design Handbook for Recreational Boating and Fishing Facilities*. Washington, DC. Available with further information on <http://www.sobaus.org>.

STORMWATER MANAGEMENT

PROBLEM:

Stormwater runoff is generated from hard impervious surfaces that prevent the absorption of rainwater into the ground. As the water runs across these surfaces, it picks up residue, litter and soil, all of which drain into surface waters either directly or through storm drains. At marinas this is a concern since oil, paint, pet waste, or other chemicals could be present and would likely be washed directly into the boat basin.

As more and more surfaces are paved, the volume of stormwater runoff increases, causing problems such as increased erosion, sedimentation, flooding, and loss of animal habitat. Due to their proximity to the shoreline, marinas can play an important role in reducing stormwater runoff and, therefore, protecting and helping to clean up our waterways.

RULES & REGULATIONS

The Clean Water Act is the federal law that sets the standards for handling waste waters and the introduction of stormwater into waterways. State and local governments interpret and implement the Clean Water Act to develop a regulatory program that fits the minimum EPA requirements and state needs.

Federal:

The Clean Water Act requires permits to be issued for projects where there will be a discharge of dredged or fill material into federal waters and wetlands. It also prohibits the discharge of oil or hazardous substances into navigable waters, and prohibits the use of soaps, detergents, surfactants and emulsifying agents to disperse fuel, oil or other chemicals. In addition, the Clean Water Act authorizes the National Pollutant Discharge Elimination System (NPDES) permit program.

NPDES permits are required for Boat Building and Repairing Facilities (SIC 373) and Marinas (SIC 4493) that discharge stormwater through a point source on their property directly into the water basin. For instance, a drainage pipe that leads to a basin would trigger the stormwater permit requirement.

Section 319 of the Clean Water Act (33 USC 1329) requires states to access and develop control programs for non-point pollution sources. Under the 1990 amendments (section 6217), NOAA and

EPA developed management measures to address coastal non-point sources, such as the Clean Marina initiative.

State:

State rule 15A NCAC 2H.1000 dictates what permits and associated requirements must be met for facilities to comply with the Division of Water Quality's stormwater management program.

The first step in obtaining a stormwater permit is to submit a Notice Of Intent (NOI) to the state Division of Water Quality Stormwater Unit to get coverage under General Permit NCG190000 to discharge stormwater under the National Pollutant Discharge Elimination System.

Specific permit requirements are as follows:

- Implement a Stormwater Pollution Prevention Plan;
- Yearly analytical testing of waters leaving all point sources by a certified lab;
- Semi-annual qualitative monitoring;
- Oil, grease and new motor oil usage monitoring for facilities that perform maintenance activities, including mechanical repairs, painting and fueling;
- Provide secondary containment for all bulk storage of liquid materials.

BEST MANAGEMENT PRACTICES

There are several types of BMPs that can be implemented to reduce stormwater pollution. The type of treatment that is chosen is dependent on the layout of the facility, the magnitude of the stormwater problem on site, and the financial capabilities of the marina.

In the yard:

⚓ Control sediment during construction: If any construction is occurring at the marina, filters can be used to capture sediments that are produced during the work. Silt fences or earthen dikes are some options.

⚓ Create vegetative buffers: Grass, plants, and the soil that they grow in act as filters for stormwater, capturing the sediment and particulates. A buffer slows down the flow of stormwater, allowing for natural processes of evaporation, transpiration and vegetative uptake to occur. All of these reduce the total amount of runoff that reaches the waterways.

- ⚓ Move downspouts so they empty into vegetated areas. Avoid draining to concrete or asphalt.
- ⚓ Use grass swales to direct the flow of stormwater on your property. Grassed swales improve water quality by filtering out particulates, taking up nutrients and promoting infiltration.
- ⚓ Plant native vegetation along the edges of parking lots.
- ⚓ Limit the use of toxic pesticides and fertilizers and instead use environmentally friendly products. Use native plants, which are naturally resistant to pests.
- ⚓ Minimize paved areas: Paved areas increase runoff. Minimize the number and the length of roadways. Plan future development around sensitive areas, and have as little impervious surface as possible.
- ⚓ Capture and filter stormwater: Runoff from hard surfaces such as roofs and parking lots can be directed towards a filtered drain system or a constructed stormwater wetland. The drainage area is comprised of material that filters sediments and other pollutants present in the runoff. The following options for stormwater drainage structures generally require a design or engineered plan for the construction and maintenance of the systems. All systems require regular maintenance to function properly.
 - Retention basins: where stormwater runoff is temporarily stored to allow sediments to settle out.
 - Constructed wetlands: manmade shallow pools planted with native wetland vegetation.
 - Infiltration practices: basins, trenches, downspouts or porous pavement temporarily hold stormwater and discharge it through filtration into the surrounding soils.
 - Bio-retention practices: depressions in the land underlain with an engineered soil mixture to help filter runoff into underlying natural soils or a subsurface drain system.
 - Sand filters and oil-grit separators: underground facilities that capture, pre-treat and filter stormwater runoff as it comes off a surface or through a point source.
 - Grassed swales: vegetated channel lined with erosion-resistant and flood-tolerant grasses underlain by soil that facilitates runoff filtration and exfiltration into the underlying natural soils.
 - Vegetated filter strips: a vegetated strip of land that is positioned to capture and filter sheet runoff.

Landscaping:

- ⚓ Use plants that are insect and disease resistant to avoid having to use pesticides.
- ⚓ Do not use pesticides on windy or rainy days.
- ⚓ Keep lawns mowed to suppress weeds.

Boat Repair:

- ⚓ Do hull maintenance and painting under a covered area.
- ⚓ Use tarps under boats that are being serviced, or do hull maintenance and painting over a cement pad where debris can be swept up or washed into a filter system. Clean the area frequently.

General Maintenance:

- ⚓ Fix leaks and drips.
- ⚓ Equip water hoses with automatic shutoff nozzles.
- ⚓ Sweep parking lots regularly instead of hosing them off.
- ⚓ Store hazardous chemicals inside or under a covered area.
- ⚓ Use water-based paints in place of more toxic, oil-based paints for parking lots and other landscaping needs.
- ⚓ Keep storm drains properly maintained and cleaned.

Education:

- ⚓ Raise marina customer and public awareness about storm drains emptying into surface waters.
- ⚓ Stencil storm drains with “Do not Dump” and indicate what water system a particular drain empties into (requires permission from the county or city department that maintains the storm drains).

FOR MORE INFORMATION:

N.C. DENR Division of Water Quality/ Water Quality Section,
919/733-9919 <http://portal.ncdenr.org/web/wq>

N.C. Cooperative Extension Service website that highlights information on protecting water and best management practices.
<http://www.ces.ncsu.edu/index.php?page=environment>

EPA’s Clean Marina website provides several BMP manuals for marinas as well as information on nonpoint source pollution.
www.epa.gov/owow/nps/marinas.html

Center for Watershed Protection website that gives more specifics on stormwater management and controls. www.cwp.org

EPA website that gives more specific regulations and guidance on how to treat wastewater and how wastewater affects the environment and contains “National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating.” <http://www.epa.gov/owow/keep/NPS/index.html>

SHORELINE STABILIZATION

PROBLEM:

Shoreline erosion can be a source of pollution because it increases the sediment and pollutants that enter the water. Increased sediment can smother shellfish and block out sunlight to aquatic vegetation. It can also increase the scale and frequency of dredging projects which increase marina maintenance costs and add to turbidity problems.

Shoreline erosion is often caused by boat wakes. There is a direct connection between rate of erosion and the type of boat, distance of the boat from the shoreline, water depth, channel width, shoreline soil condition, slope of the bank, and amount of shoreline vegetation. The closer the boat to shore, and the condition of the shore (unvegetated or already eroding), the more likely erosion will be a problem. Often the only waves to scour the shore of a marina come from boat wakes or reflection off of breakwaters. This limited wave action can also cause erosion along the edges of breakwaters and bulkheads, and under boat ramps. Where unvegetated shorelines are exposed to wave action, erosion will also occur. All of this can contribute to sediment accumulation in the marina basin.

RULES & REGULATIONS:

Shoreline stabilization activities are authorized under the N.C. Coastal Area Management Act (CAMA), the N.C. Dredge and Fill law and federal requirements of the Army Corps of Engineers. However, only a CAMA permit application is required because these permits are processed jointly. The N.C. Dredge and Fill Law and federal permit requirements of the Army Corps of Engineers for shoreline stabilization may be met by state requirements as the Corps permit for this activity is usually issued coincidentally with the CAMA permit.

State:

Where a bulkhead is to be permitted, the state requires the following specific standards to be met, as codified in 15A NCAC 07H.0208(b)(7):

A) Bulkhead alignment, for the purposes of shoreline stabilization, shall approximate the location of normal high water or normal water level;

- B) Bulkheads shall be constructed landward of coastal wetlands in order to avoid significant adverse impacts to the resources;
- C) Bulkhead backfill material shall be obtained from an upland source approved by the Division of Coastal Management pursuant to this Section, or if the bulkhead is a part of a permitted project involving excavation from a non-upland source, the material so obtained may be contained behind the bulkhead;
- D) Bulkheads shall be permitted below normal high water or normal water level only when the following standards are met:
- (i) the property to be bulkheaded has an identifiable erosion problem, whether it results from natural causes or adjacent bulkheads, or it has unusual geographic or geologic features, *e.g.* steep grade bank, which will cause the applicant unreasonable hardship under the other provisions of this Rule;
 - (ii) the bulkhead alignment extends no further below normal high water or normal water level than necessary to allow recovery of the area eroded in the year prior to the date of application, to align with adjacent bulkheads, or to mitigate the unreasonable hardship resulting from the unusual geographic or geologic features;
 - (iii) the bulkhead alignment will not adversely impact public trust rights or the property of adjacent riparian owners;
 - (iv) the need for a bulkhead below normal high water or normal water level is documented by the Division of Coastal Management; and
 - (v) the property to be bulkheaded is in a non-oceanfront area.

BEST MANAGEMENT PRACTICES

Various methods can be used to prevent erosion at a marina. The type that is best suited for a facility is dependent on the rate of erosion, the slope of the shoreline, the severity of waves and tides, the amount of vegetation present and the type of soil being eroded. Below are suggested erosion control practices and methods. Where possible, sloping rip-rap, gabions, or vegetation should be used rather than vertical seawalls.

In the Yard:

- ⚓ Retain nearby natural shoreline features during boat ramp construction to help prevent erosion around and under the boat ramp in the future.
- ⚓ Use vegetative planting instead of bulkheads where possible. These methods will work where there is low wave action and

protection structures are not necessary. This dissipates wave action thus limiting erosion. The soil must be suitable for vegetation, allowing plants to establish themselves despite wave and current activity.

- ⚓ Where non-structural stabilization methods cannot be used, structural methods for shoreline stabilization including gabions (rock encased in wire mesh), rip rap, sloping revetments, breakwaters, jetties, and bulkheads can be used.
- ⚓ Use riprap instead of a vertical hard bulkhead on sloping surfaces. Riprap provides habitat for shore animals and aquatic life. It is especially useful in basins where waves or surges would just be reflected back by a bulkhead. Riprap dissipates wave energy better than vertical structures by lessening the affect of scouring.

Education:

- ⚓ Educate boaters on damages caused by excessive wake. Inform them of no-wake zones in the area.

FOR MORE INFORMATION:

N.C. Sea Grant publication - *Shoreline Erosion Control Using Marsh Vegetation and Low Cost Structures*; UNC-SG-92-12

N.C. Sea Grant Extension Specialist 910-962-2491.

N.C. Division of Coastal Management 252-808-2808.

EPA's website for the National Management Measures for Controlling Nonpoint Source Pollution in Coastal Waters.
<http://www.epa.gov/owow/NPS/MMGI/Chapter2/index.html>

Virginia Institute of Marine Sciences. "Coastal Shoreline Defense Structures" Thomas Barnard.

PETROLEUM and OIL HANDLING

PROBLEM:

Petroleum products, which include gasoline, diesel fuel and motor oil, are harmful when introduced to surface waters and can be fatal to aquatic life and predators of aquatic life. These products float on the water's surface, sink to the bottom, evaporate into the air and are suspended in the water column. These products have a low solubility and, therefore, attach to particulates in aquatic environments. The components of these products are toxic to plants and animals both in the water and near the water. Vegetation on shore can be affected as the pollutants are taken into their root systems. Predators of aquatic life are also in danger, as they consume contaminated plants and organisms.

