Appendix I: Boater Tip Sheets 151

These pages can be removed for copying and distribution to boaters.

Gas and Oil

One quart of oil will create an oil slick over two acres in size – the equivalent of nearly three football fields. A single gallon of fuel can contaminate over a million gallons of water. Small drips and spills of gasoline, diesel, and other petroleum products add up and can have a serious effect on the marine environment, such as: death of fish, mammals, and birds; cancer, mutations, and/or birth defects; destruction of plant life; and reduction of food supply for marine organisms.

Fuel Cautiously

- Fuel your boat slowly and carefully – attend the fuel nozzle at all times.
- Never "top off" or overfill your fuel tank. Only fill the tank to 90% since fuel expands as it warms up.
- Use your hand to check for air escaping from the vent. When the tank is nearly full, you'll feel an increase in airflow. Also listen for a gurgling sound before the tank is full.
- Use fuel bib or collar to catch drips and backsplash from fuel intake and vent overflow.
- Fill portable gas tanks on shore – where spills are less likely to occur and easier to clean up.
- Outboards: close tank fuel vent when boat is not in use to save fuel from vapor loss.
- Built-in fuel tanks: install fuel/air separator in air vent line from tank to prevent vent spills.

Fuel Bib
(courtesy of BoatUS)

Traditional two-stroke engines are inefficient and can release up to 30 percent of their gas/oil mixture unburned directly into the water. Direct injected new technology two-stroke engines consume all of their oil, resulting in no oil sheen or smoke and no dirty waste oil to change. All four-stroke and traditional two-stroke engines may emit carbon monoxide at levels 100 times higher than new technology two-stroke engines and than safe workplace standards. If these high carbon monoxide emissions are trapped, passengers may be exposed to dangerous levels.

Reduce engine pollution

- Consider replacing a conventional two-stroke outboard with a quieter, cleaner, and more efficient new technology two-stroke or a four-stroke engine.
- Use premium two-cycle engine oil and use the gas to oil ratio recommended by the engine manufacturer.
- If you have a large outboard you don't plan to replace, consider purchasing a small four-stroke "kicker" to use when trolling or moving short distances. You'll save money on fuel, save wear-and-tear on your larger motor and enjoy a cleaner environment, too.

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Properly Dispose of Oil Absorbent Materials

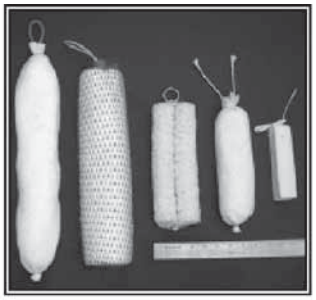
- Reuse pads that are contaminated with gasoline.
- If pad is contaminated with only diesel or oil, wring out over oil recycling bins and reuse. Or, place in one plastic bag sealed in another and discard in your regular trash.
- Bio-remediation bilge booms may be discarded in your regular trash as long as they are not dripping. Because the microbes need oxygen to function, do not seal them in plastic bags.
- Remember that materials soaked with fuel, oil, or solvents are flammable – keep away from heat.

Bilges

Bilges are also a major source of pollution since they tend to collect engine oil, fuel, antifreeze, and transmission fluid. When an automatic bilge pump is activated, these fluids are pumped overboard. Absorbent bilge pads absorb petroleum products but not water. When soaked with oil, they can be disposed of properly.

Control Oil in the Bilge

- Place oil absorbent pads or a bio-remediation bilge boom in the bilge to catch oil.
- Place an oil absorbent pad under the engine.
- Replace oil absorbent materials when heavily soiled or saturated, or at least once a year.
- Keep the engine well tuned: no leaking seals, gaskets, or hoses.
- Change oil filters often. Slip a plastic bag over filter before removal to catch drips.
- Never discharge or pump any bilge water that appears oily into or near the water – it is against the law.



Bilge Socks
(courtesy of BoatUS)

- Install a bilge pump switch that leaves an inch or two of water in the bilge. Or, connect a bilge water filter to your vessel's bilge pump. Filters will remove oil and fuel from the water.
- Trailer your boat to an area that provides containment before removing bilge or boat plugs.
- Do not use bilge cleaners when pumping to a waterbody - they simply spread out the oil and do not remove it from the bilge water.