Marinas are most susceptible to spills during fueling operations and during the operation and maintenance of boat engines. Oil from recreational boats can come from dirty ballast water, oil tank flushing, bilge water, fuel residues and waste oil.

Just one quart of oil can cover two acres of surface water (the size of three football fields).

RULES & REGULATIONS:

Oil spills and oil handling fall under federal law of both the Clean Water Act and the Oil Pollution Act of 1990. The Environmental Protection Agency develops the minimum requirements for states to comply with the federal laws. States adopt rules and add more specific requirements as needed.

Federal:

The Clean Water Act prohibits the discharge of oil or oily waste into or upon the navigable waters of the United States or the waters of the contiguous zone if the discharge causes a film or sheen upon the surface water, or causes a sludge or emulsion beneath the water surface. There is a penalty of \$5,000 for violators.

The Clean Water Act (33 CRF 153.305) prohibits the use of soaps or other dispersing agents to dissipate the oil on the water or in the bilge. These agents cause petroleum to sink and mix with bottom sediments, where it will persist for years. Soaps themselves are pollutants and fines of \$25,000 can be levied per incident of soap use.

Federal requirements for the reporting of spills specify that all spills that create a sheen must be reported to the U.S. Coast Guard National Response Center (800) 424-8802.

Any facility with above-ground fuel tanks with a combined capacity of 1,320 gallons or more is required to file a Spill Prevention Control and Countermeasure (SPCC) plan with the N.C. Division of Water Quality. A combined underground fuel storage capacity of 42,000 gallons or more also triggers this requirement (Refer to Appendix I for a sample SPCC plan).

State:

Above-Ground Storage Tanks

Under N.C. General Statute 143-215.96, facilities storing 21,000 gallons or more of oil in an above-ground tank (AST) must register with the N.C. DENR. An oil spill prevention plan, a map or sketch showing property lines and nearby water bodies or watercourses, the number of employees, and the name, address, and phone number of the facility owner and operator must be included with the registration.

Aboveground storage tank construction standards are addressed in the North Carolina Building Code, Chapter 22 of the North Carolina Fire Code and the National Fire Protection Association Standard 30 and 30A (NFPA 30 and NFPA 30A). Currently, no DENR environmental regulations exist for installation, construction, permitting or monitoring of ASTs. Above-Ground Storage Tank construction standards can be obtained by contacting the N.C. Department of Insurance and/or local fire marshals and inspectors.

Underground Storage Tanks (USTs)

The following are siting and secondary containment regulations for USTs that do not meet performance standards for corrosion protection, spill prevention, and overfill prevention. Note that if the UST was installed prior to January 1, 1991, and has met the performance standards, it is excluded from the siting and containment requirements.

- No UST system (including tank, piping and dispensers) may be installed within 100 feet of a public water supply well.
- Double-walled UST systems may be installed between 100 - 500 feet of a public water supply.
- No UST may be installed within 50 feet of any other well used for human consumption.
- Double-walled UST systems may be installed between 50 - 100 feet of any other well used for human consumption.

- UST systems located within 500 feet of surface waters with the following classifications must be double walled with interstitial monitoring: High Quality Water (HQW), Outstanding Resource Water (ORW), Water Supply I (WS-I), Water Supply II (WS-II), and Shellfishing (SA)

As of May 1, 2000, all USTs and replacements must have secondary containment if they are located between 100-500 feet of a public water supply well, within 50-100 feet of any other well used for human consumption, or within 500 feet of specified surface waters.

Secondary containment must be installed by January 1 of the following years for the following items:

- 2005 - all steel or metal connecting piping and ancillary equipment;
- 2008 - all fiberglass or non-metal connecting piping and ancillary equipment;
- 2008 - all USTs installed on or before January 1, 1991;
- 2016 - all USTs installed after January 1, 1991.

Used Oil Recycling

Federal requirements regarding used oil recycling and its transportation can be found in 40 CFR 279.24. The regulations state that:

Generators must ensure that their used oil is transported only by transporters who have obtained EPA identification numbers EXCEPT:

(a) Generators may transport, without EPA id number, used oil that is generated at the generator's site...to a used oil collection center provided that:

- 1) The generator transports the used oil in a vehicle owned by the generator or owned by an employee of the generator;
- 2) The generator transports no more than 55 gallons at one time;
- 3) The generator transports the used oil to a used oil collection center that is registered, licensed, permitted, or recognized by a state/county/municipal government to manage used oil.

BEST MANAGEMENT PRACTICES:

On the Dock:

- ⚓ Keep fuel spill equipment in a waterproof, easily identifiable locker or storage area. Locate it near fueling stations or near any location most likely to suffer a spill. The storage area should include enough spill-response equipment to contain the greatest

potential spill at your facility, including a boom large enough to encircle the largest vessel at your facility based on three times the length of the vessel.

- ⚓ Post signs about safe spill response and removal.
- ⚓ Give boaters oil-absorbent pads with the fuel nozzle so they can capture drips, vent-line overflow and backwash.
- ⚓ Install special fuel nozzles that prevent back flow or fumes. Some nozzles automatically stop the flow of fuel into a boat's fuel tank when sufficient pressure is created by the full tank.
- ⚓ Require boaters and employees to stay with a boat that is being fueled. Have employees trained in safe fuel handling onsite.
- ⚓ Post safe fueling instructions for boaters.
- ⚓ Remove holding clips on fuel nozzles. 2000 N.C. Fire Code (IFC) SECTION 2209.3.3: Dispensing nozzles used at marine service stations shall be of the automatic-closing type without a latch-open device.
- ⚓ Use hard connect delivery nozzles.
- ⚓ Locate fueling stations in low-wake zones that are easily accessible.
- ⚓ Use fuel collars and absorption pads to catch back splash and small drips.
- ⚓ Hang nozzles vertically when not in use to prevent fuel remaining in the hose from draining out. Lock the nozzle in its slot during non-fueling hours.
- ⚓ Prohibit discharge of untreated bilge water in the marina basin.

In the Yard:

- ⚓ Sell or provide oil-absorbing materials for boaters to use in their bilges.
- ⚓ Sell and install bilge filters or oil/water separators to pump oil or fuel-contaminated bilge water into for treatment.
- ⚓ Provide an impervious area for filling fuel cans so any overflow can be easily captured.
- ⚓ Gasoline-soaked absorbents should be air-dried and reused.
- ⚓ Oil or diesel-soaked absorbents should be wrung out over a recycling container and reused. Or they can be double bagged and thrown into regular trash receptacles.
- ⚓ Place oil-absorbent pads and/or leak-proof drip pans under machinery.
- ⚓ Use non-soluble grease on travel lifts, forklifts, cranes and winches.
- ⚓ Inspect transfer equipment regularly for leaks.
- ⚓ Fuel tanks should have containment around them to hold the total capacity of the fuel tanks plus room for precipitation and stand on an impervious surface, or tanks should be double-walled. Consider covering the tank with a roof to prevent rainwater from filling the area.

- ⚓ Fuel tanks should be measured daily to monitor for excessive losses that would indicate a leak.
- ⚓ The daily level of condensate water should also be measured. Measurements should be logged.
- ⚓ Look for signs of discharge in the leak detection system on tanks once a month.

Education:

- ⚓ Provide pamphlets to your boaters about the effects of fuel spills and also on safe handling practices during fueling of boats.
- ⚓ Have a spill response plan in place and practice it regularly with all employees (see Appendix I).
- ⚓ Train employees to contain a spill.
- ⚓ Do not allow topping-off, especially during the summer when fuel expands.
- ⚓ Encourage boaters to use oil-absorbing materials and filters in their bilges.

Oil Spill Response:

- ⚓ Call the N.C. DENR Water Quality Section to report oil spills at 800/ 858-0368.
- ⚓ Notify the US Coast Guard of any spills producing a sheen by contacting the National Spill Response Center at 800-424-8802 or visit www.nrt.org for more information.
- ⚓ Notify North Carolina Emergency Management of any spills producing a sheen by calling N.C. Emergency Management Operations Center at 800-858-0386.

FOR MORE INFORMATION:

The N.C. Department of Insurance, 800-546-5664, and Office of State Fire Marshal, 800-634-7854.

N.C. Division of Environmental Assistance and Outreach provides local contact information for oil recycling at www.p2pays.org/dmrm.

UST information available is on the Division of Waste Management website at <http://portal.ncdenr.org/web/wm/ust/ustmain>, or by calling 919-571-4700.

Regulations and standards for USTs on EPA website <http://www.epa.gov/oust/fedlaws/cfr.htm>

Above ground storage tank information is available from the N.C. DENR Groundwater Protection Unit, 919-733-3221 or at <http://portal.ncdenr.org/web/wq/aps>.

Updated June 2011

Summary and text of the Oil Pollution Act of 1990:

<http://www.epa.gov/oem/content/lawsregs/opaover.htm>

Environmental Protection Agency's oil spill resources:

www.epa.gov/oilspill/spcc.htm

North Carolina's boating laws:

www.boatus.org/onlinecourse/statelaws/NCarolina.html

If you observe a boat not complying with water pollution regulations, report it to the USCG Marine Safety Office (MSO) at 800-368-5647. Your call will be directed to your local MSO.

HAZARDOUS WASTE HANDLING and REPORTING

PROBLEM:

Hazardous wastes common at marinas include the following:

- Ignitable parts cleaning solvents;
- Ignitable/toxic paint related solvents;
- Paint chips;
- Waste antifreeze;
- Mercury from bilge pump switches and fluorescent light bulbs;
- Old signal flares;
- Used batteries;
- Used fuel filters and waste gasoline.

Any of these products if not handled properly can pollute groundwater and adjacent surface waters and soils. They can be harmful to aquatic plants, fish, shellfish and birds.

RULES AND REGULATIONS:

States, local governments and private citizens want to be informed of what hazardous products are in their area and be made aware of potential dangers. Under the Community Right to Know initiative, businesses that store and use hazardous products have to be responsible for their safe handling, from the arrival of shipments to disposal of the associated waste products. Here again the federal government (EPA) is the guiding entity on regulations, with states adopting their own rules based on need.

Federal:

Title III of the Superfund Amendments and Reauthorization Act requires facilities to report hazardous chemicals present on site under EPA's Tier II Emergency and Hazardous Chemical Inventory. Any hazardous chemicals identified in the MSDS must be reported if they meet or exceed the EPA thresholds identified and updated yearly in the EPA List of Lists. Chemicals are not identified by brand names so you must know the contents. County emergency management representatives will have information on how to report any chemicals. They should be contacted since county rules can be stricter than EPA, but note that there is often there is a fee associated with county filing.

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires that marinas with 10,000 pounds or more of petroleum (approximately 1,250 gallons) file "Tier Two" forms with

emergency response agencies by March 1 of each year. The single-page form must be submitted to your local Emergency Planning Committee (LEPC) and your local fire department.

The Federal Resource Conservation and Recovery Act provides guidance to improve the collection, transportation, separation, recovery and disposal of solid and hazardous waste.

Federal specific information on collection and storage rules for hazardous waste are found in Title 40 of the Code of Federal Regulations parts 260 to 299, which is summarized here:

Hazardous wastes can be accumulated on site for 90 days or less provided the waste is placed in containers, tanks or on drip pads, and management complies with the applicable requirements for each of these storage methods. A description of the removal and collection system for the drip pads and a record of each waste removal must be kept. Waste may also be stored in a containment building that has been engineer certified to handle such waste. Records of when accumulation begins and when wastes are removed must be kept. Each container must be clearly marked "hazardous waste." As much as 55 gallons of hazardous waste can be accumulated in containers near any point of generation.

BEST MANAGEMENT PRACTICES:

Disposal:

- ⚓ Provide for the convenient disposal of hazardous wastes.
- ⚓ Recycle solvents.
- ⚓ Segregate incompatible wastes. Many waste haulers charge their highest fees for unknown hazardous mixtures.
- ⚓ Use an approved hazardous waste hauler.
- ⚓ Recycle used batteries and keep them stored with caps closed and on an impervious sheltered surface.
- ⚓ Recycle discarded fluorescent and HID lamps.
- ⚓ Properly dispose of old safety flares.
- ⚓ Collect, recycle or properly dispose of used antifreeze.
- ⚓ Empty and dry out paint cans before disposal.
- ⚓ Sell used paints to customers, donate to local non-profit groups, or use on buildings and workboats.
- ⚓ Inventory stored chemicals every six months and dispose of outdated ones.
- ⚓ Put only waste oil into waste oil collection tanks to allow for easy recycling; adding anything else will greatly increase the cost and effort of recycling and may make it impossible.