When dispersants, such as detergents, soaps, and solvents, are put on fuel spills, fuel that might otherwise evaporate from the surface is dispersed down into the water. This rainfall effect causes contamination of all levels of the water, rather than just the surface, and is very difficult to cleanup. Left alone the gasoline will evaporate and, while smelly, by comparison is less harmful. Along with causing this dispersion effect, the detergent harms marine life.

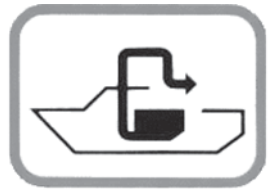
Handle spills appropriately

- If you have a spill, wipe it up with a rag – don't hose it off into the water.
- If fuel is spilled into the water:
    - Don't use soap or dish detergent to disperse it. Using detergents to disperse fuel worsens the problem and is against federal law.
    - Call 1-800-OILS-911 for both large and small spills.
- If a spill occurs in a marina, notify the marina management immediately.

Sewage Disposal

When sewage is pumped or dumped directly into the water, there is a potential for disease-carrying microorganisms to be released into that water. These microorganisms can cause human diseases such as gastroenteritis, hepatitis, typhoid, cholera, and dysentery. In addition, as bacteria and other microorganisms decay the sewage, they use up oxygen that fish and other marine life need to breathe. Discharge of vessel sewage is especially harmful due to its high concentration of sewage and the presence of chemical additives – such as formaldehyde, para-formaldehyde, quaternary ammonium chloride and zinc sulphate – which are toxic to marine life.

Don't Dump Overboard!



Look for the Pumpout Sign

- Know your marine sanitation device (MSD) type and manage it appropriately.
- Type III MSDs are the most common MSDs on recreational vessels and include recirculating and incinerating MSDs and holding tanks. It is illegal to discharge sewage from a Type III MSD overboard into coastal waters, lakes, or reservoirs. Use pumpout facilities for Type III MSDs.
- Type I and II MSDs treat the sewage and must not be discharged while in moorage or on lakes or reservoirs.
- Empty portable toilets at dump stations or at home. Discharge of this untreated sewage overboard to coastal waters or into a lake or reservoir is illegal.
- If boat has a holding tank with a y-valve and through-hull fitting, keep them locked closed when inside coastal waters or on lakes or reservoirs.
- See "A Guide to Marine Sewage Disposal Stations in Coastal South Carolina, available from OCRM for pumpout and dump station locations.

Handle Sewage Appropriately

- Use restrooms on shore whenever possible.
- Establish a regular maintenance schedule for your MSD based on manufacturer's recommendations.
- Avoid using additives like quaternary ammonium compounds (QAC) or formaldehyde in your holding tank. Use safer enzyme-based products to control odor and reduce solids.
- Consider installing a filtered air holding tank.
- Keep diapers, sanitary napkins, oils, solvents, and other harmful chemicals out of toilets.
- If using pumpout equipment, wash your hands with antibacterial soap after use.
- Dispose of your pet's waste properly.

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Gray Water

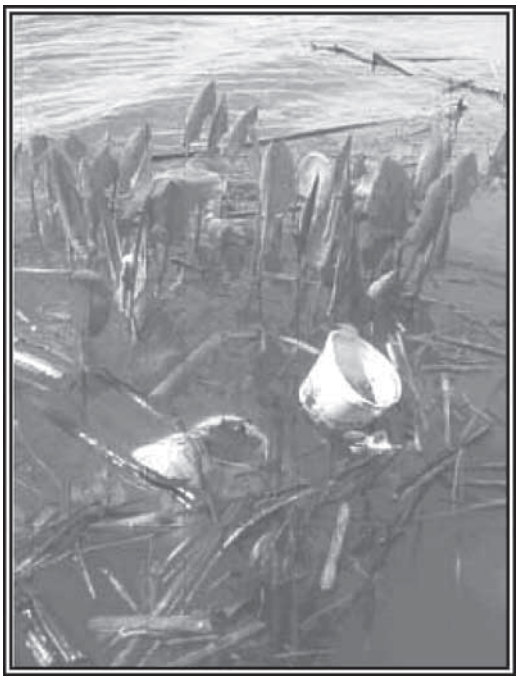
- Water from sinks, washers, and showers are discharged directly into the water without treatment. This gray water is often rich in phosphates that pollute the water and encourage the growth of unwanted algae.
- Use upland laundry facilities and showers whenever possible.
- Limit the amount of water you use in sinks and showers.
- Use non-phosphate soaps.