Safe Practices:

- ⚓ Use environmentally friendly products.
- ⚓ Keep emergency phone numbers posted by all phones.
- ⚓ Make sure all employees know the where MSDS are kept.
- ⚓ Use propylene glycol antifreeze, which is less toxic than ethylene glycol antifreeze.
- ⚓ Keep Material Safety Data Sheets (MSDS) in an easily accessible location

Storage:

- ⚓ Provide a labeled closed container for ignitable paint waste.
- ⚓ Provide a fireproof container for solvent contaminated rags.
- ⚓ Make sure containers are properly labeled.
- ⚓ Waste storage containers and tanks should have curbed or bermed structures around them and be in sheltered areas and on impermeable surfaces to prevent rainwater from entering the containment. The containment should be capable of holding 10% of the total volume of liquid material, and as a minimum 110% of the volume of the largest storage container.
- ⚓ Keep storage units locked to prevent mixing of used and recyclable hazardous wastes.
- ⚓ Minimize chemical storage by ordering just what is needed for current projects.

Education:

- ⚓ Tell boaters about the recycling programs on site for used oil, antifreeze, batteries and lamps.
- ⚓ Post “no smoking” signs near ignitable products.
- ⚓ Tell boaters what hazardous wastes are and how they are handled at the marina.
- ⚓ Provide boaters with trash bags so that they can bring back their trash.
- ⚓ Train employees on proper handling, storage, transfer, and disposal practices for hazardous materials and hazardous waste.
- ⚓ Require waste recycling in contracts. Have a designated waste drop-off area.

FOR MORE INFORMATION:

N.C. DENR Division of Waste Management 919-733-2178, or <http://portal.ncdenr.org/web/wm/>. Website for N.C. county and state Emergency Management contacts and further Tier II information; includes links to EPA Web site.

Updated June 2011

These EPA sites give further information on pollution prevention and hazardous waste handling:

www.epa.gov/ebtpages/pollutionprevention.html

<http://www.epa.gov/wastes/hazard/index.htm>

This EPA site gives a summary and text of the Community Right to Know initiative: <http://www.epa.gov/epahome/r2k.htm>

The N.C. Division of Environmental Assistance & Outreach provides local contact information for waste recycling at www.p2pays.org/dmrm

Visit Earth911.org or www.ncbigssweep.org/ for recycling programs and events in your area.

SEWAGE and WASTEWATER HANDLING

PROBLEM:

Untreated sewage dumped into waterways degrades water quality and is harmful to human health and aquatic life. Sewage decreases the amount of oxygen available for aquatic life and introduces excessive nutrients to the water which then increases algal growth. Excessive algae in the water limits the amount of sunlight that can penetrate the surface water and reach underwater vegetation. When algae dies it is decomposed by bacteria, which further reduces the amount of oxygen. Raw sewage can also introduce bacteria and viruses that can cause disease. People who swim in contaminated waters or eat contaminated shellfish can suffer from typhoid, hepatitis, cholera, gastroenteritis.

In addition to sewage, the direct discharge of waste water from showers and sinks (gray water) into surrounding waters also causes an increase in biological oxygen demand and nutrients, lowers dissolved oxygen and contributes to the creation of algal blooms.

RULES & REGULATIONS:

It is illegal to discharge raw sewage from a vessel into U.S. territorial waters within three miles of the shore. The discharge of sewage is regulated by the federal government, in cooperation with the states, through federal rules developed for boat holding tanks.

Federal:

The federal Clean Water Act requires boats with installed toilets to be equipped with a certified Type I, Type II, or Type III marine sanitation device (MSD). These requirements do not apply to boats with portable toilets, which should be emptied on shore at approved dump stations or in restroom facilities where allowed. Vessels over 65 feet must have a Type II or Type III system. Vessels under 65 feet may use Type I, II, or III. Type I and II must display a certification label affixed by the manufacturer. Type I and II MSDs treat the sewage before it is discharged. Type III MSDs are holding tanks that need to be pumped out when full.

No Discharge Zone Designations

The EPA has designated the waters of New Hanover, Brunswick and Pender counties a No Discharge Zone for marine sewage. For specific information related to these designations please refer to Appendix VI.

The Clean Vessel Act (CVA) of 1992 established a grant program administered by the U.S. Fish and Wildlife Service to provide funding to states for the installation of pumpouts and dump stations at marinas and other boat docking facilities.

State:

The Division of Coastal Management established the N.C. Marine Sewage Pumpout Station Grant Program to distribute funds available under the 1992 Clean Vessel Act. The division has averaged five to six grant projects each year, with the grant covering 75% of the project and the recipient providing a 25% match. Contact the N.C. Division of Coastal Management for grant applications.

N.C. does not have a rule requiring marinas to install pumpouts because the conditions at marinas vary in terms of number of slips and the size of boats to which they cater. However, 15A NCAC 7H.0208(b)(5)(M) states that: *“Marinas shall post a notice prohibiting the discharge of any waste from boat toilets and explaining the availability of information on local pumpout services.”* In addition, some marinas may have to install pumpouts as a condition of their CAMA permit when the marina is located adjacent to open shellfish waters, has more than 25 boats, can accommodate boats with holding tanks, and is not a commercial fish house or harbor of refuge.”

BEST MANAGEMENT PRACTICES

Types of Pumpouts:

The best option for disposing of the collected waste is to connect directly to a public sewer. If sewer is not available in your area, you will need a holding tank for your marina. The contents of the tank must be pumped periodically and trucked to a treatment plant. Holding tank size and location is determined by the local health department:

- ⚓ Types of pumpouts:
 - Permanently fixed to a dock
 - Mobile system (hand truck or boat)
 - Direct slipside connection
- ⚓ Select an appropriate system based on your marina's needs:
 - Choose an accessible location
 - Consider placement of a fixed system that avoids boater congestion around fuel docks
 - Maintain convenient service hours

- Offer pumpouts at a reasonable cost. The Clean Vessel Act grant program imposes a \$5.00 charge if federal money was used to purchase the pumpout equipment

On the Dock:

- ⚓ Install and maintain a pumpout. Inspect it regularly and establish a maintenance contract with a locally qualified contractor.
- ⚓ Install a dump station or a porta-potty wand attachment on your pumpout so those using portable toilets have a means of disposing of their sewage.
- ⚓ Post signs with directions for pumpout use including cost and safe handling of sewage, or have an attendant operate the pumpout. Train employees on safe handling and use.
- ⚓ Use dye tablets in your patrons' boats to ensure their holding tank y-valves are in the closed position. Include language in slip leasing agreements encouraging the use of pumpout facilities and designating your marina a no-discharge basin. Regulate and enforce the contract.
- ⚓ Encourage boaters to conserve water, install water saving devices and use biodegradable detergents while on their boats.
- ⚓ If pumpout service is not provided, post signage indicating the location of the nearest pumpout facility.

Gray water Handling:

- ⚓ Provide gray water pumpouts.
- ⚓ Educate customers about the impacts of gray water
- ⚓ Discourage use of dish soap on-board
- ⚓ Provide shore side dishwashing facilities for boaters and encourage their use.

In the Yard:

- ⚓ Provide convenient facilities for live-a-boards.
- ⚓ Provide clean, functional restrooms on shore and keep them open at all times.
- ⚓ Put up signs showing where your pumpout is, or indicating where the nearest pumpout to your facility is located.
- ⚓ Post signs in restrooms asking patrons not to throw paper towels, tissues, cigarette butts, diapers, or tampons in toilets and provide a receptacle for these items. This will help prevent septic failure, which can contaminate drinking water and/or shellfish.
- ⚓ Properly maintain your septic system
- ⚓ Do not dump fats, solvents or pesticides into drains. Post signs and trash bag stations for clean-up and disposal of pet waste

Education:

- ⚓ Put up signs stating that the marina basin is a no discharge area.
- ⚓ Post signs with directions on how to use the pumpout.
- ⚓ Have information available on pumpout use and why it's important.
- ⚓ Encourage boaters to use pumpouts in all of their travels.
- ⚓ Include Marine Sanitation Device (MSD) requirements and regulation for no discharge in your marina as part of your contract with the boater. Ensure they understand noncompliance will result in expulsion from the marina.
- ⚓ Educate your customers on MSD types and requirements:
 - Type I MSD: Free-flow system that macerates sewage to no visible solids, treats with chemicals or heat, and reduces bacteria count to less than 1,000 per 100 milliliters. Only allowed on vessels smaller than 65 feet.
 - Type II MSD: Free-flow system that macerates sewage finer than Type 1, to no suspended particles, treats with chemicals or heat, and reduces bacteria count below 200 per 100 milliliters. Cleaner effluent but requires more chemicals. Used on larger vessels.
 - Type III MSD: A holding tank system designed to retain or treat waste until disposed at shore side facility.

FOR MORE INFORMATION:

N.C. Division of Water Quality Groundwater Section (919-733-3221) for wastewater disposal system and well questions: <http://portal.ncdenr.org/web/wq/aps/gwpro>.

Pumpout facilities in the state and current Clean Vessel Act grant information: www.nccoastalmanagement.net/Marinas/pumpout.htm

Contact the Division of Coastal Management (252-808-2808 or <http://www.nccoastalmanagement.net/Marinas/pumpout.htm>) for pumpout grant applications.

EPA site for tips on handling wastewater, identification of the problems associated with wastewater, and rules guiding safe handling: www.epa.gov/ebtpages/wwastewater.html

Pumpout information from the U.S. Fish and Wildlife Service: <http://wsfrprograms.fws.gov/Subpages/GrantPrograms/CVA/CVA.htm>.

FISH CLEANING STATION

PROBLEM:

Excessive fish waste deposited directly into marina basins can produce foul odors and impair water quality through increased bacteria levels and decreased dissolved oxygen. It also causes an unsightly mess.

Used monofilament fishing line is harmful to wildlife and boat motors if discarded improperly.

Aquatic nuisance species can be spread through boats, ballast water and other forms of introduction into water bodies.

RULES & REGULATIONS:

There are no specific rules or regulations addressing fish cleaning stations, but the waste should be considered trash that should not be dumped into waters. There may also be local ordinances that cover this form of solid waste and its disposal. North Carolina G.S. §113-265(b); N.C. G.S. §130A-309.01 through 309.29 Non-hazardous solid waste management; N.C. G.S. §130a-309.07(7) State Solid Waste Management Plan.

State:

The N.C. Wildlife Resources Commission and the Marine Fisheries Commission have statutory authority to regulate the disposal of fish waste. Division of Marine Fisheries law states that “no one may possess aboard a vessel or while engaged in fishing any fish subject to limits without head and tail attached, except for alewife and blueback herring used for bait provided not more than two fish per boat/operation may be cut at any one time” (15A NCAC 3M .0101).

BEST MANAGEMENT PRACTICES:

On the Dock:

- ⚓ Post signs prohibiting the dumping of fish waste into the marina basin.
- ⚓ Provide fish cleaning stations with covered receptacles for disposal of waste.
- ⚓ Clearly mark stations and post rules for fish cleaning and disposal.
- ⚓ Empty garbage containers regularly.

- ⚓ Install a monofilament recycling bin with signs indicating the purpose and procedures. Include a “no trash” sign. Properly maintain and empty the bin.
- ⚓ Do not dump bait, drain your bilge or live wells, or rinse your boat in a different water basin.

In the Yard:

- ⚓ Prohibit fish cleaning outside the designated area.
- ⚓ Compost fish waste with peat moss or wood chips to make garden mulch.
- ⚓ Arrange for crabbers to take fish waste.
- ⚓ Grind fish waste into chum and sell it.

Education:

- ⚓ Post signs directing people to clean their fish at a designated station or at home.
- ⚓ Have information available on the water quality hazards associated with fish waste.
- ⚓ Prohibit fish cleaning at the marina if proper facilities are not available.
- ⚓ Include provisions in customer contracts about your marina’s fish cleaning policies.

FOR MORE INFORMATION:

Available through MN Sea Grant: *Composting Fish Waste* by Thomas Halbach and Dale Baker. <http://www.seagrants.mn.edu> or call 218-726-8106.