Garbage

Trash – plastic bags, Styrofoam, bottles, cans, discarded nets, fishing line, and other refuse – can injure or kill aquatic life and birds by trapping or suffocating them. Along with being unsightly, trash can also foul props, clog water intake fittings, and damage fishing nets.

Contain Trash: Nothing overboard!

- Bring a container aboard to collect your garbage and keep it from blowing overboard.
- Minimize the use of plastic wrap and bags when packing for your trip.
- Don't toss any garbage or cigarettes overboard; cigarette filters are plastic and deadly to birds and fish.
- If trash blows overboard, retrieve it – consider it "crew-overboard" practice.
- Teach everyone on board that tossing anything into the water is just not done.
- Pick up other trash in the water or along the shore if you can reach it safely.
- Recycle cans, glass, plastic, and newspapers.
- Bring used monofilament fishing line to recycling bins at your marina or tackle shop.
- Encourage your marina to provide well-marked trashcans and recycling bins.



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Boat Cleaning

Many products used to clean boats contain toxic chemicals such as chlorine, phosphates, and ammonia. These products can enter the water during boat cleaning and can poison marine life. Degreasers dry the natural oils fish need for their gills to take in oxygen. The best way to keep toxic chemicals out of the water is to not use them at all. In many cases, "elbow grease" will go a long way.

Clean Gently

- When possible, wash the boat on land where the wash water can be contained or filtered.
- Wash your boat frequently with sponge and plain water.
- Use detergents sparingly.
- Avoid cleaners with bleach, ammonia, lye, or petroleum distillates.
- Use phosphate-free, biodegradable and non-toxic cleaners, such as those in table. Though much less harmful, these cleaners can still cause damage to local marine life and should be used only on land when possible.
- If your boat does not have sloughing paint on it, wash over grass or soil with an environmentally friendly detergent.
- Wax your boat – a good coat of wax prevents surface dirt from becoming ingrained.
- Clean wood with a mild soap powder and a nylon brush – not harsh chemical cleaners.
- Ask your ship's store to stock common alternative products listed in the table and biodegradable spray-type cleaners that do not require rinsing.

Toxic Water
(Courtesy of Surfrider)

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Non-toxic Cleaning Alternatives

Toxic Product	Alternative
All Purpose Cleaner	Mix one cup white vinegar with two gallons water.
Air Freshener	Leave out an open box of baking soda.
Aluminum Cleaner	2 Tablespoons cream of tartar in 1 quart hot water.
Ammonia-Based Cleaners	Vinegar, salt, and water.
Bleach	Borax or hydrogen peroxide
Brass Cleaner	Worcestershire sauce. Or paste made of equal parts of salt, vinegar, and water.
Chrome Cleaner/Polish	Apple cider vinegar to clean; baby oil to polish.
Copper Cleaner	Lemon juice and water. Or paste of lemon juice, salt, and flour.
Drain Opener	Disassemble and replace or use plumber's snake. Or flush with boiling water, plus ¼ cup baking soda, plus ¼ cup vinegar.
Fiberglass Stain Remover	Baking soda paste.
Floor Cleaner	One cup white vinegar in 2 gallons water
General Cleaner	Baking soda and vinegar. Or lemon juice combined with borax paste.
Hand Cleaner	Baby oil or margarine.
Head Cleaner	Put in baking soda and use a brush.
Mildew Remover	Paste using equal parts of lemon juice and salt or white vinegar and salt
Rug/Upholstery Cleaner	Sprinkle on dry cornstarch and then vacuum.
Scouring Powders	Baking soda or salt. Or rub area with one-half of a lemon dipped in borax, then rinse.
Shower Cleaner	Wet surface, sprinkle with baking soda, rub with scouring cloth.
Stainless Steel Cleaner	Baking soda or mineral oil for polishing, vinegar to remove spots.
Toilet Bowl Cleaner	Use toilet brush and baking soda.
Varnish Cleaner	Wipe with ½ cup vinegar and ½ cup water solution
Window Cleaner	Mix two tablespoons vinegar in one quart of water or rub glass with newspaper.
Wood Polish	3 parts olive oil and 1 part white vinegar (for interior unvarnished wood only).