For further information on monofilament recycling, and how to construct an outdoor bin, visit <http://www.fishinglinerecycling.com/>

For free, postage paid envelopes to return fishing line, or for free indoor monofilament recycling boxes, please contact Pure Fishing America (Berkley) at 1-800-Berkley.

BOAT CLEANING PRACTICES

PROBLEM:

Work that is done on boats can release oils, grease, paint chips, paint liquids, detergents, copper, zinc, lead and a host of other contaminants into the waters. These products can pollute waters, kill marine life, and limit the sunlight needed by aquatic plants for growth. Bottom dwelling creatures may ingest heavy metals, putting the contaminants into the food chain. Contaminants that settle into bottom sediments can increase the cost of dredging by making it more difficult to find a suitable disposal site for the dredged material.

Detergents and other cleaning products can contain toxic chemicals that can be corrosive or caustic. Even products labeled non-toxic can be harmful to aquatic life. Detergents, for example, destroy the natural oils on fish gills reducing their ability to breathe.

Engine maintenance is necessary on a regular basis to ensure proper performance of boat engines. Engine maintenance requires using hazardous materials such as oil, solvents, and antifreeze.

RULES & REGULATIONS

The Refuse Act of 1899 prohibits the dumping of any pollutants into U.S. territorial waters. States have made this law more specific by regulating boat cleaning and maintenance operations to minimize pollutants that enter the waters through runoff or are released into the air.

Federal:

Marinas that provide commercial boat maintenance services where maintenance activities are susceptible to stormwater runoff may require a National Pollutant Discharge Elimination System (NPDES) permit under US EPA regulations.

State:

State rule T15A NCAC 7H.0208(b)(5)(N) guides the maintenance activities that take place in boatyards: *“Boat maintenance areas shall be designed so that all scraping, sandblasting, and painting shall be done over dry land with collection and containment devices that prevent entry of waste materials into adjacent waters.”*

The Division of Water Quality identifies pressure wash water as industrial (process) wastewater. Therefore, discharge of pressure

washwater to coastal waters, the ground, or a sewer system is illegal without a permit.

All pressure wash facilities must develop a system to collect wastewater for treatment, recycling or offsite disposal. To meet requirements, significant pretreatment of the wastewater prior to discharge would be required, regardless of the chosen discharge option (treatment, recycling or offsite disposal).

BEST MANAGEMENT PRACTICES:

In the water boat cleaning or maintenance:

- ⚓ Do not allow underwater work, including maintenance and the removal of marine fouling debris (algae, barnacles and other organisms), where paint residue can be released into the water. Cloudy water during scrubbing indicates the release of anti-fouling paint containing copper and other metals. Properly functioning anti-fouling paint will repel growth of fouling organisms and requires only occasional light wiping with a soft cloth to remove slime.
- ⚓ Do not use abrasive materials. Use only a soft cloth or fleece mitt. Cleaning using abrasive items can contribute to the release of copper and other toxic metals into the water and sediment. Aggressive cleaning of antifouling paint using tools such as scrubbing pads and powered rotary brushes will shorten the effective life of the paint significantly.
- ⚓ Work on boats should be performed over dry land and according to the Best Management Practices outlined above to clean hulls within the confines of your marina. It is best that no hull maintenance be performed below the water line where copper containing anti-fouling paint can be released. However, if underwater work is allowed, it should be limited to gentle wiping with a soft cloth to remove slime.
- ⚓ Prohibit any boat hull cleaning on boat hulls that have been coated with anti-fouling bottom paint within 90 days of application.
- ⚓ If available, provide an alternative to underwater hull cleaning by offering mid-season pressure wash specials.
- ⚓ Allow only hull maintenance divers that follow the Best Management Practices outlined above to clean hulls within the confines of your marina.
- ⚓ Customers who have had their hulls coated with ablative bottom paints should be asked to read and sign a notice that states, "I understand that my boat has been painted with an ablative bottom paint that contains Copper and other high concentrations of paint and toxins. If my hull is scrubbed below the waterline

while in the water, high concentrations of paint and toxins may be released possibly leading to water quality and habitat degradation. I am responsible for the actions of contractors if I allow underwater hull maintenance service on my vessel.”

- ⚓ Promote the use of water as a natural cleaner. Encourage the use of biodegradable and phosphate-free cleansers or use alternative cleaners (Appendix IV)
- ⚓ Use caution with open cleaning products on the deck and close properly between applications. Clean up all spills immediately with absorbent materials; do not hose the spill into the water.
- ⚓ Limit amounts of solvents, paints and cleaners to the minimum amount needed to get the job done.
- ⚓ Prohibit pressure-washing in and over the water. Boat hulls should only be washed in the water if washing above the waterline by hand.
- ⚓ Plug scuppers to contain dust and debris.
- ⚓ Prohibit sanding of a vessel’s exterior when in the water, unless using vacuum sanders. Use additional BMPs as necessary to prevent sanding debris from entering the water.
- ⚓ Offer biodegradable cleaning products for sale.
- ⚓ Wash and drain any bilges or bait wells before transporting a vessel to another body of water to prevent the spread of exotic or nonnative plants and organisms. Be sure to drain bilges and bait wells in an area that does not run back into the water.
- ⚓ Collect and recycle all used zinc anodes.

Boat Painting:

- ⚓ Use anti-fouling paints with the minimum amount of toxins.
- ⚓ Use water based paints with lower volatile organic compound (VOC) content where possible.
- ⚓ Limit in water painting to small jobs within the confines of the interior of the boat.
- ⚓ Liquid paints are classified as hazardous materials. To dispose of properly, allow all paint cans, brushes and rollers to air dry before disposal.
- ⚓ Mix paints, solvents and reducers away from the water’s edge.
- ⚓ Clean up all paint spills with absorbent materials. Dispose of materials properly.
- ⚓
- ⚓ Conduct spray painting in a spray booth (enclosure around boat) or under a tarp.
- ⚓ Utilize traditional painting methods (brush or roller), which reduce air emissions. If not, invest in high-volume low-pressure (HVLP) spray guns to effectively and efficiently apply boat paint.
- ⚓ Place tarps or other debris-catching devices under all boats prior to boat scraping and painting. Prevent debris from being

blown or washed off of tarps by storms and properly dispose of tarp after job is completed.

Engine Maintenance:

- ⚓ Do not wash engine parts over bare ground.
- ⚓ Use drip pans when handling any type of liquid.
- ⚓ Clean engine repair areas using dry clean-up methods such as capturing petroleum with absorbent pads. Prohibit hosing down of maintenance areas.
- ⚓ Recycle used oil. Consider the use of bio-remediating systems that use microbes to breakdown oil and grease.
- ⚓ Store engines and engine parts under cover on concrete or asphalt.
- ⚓ Use funnels to transfer liquids.
- ⚓ Add stabilizers to prevent fuel degradation. These products protect engines by preventing corrosion and the formation of sludge. It also eliminates the need to dispose of “stale” fuel.
- ⚓ Oil, solvents, anti-freeze, batteries, and other materials generated in engine maintenance are classified as hazardous waste. Refer to section on hazardous waste for proper disposal.

Education:

- ⚓ Have information on boat cleaning and maintenance practices available for boaters. Inform boaters about the potential harm caused by the release of metals and other toxins from pressure-washing hulls with anti-fouling bottom paint.
- ⚓ Post a sign near the dock that describes the environmental impacts from underwater maintenance on hulls coated with anti-fouling paint.
- ⚓ Encourage boaters to use dustless sanders. Have them available for rent.
- ⚓ Ensure customers use designated work areas or tarps by posting signs on proper procedures.
- ⚓ Include rules in customer contracts that outline areas, materials and procedures for vessel maintenance.
- ⚓ Train employees in proper maintenance activities and BMPs.
- ⚓ Share leftover supplies with boaters if possible.

Pressure Washing Wastewater:

Abrasive blasting, pressure washing, hull scraping and sanding, and hull painting.

All pressure washing wastewater must be collected and handled in an acceptable manner. **(Note: It is recommended that facilities evaluate the number of boats washed, site characteristics, sewer availability, cost, staff ability and other factors before selecting one of the following options. Additional options may**

be available and should be discussed with regional water quality personnel).

1. Install a collection system: Involves installing a device used to collect all of the wash water and solids from pressure washing. Good house-keeping must be practiced. This includes sweeping the wash down area, collecting the solids, and disposing properly. Wash water must be collected and stored in holding tanks and not allowed to discharge to surface water or ground water, and can be combined with the following:
 - a. Closed Loop Recycling: Treats wastewater for reuse as wash water, without a wastewater discharge. May not require a wastewater discharge permit if there is no wastewater discharging from the system. However, it may require periodic hauling by a licensed/certified industrial wastewater hauler to dispose of residual wastewater and solids. May not require a permit must be reviewed by the Aquifer Protection Section within the Division of Water Quality prior to operation. Sewer availability may be an option for proper disposal of the wastewater.
 - b. Pump and Haul: Involves a licensed/certified wastewater hauler to remove wastewater from the site to dispose of at a permitted facility. Requires an industrial wastewater holding tank that is in compliance with state regulations.
 - c. Connectivity to a Sewer System: Requires a permit from the local sewer authority or sewage treatment plant before discharge of wastewater is allowed. Requires significant pretreatment before disposal, and may require a certified operator to run the treatment system.
2. Convert from a liquid operation to a dry operation: This involves converting the media used to clean boat hulls and maintain hulls from a liquid (water) to a solid (sand, soda, or other).
3. Conduct all cleaning and maintenance activities under a roof and away from the water's edge to minimize exposure to stormwater runoff.

*Overspray must be controlled and is included in the wastewater collection and management requirements listed above.

BEST MANAGEMENT PRACTICES:

- ⚓ Designate a boat maintenance area designed to minimize pollutant spread by containing all solid waste and wastewater. Activities restricted to this area should include abrasive blasting, pressure washing, hull scraping and sanding, and painting.
- ⚓ Maintenance area should be on a hard, impermeable surface. Use canvas or plastic tarps under boats if no designated work area is available. Secure tarps with cement blocks to minimize negative effects from the wind. Paint chips, barnacles, and other solids that are removed from boat hulls painted with anti-fouling paint must be collected and disposed of properly. Tarps should be cleaned daily or prior to a rain event.
- ⚓ Cover maintenance area with tarp when not in use to prevent rainwater from entering the area. Berm or curb the area to enclose materials and to prevent runoff.
- ⚓ Clearly mark designated work and pressure wash areas.
- ⚓ Perform abrasive blasting within an enclosure or under a plastic tarp in a designated maintenance area.
- ⚓ Pressure-wash over a bermed impermeable surface that allows wastewater and solids to be captured. Wash water is defined as an industrial wastewater by the EPA and must not be discharged directly into stormwater drains or surface waters.
- ⚓ Cover storm drains near the work area to prevent wastewater and solid wastes from entering the water.
- ⚓ Use dustless sanders. Encourage boaters and contractors to do the same.
- ⚓ Collect maintenance debris such as sandings, paint chips, fiberglass, and dispose of properly. Clean up designated area prior to rain to prevent runoff to surface waters.

FOR MORE INFORMATION:

Information on ways to prevent pollution at your marina:
<http://wrrc.p2pays.org/industry/marina.htm>

N.C. Division of Environmental Assistance and Outreach provides local contact information for oil recycling at www.p2pays.org/dmrm.

Division of Waste Management List of N.C. Hazardous Waste Collection sites: <http://portal.ncdenr.org/web/wm/hw>

North Carolina Division of Water Quality requires a NPDES permit. For general information visit DWQ at h2o.enr.state.nc.us/nps/What_is_NPS/marinas.htm

Updated June 2011

For NPDES permit forms and information visit DWQ at <http://portal.ncdenr.org/web/wq/ws/su> or the Environmental Protection Agency at cfpub2.epa.gov/npdes/stormwater/msgp.cfm

BOAT OPERATIONS

PROBLEM:

The improper operation of boats can cause harm to healthy marine habitats. Boat traffic through shallow-water areas and in near shore areas at wake-producing speeds can stir up bottom sediment, uproot submerged aquatic vegetation, erode shorelines, and harm wildlife.

Suspended sediment and erosion along shorelines increase turbidity in the water column. Turbid waters can't support submerged aquatic vegetation to the same depths as clear waters because sunlight can't penetrate as deep. With photosynthesis limited to the upper foot or so of water, less dissolved oxygen is produced. Fish that locate prey primarily by sight have a harder time finding prey in turbid waters. Plant leaves can become coated with fine sediment, and bottom-dwelling organisms are continually covered by resettling sediment.

Resuspended sediment can also contain harmful chemicals that have been trapped in the mud and sand. Once in the water column, these chemicals are more likely to be ingested by fish and shellfish, and work their way up the food chain.

Uprooted submerged aquatic vegetation can no longer provide habitat for fish and shellfish or food for waterfowl. Instead of recycling nutrients released from matter decomposing in the waterbody, the vegetation adds more nutrients as it decomposes. It also cannot reduce wave energy at shorelines, which increases the rate of erosion.

RULES AND REGULATIONS:

Local enforcement officials monitor adherence to no wake laws and issue citations when the rules are not followed.

BEST MANAGEMENT PRACTICES:

- ⚓ Be aware of your wake and observe no wake zones.
- ⚓ Distribute your passengers equally. A heavy stern creates a larger wake.

- ⚓ Be aware of low tide when seagrass beds, other delicate vegetation and bottom organisms are more exposed. Avoid boating in shallow waters.
- ⚓ Operate away from shore as much as possible to avoid disturbing wildlife and wetlands.
- ⚓ Operate in main channels to avoid disturbing bottom sediments.
- ⚓ Promote safe and responsible use of boats.
- ⚓ Sell four-cycle engines. The newest engines are clean burning and fuel efficient, which saves money for fuel costs and keeps our air and water clean.

FOR MORE INFORMATION:

North Carolina Coast Guard Auxiliary for Safe Boating Classes:
<http://coastguardaux.com/>

North Carolina Wildlife Resources Commission boating and waterways information:
http://www.ncwildlife.org/Boating_Waterways/index.htm

North Carolina Marine Patrol fishing enforcement:
<http://www.ncfisheries.net/ncdmf/patrol/index.html>

HURRICANE PREPARATION

PROBLEM:

As seen from recent history, N.C. is a prime target for hurricanes. The damages caused by hurricanes take many different forms and can be extremely costly to repair. Wind and water are the main factors to consider.

Wind can blow down trees, create projectiles of objects not securely fastened, and blow off building roofs and canvas from boats. Water can result in flooding of buildings and yards from high waves and tides, and can damage docks, pilings and the boats attached to them. Either of these factors can also increase the likelihood of pollutants reaching the waters. Wind and water can sink boats, which can leak fuel, oil and other chemicals. Flooding of upland buildings and equipment can also cause these same pollutants to escape into the waters.

Hurricane preparation must be an ongoing activity at a marina and cannot just be considered when a storm is approaching. Both employees and customers should know well in advance what their responsibility is if a hurricane is approaching.

RULES & REGULATIONS:

Since liability issues surround hurricane damage, there are no set state or federal rules on how marinas should operate before and during storms. In addition, every facility and every storm are unique, making it impossible for a one-size-fits-all standard. And while it is good practice to have a hurricane plan, the plan must be tailored to fit the needs of individual facilities, again making a regulated plan impractical.

BEST MANAGEMENT PRACTICES:

- ⚓ Have a hurricane preparation plan (see Appendix II).
- ⚓ Review plan yearly with employees.
- ⚓ State in your contract with customers what must or will be done with their boat if a storm is coming. Protect yourself from liability by having an attorney review your contract.
- ⚓ Secure boats properly or remove from water.
- ⚓ Recycled fuel containers, dumpsters and trash cans should be emptied or otherwise covered and secured.

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- ⚓ Paints and other chemicals in the shop should be secured or removed from the premises.
- ⚓ Underground or above-ground storage fuel tanks that may float during a storm should be secured.
- ⚓ Shut off all fuel lines. Remove electric, water and other connections from the dock.

FOR MORE INFORMATION:

Federal Emergency Management Agency (FEMA) guidelines for marinas preparing for hurricanes:

<http://155.82.160.101/USHESdata/FEMA/Marinas/Marinasframe.htm>

FIRE AND SAFETY MANAGEMENT

PROBLEM:

Due to the proximity of a marina to the water, the presence of chemicals and fuels, and the sheer number of boats, a marina is at high risk for potential accidents. Many situations can occur at a marina that will require immediate response, where waiting for 911 emergency personnel is a loss of valuable minutes. In order for quick response to work, the roles of employees must be well understood and practiced. Planning ahead for disaster is, therefore, a crucial part of marina management.

Some Potential Emergencies: boat fire, dock fire, facility fire, medical emergency, poisoning, drowning, boating accident, accident involving equipment.

RULES & REGULATIONS:

Rules for fire and safety are commonly found under local fire and building codes. There are no state laws that cover all areas of the state, but rather local fire codes that vary by county and even city or town. To make sure you are in compliance, talk with the local fire marshal or building inspector.

The following are the standards for fire protection under the National Fire Protection Association (NFPA): NFPA 303, Fire Protection Standards for Marinas and Boatyards (May be referenced in local building codes); NFPA 30A, Automotive and Marine Service Station Code (Referenced in State Building Code); NFPA 307, Standard for the Construction and Fire Protection of Marine Terminals, Piers and Wharves (May be referenced in local building codes); and NFPA 33, Standard for Spray Application Using Flammable and Combustible Materials (Referenced in State Building Code) .

BEST MANAGEMENT PRACTICES:

On the Dock:

- ⚓ Place fire extinguishers on the dock. NFPA standards call for extinguishers listed for Class A, B and C fires to be installed at the pier/land intersection on a pier that exceeds 25' in length. Additional fire extinguishers should be placed such that the

maximum travel distance to an extinguisher does not exceed 75 feet.

- ⚓ Have life buoys readily available on the dock.
- ⚓ Do not allow gas cans or other flammable liquid containers to be left on docks.
- ⚓ Ensure ready access for municipal fire fighting equipment.
- ⚓ Inspect fuel lines routinely for signs of deterioration.

In the Yard:

- ⚓ Invite the local fire marshal to inspect the facility for fire hazards.
- ⚓ Meet with the fire department to talk about the marina layout and special considerations (preplanning).
- ⚓ Establish procedures for the safe handling and storage of flammable liquids and gases.
- ⚓ Keep equipment operating safely through a preventative maintenance schedule including testing fire extinguishers yearly.
- ⚓ Prevent the accumulation of combustible materials, such as used rags, paintbrushes, and half filled containers of flammable liquids.
- ⚓ Place the appropriate class of fire extinguisher (A,B,C) in workshops, office buildings and in the yard.
- ⚓ Identify and mark all utility shutoffs.
- ⚓ Have first aid equipment on site, including a backboard and an eyewash station.
- ⚓ Install smoke detectors in buildings.
- ⚓ Be sure hydrants are available.

Education:

- ⚓ Consider all the possible emergency situations that can occur and put together a notebook or file with step-by-step directions on how to handle each emergency.
- ⚓ Review this notebook.
- ⚓ Train employees how to use fire extinguishers.
- ⚓ Ensure employees are familiar with all fire safety systems.
- ⚓ Establish a fire warning system. Have an alarm connect directly to the nearest fire station.
- ⚓ Have appropriate emergency numbers posted and/or readily accessible to all employees.
- ⚓ Have MSD sheets readily available because they list how to handle accidents involving the specific material.

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FOR MORE INFORMATION:

Florida Sea Grant College Program-Panic Preventer File
[http://www.flseagrant.org/program_areas/waterfront/publications/S
GEB_045_%20Panic_Preventer_File_web.pdf](http://www.flseagrant.org/program_areas/waterfront/publications/S
GEB_045_%20Panic_Preventer_File_web.pdf)

N.C. Division of Emergency Management 919-733-3825,
www.ncem.org

N.C. Department of Insurance, Office of State Fire Marshall:
<http://www.ncdoi.com/OSFM/>

RESOURCES

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United States Environmental Protection Agency. National Guidance for Marinas and Recreational Boating Controlling Nonpoint Pollution to Surface Waters. <http://www.epa.gov/owow/nps/mmisp/index.html>

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United States Environmental Protection Agency. 1996. Clean Marinas, Clear Value: Environmental and Business Success Stories. Washington, DC. EPA-841-R-96-003.

APPENDICES

- I. Sample Oil Spill Response Plan
- II. N.C. Marine Trades Services Hurricane Preparedness Plan
- III. N.C. Clean Marina Program
- IV. Alternative Cleaners
- V. Monofilament Recycling
- VI. No Discharge Designations
- VII. Boater Tip Sheets

Appendix I

Sample Spill Prevention, Control and Countermeasure Plan (SPCC)

The sections of this plan listed below in bold are required, but the information given under each section is an example of what a business could or should record. Marinas not required by law to have a certified SPCC plan should consider having a Spill Response plan onsite, following the SPCC guidelines.

Facility Information:

Marina Name:

Address:

Contact Name:

Phone:

Fax:

Email:

Spill Emergency Contacts:

Local:

Fire Department

Police Department

NC DENR local office

Marina personnel in charge of spills

Emergency clean-up contractor

Marina emergency contact number (mobile):

State & Federal:

USCG National Response Center, 800-424-8802

N.C. DENR, 800-858-0368

The following information will be given to spill response departments:

Location of spill, land and water

Source of spill

Time of spill

Estimated volume of spill

Nature and potential danger of spilled material

Anticipated movement of spilled material

Responsible party name, address, phone number

Action already taken

Weather conditions at spill site

Spill Containment Procedures:

Upon discovering a spill the employees of this facility will make every effort to stop the source of the spill and contain the spilled materials. If any danger to the health and/or safety to employees exists from the spill only those methods which would allow for minimum contact with the spill site area will be undertaken. If the spill consists of gasoline, employees are not advised to contain the spill because of its explosion/flammability hazard. The gasoline should be allowed to dissipate and the U.S. Coast Guard National Response Center (800) 424-8802 notified immediately.

Clean-up and removal of the spill will be done by the qualified contractor listed here:

Containment equipment on site:

Booms (size & number) can contain the volume of the largest tank on site
Pillows (number)
Pads (number)
Gloves
Goggles
Tyvek coveralls
Hazardous material disposal bags

Description of storage and areas where spills are most likely to occur:

Vent pipes from tanks	Fuel pumps
Loading areas	Boiler rooms
Off-loading areas	Sumps
Piping to storage tanks	Packaged oil storage areas

Spill History:

Description of spills occurring within the past year, corrective action taken, and prevention.

Potential Spills – Prediction:

1. Complete failure of full tank, #gallons released instantaneously, flow direction would be (N, S, E, or W) along lines of natural drainage.
2. Partial failure of a full tank, #gallons released gradually to instantaneously, flow direction would be (N, S, E, or W) along lines of natural drainage.
3. Tank overfill, #gallons (depending on capacity of fill truck), at a rate of #gallons per minute.
4. Leaking pipe or valve packing, several ounces to several gallons, up to 1 gallon per minute.

Controls:

Containment and diversionary structures and equipment on site to prevent spills from reaching navigable waters include:

1. Drainage from diked storage areas have valves or other positive means to prevent an oil spill.
2. Valves are manual, open and closed design.
3. Storm water from diked areas is inspected before drainage and records are maintained.
4. Catchment basins collect spills that do not occur in diked areas.

Storage tanks (above ground):

Storage tanks are made of _____ (specify material). Secondary containment is provided for the largest tank, with an allowance for precipitation.

Inspections:

1. Tanks are inspected weekly for leaks and overall soundness.
2. Shell thickness will be tested every other year by an engineer.
3. Tank inventories will be taken daily using sounding stick and conversion table.
4. Above ground piping will be visually inspected every week.
5. Below ground piping will be inspected where the pipe breaks the ground weekly. Corrosion and deterioration of mastic coating will be monitored.
6. Valves, gaskets, flanges will be visually inspected weekly and monitored for leaks or stains.
7. Diked areas will be monitored daily. Accumulated water will be inspected for an oily sheen. Areas will be drained, recording date, time and approximate quantity discharged, noting no oily discharge has been released.
8. A visual inspection of the entire fenceline will be completed weekly and a verification that all lights in the yard are operable will also be completed weekly.
9. Spill prevention equipment will be inventoried monthly or after use and a list of items needing replacement will be submitted to purchasing.

Training:

Facility personnel are properly instructed in the operation and maintenance of all equipment used to prevent oil discharges, as well as the applicable spill prevention regulations. Spill prevention briefings for operations personnel are conducted monthly, with a quarterly meeting for all facility personnel, including sales and secretarial.

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Employees are made aware of where spill response equipment is kept, where the list of contact names is kept and notification procedure, and how the spill response equipment is to be deployed.