Vessel Maintenance

General upkeep of boats generates household hazardous wastes such as solvent paint waste, used antifreeze, used oil, old gasoline, used batteries, mercury containing bilge pump switches, and out-of-date flares. These wastes pose a threat to the environment if they are improperly disposed into the water, air, or ground.

Manage your Hazardous Waste

- Use less-toxic propylene glycol antifreeze (usually pink).
- Use premium two-cycle engine oil.
- Share any leftover chemicals, paint, or varnish.
- Recycle used motor oil, antifreeze, and other engine fluids. Prior to recycling, store in separate closed containers to prevent escape, mixing, or fire hazard.
- Bring items to a local hazardous waste collection day or facility.
  Visit http://www.scdhec.gov/recycle for local recycling centers
- Encourage your marina to offer oil recycling.
- Trade in a used battery for a possible credit toward a replacement battery.
- If out-of-date flares have not been exposed to water and are undamaged, keep them on the boat along with the number of required in-date flares.
- When possible, use paints that are not solvent based.
- Buy bilge pump switches that do not contain mercury. Check with marina on mercury containing bilge switch disposal.

Recycle

Oil	Aluminum	Solvents
Antifreeze	Cardboard	Steel
Lead batteries	Metal fuel filter canisters	Scrap Metal
Glass	Mixed Paper	Tin
Plastic	Newspaper	Tires

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Hull Paint

Anti-foulant coatings on boat hulls are another toxic threat to marine life. These coatings contain compounds such as copper that kill marine organisms that grow on the underside of a boat. These coatings, especially ablative (a.k.a. soft, self-polishing, or sloughing) coatings, also release toxic compounds into the water. Hard antifouling coatings have extended antifouling properties, but limit the amount of toxic metals leached into the water. Hard coatings also release less material into the water when they are cleaned.

Maintain your Hull Wisely

- Consider alternatives to toxic sloughing bottom paints.
  - Some good alternatives are silicon, polyurethane, Teflon, and other hard antifouling coatings.
  - These alternatives rely on a slick surface to discourage the growth of marine organisms rather than killing them.
- If boat has a sloughing paint coat, do not clean the boat bottom while in the water – this creates a discharge of toxic paint chips in the water. Only clean running gear and anodes.
- Clean boat bottoms ashore over hard surfaces or a tarp, where all debris can be contained.
- Wait 90 days to clean a newly painted hull, as it will release more toxins when new.
- Consider storing your boat out of the water to prevent fouling.
- Do hull work inside or under cover where rain can't wash dirt, dust, oil, or solvents into the water.
- Use a dust-less or vacuum sander, or a drop cloth to collect all paint chips, dust, and residue. Dispose in regular trash.

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Fish Bait/Waste

In small quantities, crabs and other marine animals scavenge fish waste. However, in an enclosed marina basin decomposition of excessive fish waste can produce foul odors and impair water quality through increased nutrient and bacteria levels and decreased dissolved oxygen. This can cause fish kills as well as an unsightly mess.

Dispose of Fish Waste Properly

- Do not throw fish waste, unwanted bait, or bait packaging into marina waters.
- Discard fish waste over deep water or in the trash.
- If available, use fish cleaning stations.
- Recycle fish parts by composting with peat moss or burying in the garden as fertilizer. Or freeze fish waste and reuse as chum or bait.

Fish Cleaning Station

Underway

Boat traffic (including personal watercraft) through shallow-water areas and in the nearshore areas at wake-producing speeds can stir up bottom sediment, uproot submerged aquatic vegetation, erode shorelines, and harm some animals. Disturbed sediment can cause darker waters which harm aquatic plant life and bottom-dwelling organisms, reduce dissolved oxygen levels, and disrupt fish feeding. The loss of underwater plants reduces available habitat for fish, shellfish, and waterfowl, diminishes the recycling of nutrients, and decreases natural shoreline erosion protection.