Appendix II

**N.C. MARINE TRADES SERVICES
HURRICANE PREPARATION PLAN**

Operator Checklist

EQUIPMENT ON SITE

- lines
- chafing gear
- tarps
- screw anchor
- batteries
- first aid kit
- portable generator
- plywood
- cut/patch equipment
- duct tape
- submersible pump
- plastic sheeting
- camera/video equipment
- mobile radio/cellular phone
- spill containment gear
- minimum repair kit
- _____

INSPECT YEARLY

- docks have quick shut-off above the flood plain
- docks are attached to pilings that can sustain a 50-year storm surge and wind load
- there is enough storage space above the flood plain for boats and vehicles
- there is storage space above the flood plain for office records and equipment
- there is emergency power for winch operation, travel lift, pumps and communication
- cradles and jacks are stored and easily accessible
- moorings have been checked by a diver and set
- all employees are trained for hurricane plan actions
- all boaters have received checklists for hurricane planning
- all boaters have current insurance for their vessels
- _____

INSPECT MONTHLY

- building roofs, doors and windows
- fuel and sewer pumping lines
- fire fighting gear
- spill containment gear
- lifts and cranes
- electrical supplies
- debris is removed from open areas
- trees and shrubs are trimmed
- trash bins and dumpsters are secured in protected area
- salvaged or abandoned hulls, equipment and parts are disposed of or secured
- dry storage areas and racks

CONTRACTORS FOR RECOVERY – Identify and list with phone numbers.

ACTIONS DURING STORM APPROACH

72-48 HOURS PRIOR TO PROJECTED STORM ARRIVAL

MANAGER (this job is the same throughout the preparation stage)

- monitor NOAA weather station and/or the internet weather reports
- assist where needed
- coordinate volunteers

- act as home base where employees can report jobs completed and where help is needed
- coordinate supplies, tools and labor

OFFICE

- notify customers that facility is on alert
- monitor NOAA weather station and/or internet weather reports
- process mail and all paperwork
- back up computer records
- delay orders of materials and stocks that are due to be shipped
- contact all contractors for post-storm clean-up
- contact volunteers to begin preparation work
- cover and tape windows

YARD

- remove or secure blowables (signs, tables, chairs, trash cans, etc.)
- fill fuel tanks
- remove or secure small drystorage boats (dinghies, kayaks, canoes, etc)

DOCKS

- begin hauling boats
- begin securing boats that have decided to remain at the docks
- allow boat owners to evacuate to an off-site location
- assist boaters in preparation

48-24 HOURS BEFORE PROJECTED STORM ARRIVAL

OFFICE

- remove equipment and records to safe storage
- cover remaining equipment and furniture with plastic
- move items that could sustain water damage to tables or off the ground
- purchase extra batteries, food and water for emergency securing and recovery workers
- have a source of ready cash for recovery work
- confirm insurance coverage and secure policies
- establish an "outside the area" contact person for communication during evacuation

YARD

- move all vehicles upland
- secure the marina from non-essential traffic
- remove floating docks if possible and tie them down
- turn off water supply if it is public
- turn off fuel pumps and main electricity
- take pictures/video of the facility and preparation conditions
- _____
- _____

DOCKS

- continue securing vessels
- check boats to see that no occupants are remaining
- _____

24-0 HOURS BEFORE PROJECTED STORM ARRIVAL

OFFICE

- lock doors and brace them against wind
- set up answering machine (have battery back-up installed)
- give instructions for post-storm activities
- give approximate time to return to the marina (to be confirmed by off-site contact)
- ensure everyone has the number of the off-site contact
- _____
- _____

YARD

- do a last patrol of the grounds
- secure all access points
- _____
- _____
- _____

DOCKS

- conduct a last patrol of the vessels, checking docklines and moorings
- ensure no one remains on their vessel; if they choose to remain have them sign a waiver of liability and give you the next of kin address and phone number
- _____

Send All Employees Home Unless a Skeleton Crew Is Needed To Remain For the Storm!

DURING THE STORM

ON-SITE

- Monitor weather reports on radio, TV and/or internet
- Stay in a protected area
- Use extreme caution and stay off the docks
- Do not attempt to re-tie or board a loose vessel during the storm
- _____
- _____

OFF-SITE

- Monitor weather reports on radio, TV and/or computer
- Coordinate return of all employees
- Review recovery plan
- Review insurance policy
- _____
- _____

RECOVERY

Beware Of Snakes, Downed Electric Lines, Wet Electronic Equipment, Leaking Gas or Fuel

- contact employees regarding when they should return
- contact recovery crews
- contact insurance company to get an adjuster and surveyor to you
- set up security to prevent looting and for crowd control
- photograph/video everything
- complete a survey of the facility including equipment and inventory
- estimate damages and prepare a written assessment if possible
- if anything is stolen, file an incident report with local police
- set up an answering machine or volunteer to respond to customers' inquiries
- investigate to find a marina where your customers can berth temporarily
- begin clean-up efforts
- coordinate employees and contractors
- investigate boat repair facilities for customer referral
- control news media

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- control conflicts between returning boat owners and recovery of damaged boats
- order repair supplies
- coordinate utility evaluation and reinstatement of service
- if your marina did not sustain damage, let other marinas know that you can take boats

CUSTOMER CHECKLIST

Equipment to Be Kept On Board:

- chafing gear
- fenders
- two sufficient anchors with 300' or more oversized line
- flashlight with spare batteries
- battery-operated radio

Check Monthly:

- exterior lights operable
- auto bilge pump operating (check battery)
- hatches are watertight
- power and electric gear operating
- engine battery charged
- flashlight battery charged
- radio batteries charged

To Do At A New Marina:

- learn marina approaches and basin
- learn the size and type of your mooring
- ensure mooring and lines are sufficient for all likely wind direction and velocity
- ensure mooring has enough weight and scope and is properly set
- learn your moorage lease and rental agreement responsibilities
- learn responsibilities for your boat's safety when a hurricane is approaching
- develop a plan for securing your vessel outside the marina if you plan to evacuate
- if evacuating, visit the site by boat and time the trip
- learn what possible delays you may encounter when evacuating (drawbridges, boat traffic etc.)
- photograph your boat and surroundings
- keep a list of all equipment on board
- keep a list of all equipment that will be removed during storm preparations
- keep a complete set of records for your boat at home
- give the marina operator the name and number of your absentee skipper
- give the marina operator a description of your boat, registration number and location

DOCKED BOAT PREPARATIONS

- close all through-hull fittings set chafing gear where lines will rub (chocks, cross lines, deck edge, dock edge etc.)
- strip all removable items, including spare rigging
- clear self-bailing cockpit drains

- remove portable fuel and oil storage containers
- remove ship papers
- shut off fuel tanks
- leave anchor light on
- leave auto bilge pump on
- check openings to ensure boat is watertight
- set and check storm anchors
- consider attaching 3 sets of bow and stern spring lines
- consider attaching lines to cleats at a 45 degree angle
- consider tying your boat between two piers or along a pier and anchored off one side

MOORED BOAT PREPARATIONS

- make plans to have someone pick you up from your boat before the storm arrives
- strip all removable items, including spare rigging
- clear self-bailing cockpit drains
- close all through hull fittings
- remove portable fuel and oil storage containers
- remove ship papers
- shut off fuel tanks
- leave anchor light on
- leave auto bilge pump on
- check openings to ensure boat is watertight
- use storm pennants to increase scope
- attach chains directly to pennants instead of swivels
- add an emergency catenary weight at the vessel end of the chain
- use double or triple chafe protection
- use chafing gear over entire length of pennants
- use two pennants
- if no permanent mooring is available, use two storm anchors at 45-degree angles

TRAILERABLE BOAT PREPARATIONS

Store in a garage:

- strip all removable items, including spare rigging
- clear self-bailing cockpit drains
- close all through-hull fittings
- remove portable fuel and oil storage containers
- remove ship papers
- shut off fuel tanks
- leave auto bilge pump on
- check openings to ensure boat is watertight
- _____

If no garage is available:

- secure trailer to a sturdy object
- let half the air out of the trailer tires
- put wood blocks between the frame and axle
- take out the drain plugs
- cover with tarp
- use tie downs

ANCHORED BOAT PREPARATIONS

Make plans to have someone pick you up from your boat before the storm arrives

- strip all removable items, including spare rigging
- clear self-bailing cockpit drains
- close all through-hull fittings
- remove portable fuel and oil storage containers
- remove ship papers
- shut off fuel tanks
- leave auto bilge pump on
- check openings to ensure boat is watertight
- use 3 or 4 substantial anchors and good tie rope
- tie your boat high on the mainland to a substantial tree or similar structure
- do not tie parallel to the bank
- keep a navigable passage at your stern to allow other boats passage
- use enough line to allow for storm surge
- leave enough room between your boat and others to allow for swing
- take valuables off
- _____

Appendix III

N.C. CLEAN MARINA PROGRAM

The purpose of the North Carolina Clean Marina program is to give marinas a chance to be recognized for their efforts towards environmental responsibility. It also gives boaters a way of identifying marinas that are promoting clean boating activities and following best management practices. The program is strictly voluntary, but it shows that your marina cares about clean water.

To participate in the Clean Marina Program, visit the Clean Marina website at <http://www.nccoastalmanagement.net/Marinas/clean.htm> to download an application suited for your facility. Applications are separated into two categories, “marinas *with* boat maintenance yards” and “marinas *without* boat maintenance yards.”

Complete the application by identifying all the ways that a clean environment is promoted at your marina. There are several areas where your marina must be using best management practices (BMPs) in order to be identified as a Clean Marina. If your facility qualifies on paper, a Clean Marina representative will visit your site to visually identify BMPs implemented at your facility.

When it has been verified that your facility meets the Clean Marina criteria, you will be issued a Clean Marina flag and Clean Marina Certificate, identified on the Clean Marina website (including a link to your website) and you will be able to use the Clean Marina logo in all your publications. Re-certification of your facility by a Clean Marina representative is required every two years to renew your standing.

Please send completed applications to: N.C. Clean Marina Program
400 Commerce Ave.
Morehead City, NC 28557

For more information contact the Clean Marina Program coordinator at (252) 808-2808 (e-mail: cleanmarina@ncmail.net).

Appendix IV

ALTERNATIVE CLEANING SOLUTIONS

General Uses for Ordinary Items

Baking soda: cleans, deodorizes, softens water and acts as a scouring powder.

Washing soda (sodium carbonate): works as a germ remover and laundry soap booster.

Vinegar: cuts grease and deodorizes.

Lemon Juice: cuts stains and freshens smells.

Vegetable Oil-Based Liquid Soap: cleans almost any surface and acts as laundry booster.

All-Purpose Cleaner

4 T. baking soda + 1 qt. warm water: dissolve soda in water, apply with sponge and wipe clean.

1 t. vegetable-oil based soap + a squeeze of lemon + 1 qt. warm water: combine in small bucket, apply with sponge or rag and wipe clean.

1/8 c. washing soda + 1 T. vegetable-oil based soap + 1/4 c. vinegar + 2 gallons hot water: mix ingredients in pail, apply with mop or cloth and wipe clean.

3 T. washing soda + 1 qt. warm water: mix in pail, apply with sponge or rag and wipe clean.

Bathroom

Drain Cleaner: 3 T. salt + 1/2 c. vinegar + 1/4 c. baking soda: pour soda down drain followed by salt, then vinegar, let sit 10-15 minutes and flush with boiling water.

Mildew Remover: equal amounts of vinegar and salt.

Toilet Cleaner: 1/4 c. baking soda + warm water; equal amounts of baking soda and washing soda + warm water; 2 t. Borax + 1 qt. warm water; Pumic block for stubborn stains.

Lime Deposits: soak paper towels in vinegar and leave on deposits for one hour. Soak shower heads in vinegar.

Tub and Tile Cleaner: $\frac{1}{2}$ t. washing soda + $\frac{1}{4}$ to $\frac{1}{2}$ t. vegetable-oil based soap + 3 T. vinegar + 2 c. hot water: mix ingredients into spray bottle, apply and wipe clean; $\frac{1}{4}$ c baking soda + warm water; baking soda + vinegar: sprinkle baking soda on sponge, add vinegar, apply and rinse; 2 t. Borax + 1 qt. warm water

Carpets

Deodorizer/Cleaner: baking soda or dry cornstarch: sprinkle over carpet, let sit overnight and vacuum.

Stain Remover: club soda: apply to stain and scrub; lemon juice: apply to stain and scrub; $\frac{1}{4}$ c. vinegar + $\frac{1}{4}$ t. water: mix, rub, and rinse with water.

Furniture

Wood: $\frac{1}{8}$ c. linseed oil + $\frac{1}{8}$ c. vinegar + $\frac{1}{4}$ c. lemon juice: mix and apply with soft cloth; $\frac{1}{4}$ c. olive oil or mineral oil + $\frac{1}{8}$ c. lemon juice: mix and apply with cloth.

Leather: $\frac{1}{4}$ c. olive oil + a few drops of lemon oil: mix and apply.

Vinyl: $\frac{1}{4}$ c. vinegar + $\frac{1}{4}$ t. vegetable-oil based soap + water, mix and apply.

Kitchen

Grease cutter (in dish detergent): $\frac{1}{2}$ c. baking soda + usual amount of dish soap.

Grease cutter (all-purpose): $\frac{1}{2}$ t. washing soda + $\frac{1}{4}$ to $\frac{1}{2}$ t. vegetable-oil based soap + 3 T. vinegar + 2 c. hot water: mix in spray bottle, spray, scrub and wipe clean; Borax on a damp cloth.

Garbage Disposal Deodorizer: cut up oranges or lemons, or baking soda: put in disposal, turn it on and rinse.

Linoleum Floor Cleaner: 1 c. white vinegar + 2 gallons water.

Oven Cleaner: small box of baking soda + water + vegetable-oil based soap + a mild abrasive pad (cellulose green scouring pads are the most effective): sprinkle water over bottom of oven, cover with baking soda, let sit overnight, wipe with pad, after bottom is clean put soap on sponge and wash sides and top.

Porcelain Stain Remover: rub area with moist salt or baking soda and rinse.

Coffee Pot Cleaner: brew full capacity of white vinegar followed by two cycles of full capacity water. Pour hot vinegar down drains to clean them.

Laundry

Detergent: soap flakes and 1/3 c. washing soda: wash in pure washing soda before switching to remove detergent residues.

Bleach: ¼ c. lemon juice; Borax; ½ c. vinegar.

Fabric Softener: 1 c. vinegar or ¼ c. baking soda in final rinse.

Soap: any non-phosphate soap.

Starch: 1 T. cornstarch + 1 pint cold water: mix in spray bottle, shake to dissolve cornstarch and apply.

Whitening: Borax or baking soda.

Metal Cleaners and Polishes

Aluminum: 2 T. cream of tartar + vinegar (enough to make a paste): scrub and rinse.

Brass and Copper: half a lemon dipped in salt; flour (enough to make a paste) + ½ t. salt + ½ c. vinegar; 2 T. lemon juice + 1 T. vinegar; Worcestershire sauce.

Chrome: apple cider vinegar; baking soda + water.

Silver: 1 qt. warm water + 1 T. baking soda + 1 piece Aluminum foil + 1 T. salt: make sure silver is completely covered with water and heat; baking soda + water to form paste; toothpaste.

Stainless Steel Cleaner: baking soda + water; vinegar; olive oil; club soda.

Pests

Ants: squirt with 1 t. dishwashing soap; put chili powder, talc, chalk, Borax, chili pepper seeds, dried bay leaves, or lemon peels at the point of entry; put lemon juice in holes.

Fleas: sprinkle non iodized salt on carpets: it kills larvae, but won't hurt rugs.

Flies: well watered pot of basil; flypaper: make your own with yellow paper and honey; prompt trash removal.

Roaches: set out boric acid in small containers (KEEP OUT OF REACH OF CHILDREN); equal parts powdered sugar and baking soda in small containers; traps; Borax.

Miscellaneous

Car Battery Corrosion Removal: baking soda + water.

Glass Cleaner: 3 T. vinegar or more + warm water.

Hand Cleaner for Paint/Grease: baby oil or margarine.

Scouring Powder: 1 c. baking soda + ¼ c. vinegar: apply with steel wool or soft brush.

Oil-Based Paints: use water based paints instead; use tung oil to remove oil-based paint stains; buy stains having natural pigment finishes.

Appendix V

KEEP OUR WATERWAYS TANGLE-FREE RECYCLE FISHING LINE RESPONSIBLY

What is fishing line (or monofilament) recycling?

This is an effort to keep high-density nylon fishing line, used on reels and nets, out of our waters.

Why should you recycle your used fishing line?

Since monofilament is invisible in the water and extremely strong, improperly discarded fishing line is a hazard to wildlife and humans, and **stays in the environment for as long as 600 years before it breaks down!**

How does improperly discarded fishing line affect wildlife?

Birds, mammals, reptiles and fish can easily become entangled in improperly discarded fishing line. This leads to injury, disfigurement, drowning, strangulation or starvation.

How does improperly discarded fishing line affect humans?

Swimmers and scuba divers can become tangled in fishing line or caught by hooks that may be hidden in the discarded line. Fishing line is frequently caught in boat propellers, which can cause the prop to seize up. This line can also enter a boat's bilge pump, water intake valves and wrap around the lower unit.

What is recycled fishing line turned into?

Once the line is cleaned of hooks, leaders, weights and trash, it is melted down into raw plastic pellets. These pellets can then be made into other plastic products including tackle boxes, new fishing line and spools for line.

How can my marina participate?

Construct and install a monofilament recycling bin outside (see instructions on next page). Contact Pure Fishing America (Berkley) at 1-800-Berkley for free, postage paid envelopes to return collected line.

Don't have the resources? Put up a free monofilament recycling box in your marina office, store or boat house. To obtain a box, please contact the Clean Marina Program Coordinator at 252-808-2808 or at cleanmarina@ncmail.net.

For further information on the program and bin construction, visit www.fishinglinerecycling.com.

CONSTRUCTION OF PVC FISHING LINE RECYCLING CONTAINERS

Materials needed (per station)

2' of 6" PVC pipe



1 6" elbow



1 6" female threaded adapter



1 6" threaded male plug



Glue the elbow to one end of the pipe and the adapter to the other. Drill two holes in the plug (this is for drainage in case water gets into the recycling container) and attach (hand tight). Affix stickers.

Monofilament recycling bin assembly and installation

Assembly:

- Cut PVC pipe into approximately 2' long pieces using a hacksaw, reciprocating saw (metal blade; 12" long blades work well), bandsaw or table saw. Use a deburring tool or sandpaper to remove PVC "burrs" around edges.
- Working in a well-aerated area, apply PVC glue to inside (non-threaded part) of adapter. With adapter sitting squarely on the ground, press the pipe down into the adapter until snug. Note that PVC glue works by dissolving the PVC, then sets rapidly, so you don't have a lot of "play" time with it.
- Apply PVC glue to the inside of one end of the elbow (it does not matter which end). Press the elbow onto the pipe. Try and make sure that any blemishes on the pipe end up on the back side of the bin.
- Apply stickers.
- Drill 2 holes (about ¼ or 3/8") in the center of the screw plug. Thread plug into adapter.

Installation:

- Decide where you are going to install the bin and sign. Using a long drill bit (8"), drill 2 holes in the supporting wood (post or railings). The holes should be placed such that the upper hole will line up with the lower part of the elbow and the lower hole lines up with the collar of the adapter. Drill a hole through the base of the elbow at the back of the bin.
- Use bolts or all-thread to attach the bin to the post at the top hole. Lok-tite may be used on the threads to try and keep the nuts from coming loose.
- From the back side of the post, drill through the existing hole and through the collar of the adapter. Use a second bolt or piece of all-thread to attach the bin through these holes.
- If using all-thread, use a reciprocating saw or bolt cutters to cut off the excess material.

Alternate method of installation:

In relatively secure areas (paid-access fishing piers, for example), or where you must attach the bin to a concrete railing, you can use long cable-ties (tie-wraps) to wrap around the post and bin in 2 or 3 places. You can purchase tightening tools for the cable ties which will allow you to get a snug fit. The cable ties are available from Home Depot in 34" and 48" lengths. The excess part of the cable tie should be cut off using the tightening tool or snips.

Deterring vandals:

You can help prevent removal of 4x4 posts in one of two ways: 1. Use concrete to help set the post in the ground; 2. Nail or screw a piece of 2x4 perpendicular to

the 4x4 post, as close to the ground as you can. This will prevent people from being able to rock the post back and forth.

If the container is attached to a pier/railing, you can attach a 2x4 or 4x4 to the pier adjacent to both sides of the container—this helps stop people from rocking the container back and forth and breaking it loose.

Suggested tool list

Tools listed as “optional” will make your life easier, but may be fairly expensive. However, if you or a volunteer happen to already own them, plan to bring them along!

Bin assembly:

- Hacksaw (there are specific PVC hacksaws which can be purchased from plumbing supply companies, but a regular hacksaw should work)
- Tape measure
- Sandpaper (any grit is fine; if purchasing specifically for this project, get 100 grit)

Optional: reciprocating saw with 12” metal cutting blade; OR bandsaw OR table saw with fine-toothed blade (the more teeth the better), de-burring tool (available from plumbing supply company)

Bin installation:

- Post-hole diggers (if installing 4x4 post)
- Cordless drill with long (8”) drill bit (3/8” preferred)
- Wrenches to fit nuts you will be using to install (2 wrenches or ratchets with sockets or combination of the 2)
- Hacksaw or bolt-cutters (if using all-thread)
- Screwdriver (or screwdriver bit for drill) (if attaching signs; use stainless steel screws)
- Cable-tie tightener (available from Home Depot online or at A/C supply companies) (if using cable ties)

Optional: Bucket and small shovel/trowel for mixing concrete, reciprocating saw with metal-cutting blade (if using all-thread)

Suggested items for volunteers who are collecting line from containers:

- Grocery store bags (to collect line)
- Nail clippers or small pair of scissors (to remove hooks, etc.)
- Large pair of pliers or large wrench (in case plug is too tight)
- Short stick with cuphook on the end (used to reach inside container and pull down line without having to put one’s hand inside it)
- Spray bottle with 10% bleach (for occasional rinsing of inside of containers)

Appendix VI

NO DISCHARGE DESIGNATIONS

The coastal waters of New Hanover, Brunswick and Pender counties have recently been designated a No Discharge Zone.

What is a No Discharge Zone?

A No Discharge Zone (NDZ) designation prohibits discharging sewage into waters covered by the designation. This includes chemically treated sewage from Marine Sanitation Devices, but does not apply to gray water from showers or sinks, and does not prohibit the use of “porta-potties” that do not discharge waste. Through-hull fittings for disposal of sewage are required to be closed and appropriate methods to dispose of sewage implemented.

Who is affected?

The No Discharge Zone applies to all commercial and pleasure vessels operating in the waterways of New Hanover, Brunswick and Pender counties.

How can boaters comply?

MSDs Type I, Type II and Type III must be secured to prevent discharge when operating in a No Discharge Zone. This can be done by closing the seacock and padlocking it, using a non-releasable wire tie, or removing the seacock handle (with the seacock closed). Type I and Type II can also be secured by locking the toilet door handle. Boaters must use sewage pumpout facilities to empty MSDs.

N.C. requirements

Any owner or operator of a vessel that has a Marine Sanitation Device (MSD), and is in coastal waters that are either designated as a no discharge zone or are included in a petition to the Environmental Protection Agency to be designated as a no discharge zone, shall maintain a record of each pumpout of the MSD and the location of the pumpout facility. A simple log is available on DCM's website at http://www.nccoastalmanagement.net/Marinas/vessel_log.pdf.