(Courtesy of S.C. DNR)

Protect Sensitive Habitat

- Always be aware of your wake. Distribute your passengers equally. A heavy stern creates a larger wake.
- Observe posted No-Wake Zones.
- Operate away from shore as much as possible to avoid disturbing wildlife, chopping vegetation, and disturbing bottom sediments.
- Proceed slowly in shallow areas.
- Do not disturb wildlife.

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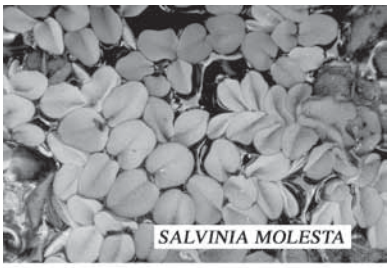
Aquatic Nuisance Species

Exotic plants and animals such as the zebra mussel, hydrilla, and salvinia can hitch a ride attached to your boat or trailer or as tiny young present in water taken in by your boat. Hitching from one waterbody to another, these aquatic nuisance species spread quickly and can become established in another waterbody. They contribute to the degradation of water quality and fish and wildlife habitat by displacing native species and by blocking light needed by submerged aquatic plants. Once introduced, control of aquatic nuisance species is very expensive and extermination is extremely difficult.

Stop the Spread of Aquatic Nuisance Species

- Never release live or dead bait or bait packaging into a waterbody, or release aquatic animals from one waterbody into another.
- Share live bait with other anglers or empty your bait bucket in the trash before leaving the area.
- Inspect your boat and trailer, especially at the points in the diagram. Remove any plants and animals you see before leaving the waterbody.
- Avoid chopping vegetation with outboard motor propellers.
- When hauling your boat, drain your motor, wet well, and bilge in a containment area on shore.
- Rinse your boat, trailer, and equipment. It is best to use high-pressure, hot water. A garden hose will work if no other option is available.
- Be especially careful if you've been boating in an infested lake, or if you're buying or using a boat that has come from out of state. Flush raw water-cooling systems and clean sea strainers.
- Air-dry your boat and equipment for as long as possible – at least five days is optimal.
- If you find one of the below species, or suspect there may be a new infestation, go to http://www.protectyourwaters.net/sc.

Hydrilla
(Photo courtesy of SC DNR)



Salvinia Molesta
(Photo courtesy of SC DNR)

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Fishing Line Recycling

Monofilament fishing line – the plastic fishing line popular with anglers for its strength and invisibility under water can become a danger when it makes its way into the environment. It can get into our waterways by breaking while fishing, but most often it is carelessly tossed into the water or on land. Monofilament is a particularly troubling form of marine debris because it is not biodegradable and can last hundreds of years in the environment. Becoming entangled is a common problem for many marine animals, but there are other threats as well. Birds, sea turtles, and marine mammals like dolphins and manatees are known to mistake line for prey, or inadvertently ingest it along with their normal food. Even humans cannot escape the dangers of rogue monofilament. Swimmers and SCUBA divers can become entangled as easily as marine animals. Line can also be wrapped around boat propellers, causing a dangerous and expensive problem.

Fortunately, there are steps you can take to keep fishing line from becoming a threat.

Recycle Your Line

- Monofilament line can be recycled to make new plastic products like tackle boxes and artificial fish habitat structures.
- Monofilament recycling bins work much like household recycling bins. They are white, PVC structures found at many boat landings, marinas, fishing piers, or other popular fishing spots. Simply place used monofilament fishing line (and nothing else) into the bins.
- If you cannot find a monofilament recycling location near you and must throw your line away, cut it into 6 inch pieces first. Once in the landfill, this reduces the risk of entanglement by birds and other animals.

Adopt a Monofilament Recycling Bin

- The SC Monofilament Recovery and Recycling Program (SC-MRRP) offers an opportunity not only to recycle your used line, but also to adopt a recycling bin.
- Each bin is adopted and maintained by a volunteer, group, or entity.
- Once the bin is installed, the volunteers check it periodically, collect fishing line, and fill out an information sheet about how much line is collected.
- The line is shipped using a pre-paid shipping box to Berkley© for recycling.
- If you have a location in mind for a recycling bin or want to adopt a bin, contact the program at: sc-mrrp@dnr.sc.gov or 843-953-6666
- For more information, check out the program at: http://saltwaterfishing.sc.gov/monofilament.html