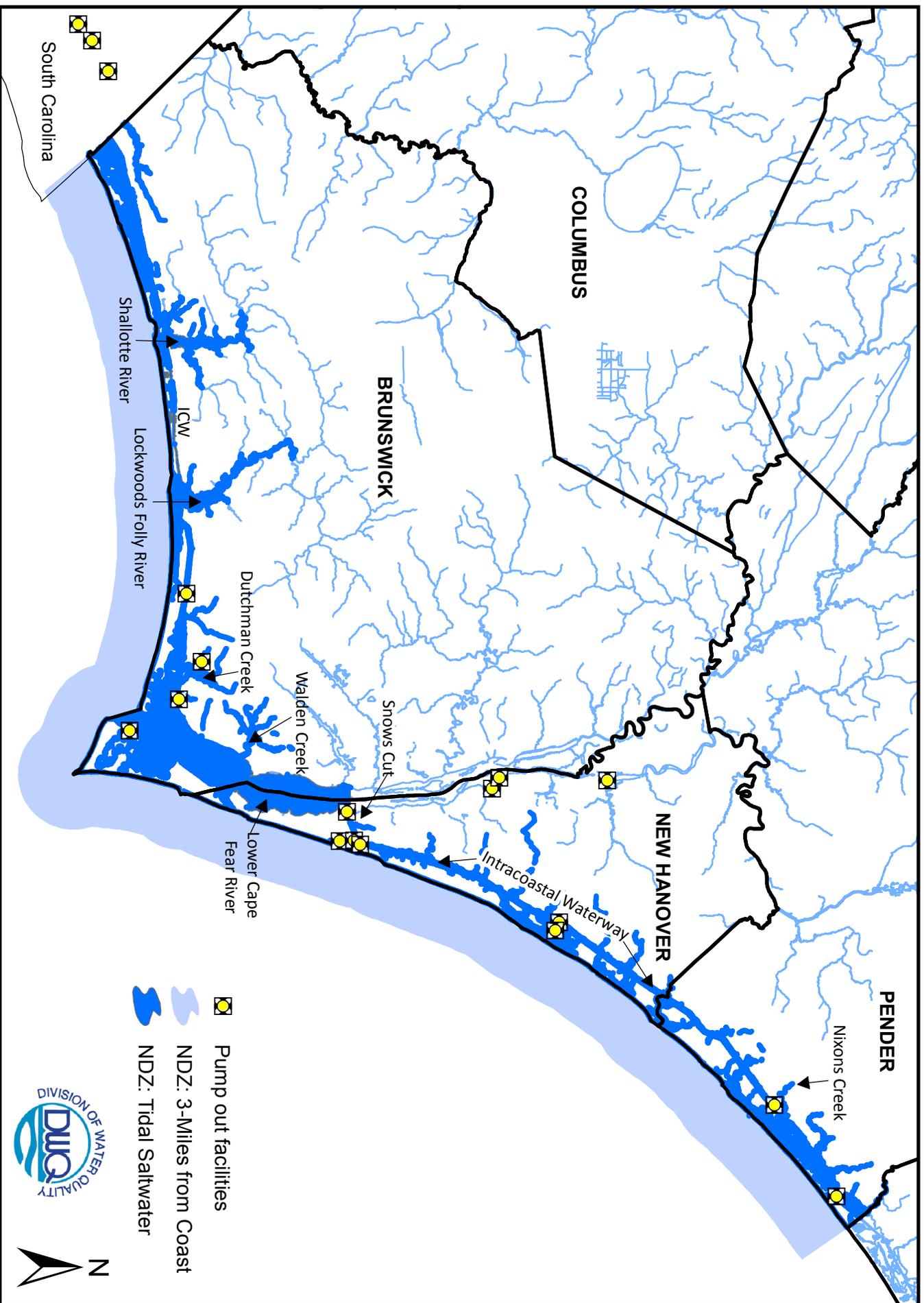
Owners and operators of large vessel marinas (those with docking facilities and more than 10 slips for vessels of 26 feet or more that have MSDs) in these areas are also required to keep records of pumpouts and may ask to see the vessel's records. Records must be maintained for one year after the pumpout date.

Owners or operators of any large vessel marina that is located on coastal waters designated as a no discharge zone by the Environmental Protection Agency or that is located in a county or municipality that has adopted a resolution to petition the Environmental Protection Agency for a no discharge zone designation is required to either:

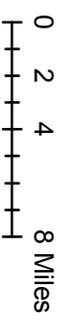
- (i) install and maintain an operational pumpout facility at the marina that is available to customers patronizing the marina, or
- (ii) contract with an outside service provider to provide pumpout services on a regular basis to the marina.

No Discharge Zones

Brunswick, New Hanover & Pender Counties, North Carolina



Map Source: NCDENR Division of Water Quality, Produced January 31, 2011



Appendix VII

CLEAN BOATER TIP SHEETS

Boaters can play an important role in protecting the waters they use by preventing fuel spills, practicing clean boat maintenance, properly disposing of sewage, trash and fish waste, and by visiting Clean Marinas.

Help educate the boaters that visit your marina by sharing quick-reference fact sheets with them, available on the Clean Marina website. Consider including language in your customer contracts that requires clean boating practices such as no sewage discharge in the marina basin.

For more materials, including “A Boaters Guide to Protecting North Carolina’s Coastal Resources,” or information on how to encourage clean boating at your marina, contact the Clean Marina coordinator at 252-808-2808 or cleanmarina@ncmail.net.

Clean Boater Tips - Waste Containment and Disposal

Trash is not only ugly, it can be dangerous to humans and wildlife. For example, plastic can snare boat propellers and choke sea turtles who mistake them for food. Congress passed a law in 1987 to protect our waterways from garbage. The Marine Plastic Pollution Research and Control Act (Title II of Public Law 100-220) regulates the disposal of garbage at sea according to how far a vessel is from shore:

- ▶ It is illegal to dump anything other than fish scraps in U.S. lakes, rivers, bays, sounds, and within three nautical miles from the ocean shore.
- ▶ Between three and 12 nautical miles from shore, it is illegal to dump plastic and any other garbage that is greater than one inch in size.
- ▶ Between 12 and 25 nautical miles from shore, it is illegal to dump plastic and dunnage, (*i.e.*, lining and packing material, nets, lines, etc.)
- ▶ Beyond 25 nautical miles, it is illegal to dump plastic.

Adhering to the law is easy. Just follow these tips!

Contain Trash

- ▶ Don't let trash get thrown or blown overboard.
- ▶ Pack food in reusable containers.
- ▶ Buy products without plastic or excessive packaging.
- ▶ Don't toss cigarette butts overboard. They are made of plastic (cellulose acetate).



- ▶ Purchase refreshments in recyclable containers.
- ▶ Properly dispose of all trash onshore (*e.g.*, take it home or place in a dumpster at the marina).

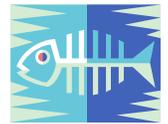
Recycle

- ▶ Recycle cans, glass, newspaper, antifreeze, oil, oil filters, and lead batteries.
- ▶ Bring used monofilament fishing line to recycling bins at your local tackle shop or marina.



Fish Scraps

Marinas are often located in sheltered areas—areas that will protect boats from wind and waves during a storm. The same features that protect boats during a storm, however, also limit the exchange of water. Poor exchange, or flushing, means that any waste which is discharged into the water may stay in the same general area for an extended length of time.



Fish cleaning may pose a problem if the scraps are discarded into a poorly flushed marina basin. Fish waste is smelly and unsightly. Also, life-sustaining oxygen is removed from the water column as bacteria decompose the waste. Avoid problems by following these tips.

- ▶ Don't discard fish waste in poorly flushed areas.
- ▶ Find out what your marina's disposal policy is.
- ▶ Bag waste and dispose of it at home or in a dumpster.

Clean Boater Tips – Petroleum Control

Petroleum in or on the water is harmful and, in some cases, fatal to aquatic life. Floating petroleum is particularly bad because it reduces light penetration and the exchange of oxygen at the water's surface. Floating oil also contaminates the microlayer. The microlayer refers to the uppermost portion of the water column at the air/water interface. This microlayer has high concentrations of nutrients, particulate organic matter, and bacteria and is important for gas exchange. Floating eggs and larvae may also be found there. Pollution in the microlayer, thus, has the potential to poison much of the aquatic food web.



result in stains on the hull and damage to the gel coat and striping. Follow these tips to avoid problems:

- Fill tanks to no more than 90 percent capacity—gas that is drawn from cool storage tanks will expand as it warms up onboard your vessel.
- To determine when the tank is 90 percent full, listen to the filler pipe, use a sounding stick, and be aware of your tank's volume.
- Rather than filling your tank upon your return to port, wait and fill it just before leaving on your next trip. This practice will reduce spills due to thermal expansion because the fuel will be used before it has a chance to warm up.
- Fill portable tanks ashore where spills are less likely to occur and easier to clean up.
- Use oil absorbent pads or containment jugs to catch all drips.
- Slow down at the beginning and end of fueling.

The Law

The Federal Water Pollution Control Act (also called the Clean Water Act) prohibits the discharge of oil or oily waste into or upon the navigable waters of the United States or the waters of the contiguous zone if such discharge causes a film or sheen upon, or discoloration of, the surface of the water, or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a penalty of \$5,000 from the U.S. Coast Guard. State law also prohibits the discharge of oil.

Fueling Practices

Gas or diesel may be spilled during the act of fueling; as backslash out of the fuel intake or as overflow from the vent fitting. Spills of this sort may harm aquatic life, waste money, and can

Bilge Maintenance

Engine oil tends to accumulate in bilges. If no precautions are taken, the oil is pumped overboard along with the bilge water. Discharging oily water is illegal. To avoid fines and to protect water quality, follow these tips:

- Keep your engine well tuned to minimize the amount of oil that is

released. Be sure there are no leaking seals, gaskets, or hoses.

- Place oil absorbent materials or a bioremediating bilge boom in the bilge.
- Place an oil absorbent pad under the engine.
- Replace oil absorbent materials regularly.
- Look for contractors or marinas that offer a bilge pumpout service.
- Do not treat oily water with detergents, which can harm fish and other aquatic life. Using soaps to dissipate oil is illegal.

Disposal of Oil Absorbent Materials

The disposal of used oil absorbent material depends on what type of product it is and how it was used:

- Standard absorbents that are saturated with gasoline may be air dried and reused.
- Standard absorbents saturated with oil or diesel may be wrung out over oil recycling bins (if they are saturated with oil or diesel only!) and reused. Alternatively, they should be double bagged with one plastic bag sealed inside of another and tossed in your regular trash.
- Bioremediating bilge booms may be disposed of in your regular trash as long as they are not dripping any liquid. Because the microbes need oxygen to function, do not seal them in plastic bags.

Emissions Control

Marine engines—especially two-cycle outboard motors—produce the highest average level of hydrocarbon exhaust emissions after lawn and garden

equipment. Hydrocarbon emissions contribute to ground level ozone, a known health risk. Follow these tips to help your engine operate as efficiently as possible:

- Use the gas-to-oil ratio recommended by the engine manufacturer. Too much oil can foul spark plugs and too little can lead to increased engine wear or even failure.
- Use premium two-cycle engine oil. Premium oils improve engine performance and reduce pollution because they burn cleaner, contain more detergents, and prevent formation of carbon deposits.
- Use gasoline with the octane level recommended by the engine manufacturer.

Preventive Equipment

Products are available that can help you prevent spills and reduce emissions:

- Install a fuel/air separator along your vent line. These devices allow air, but not fuel, to escape through a vent opening.
- Attach a safety nozzle to portable gas cans used to fill outboard engines. These nozzles automatically stop the flow of fuel when the receiving tank is full.
- To prevent oily bilge water from being discharged, install a bilge pump switch that leaves an inch or two of water in the bilge. Alternatively, connect a bilge water filter to your vessel's bilge pump. Filters will remove oil, fuel, and other hydrocarbons from the water.

- When it is time to buy a new engine, select a fuel-efficient, low-emission model.

In Case of a Spill

- Stop the flow.
- Contain the spill.
- Notify NCDENR's emergency response center at (919) 807-6308, Mon.-Fri. 8 a.m.-5 p.m., or (800) 858-0368 after hours or on weekends.
- Call the U.S. Coast guard national response center at (800) 424-8802.
- Information on spill response requirements can be found at:
<http://portal.ncdenr.gov/web.wq.home/er>

N.C. General Statutes Chapter 143 Article 21A

143-215.85. Required notice

A person who owns or has control over petroleum that is discharged into the environment shall immediately take measures to collect and remove the discharge, report the discharge to the Department within 24 hours of the discharge, and begin to restore the area affected by the discharge in accordance with the requirements of this Article if the volume of the petroleum that is discharged is 25 gallons or more or if the petroleum causes a sheen on nearby surface water or if the petroleum is discharged at a distance of 100 feet or less from any surface water body. If the volume of petroleum that is discharged is less than 25 gallons, the petroleum does not cause a sheen on nearby surface water, and the petroleum is discharged at a distance of more than 100 feet from all surface water bodies, the person who owns or has control

over the petroleum shall immediately take measures to collect and remove the discharge. If a discharge of less than 25 gallons of petroleum cannot be cleaned up within 24 hours of the discharge or if the discharge causes a sheen on nearby surface water, the person who owns or has control over the petroleum shall immediately notify the Department.