



Engines are central to the boating experience. Engine maintenance must be performed regularly to ensure optimum performance and with care to protect the environment.

4.3 Engine Maintenance

Engine maintenance requires using hazardous materials such as oil, solvents, and anti-freeze. These substances must be used with care. Any marina that provides commercial engine services (for a fee) must use BMPs and be covered by a NPDES Multi-Sector General Permit. This section provides you and your boating customers with the information needed to prevent and control pollution from engine maintenance activities.

LEGAL REQUIREMENTS

The following laws apply to engine maintenance activities. If you perform engine maintenance services at your facility, please read the summary of these regulatory programs in Chapter 6.

- Clean Water Act – Discharge of Oils
- National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit for Industrial Activities
- Massachusetts Hazardous Waste Regulations
- Massachusetts Waterways Regulations

Best Management Practices

Routine Maintenance

Engine maintenance is necessary on a regular basis to ensure proper performance of boat engines. Consider the following list of BMPs when conducting routine engine maintenance.

- ▶ **Designated Maintenance Areas:** Set up designated maintenance areas for engine work as described under Section 4.1.
- ▶ **Proper Waste Disposal:** Oil, solvents, anti-freeze, batteries, and other materials generated in engine maintenance is classified as hazardous waste. See Section 4.10 for information on proper handling and disposal of these materials.
- ▷ **Clean Work Areas:** Keep engine maintenance areas clean. Regularly sweep or vacuum to keep them free of clutter that can cause spills and collect pollutants. Inspect these areas daily to be sure they are clean and all products are properly stored and used.
- ▷ **Prohibit Hosing Down of Maintenance Areas:** Prohibit engine maintenance areas from being cleaned with water from hoses. Water will collect all oil, grease, and lubricants and wash them to drainage structures. Use absorbent materials to clean up liquids.
- ▷ **Provide Absorbent Pads:** Make sure that absorbent materials are always available in the designated maintenance area to immediately soak up any spills. Absorbent

materials might include cloths, pads, booms, or granular materials. The latter is often used for small, contained spills on hard surfaces. Several pads or a boom may be employed for a larger spill that is running over land. Any absorbent materials that are saturated (i.e. able to squeeze more than one drop) with oil or other hazardous materials must be disposed of as hazardous waste.

- ▷ **Inform Do-It-Yourselfers:** Keep your customers who work on their boats at the marina informed about the proper use of petroleum products and solvents. Use visible signs, clauses in customer contracts, fact sheets, and/or tips in mailings.

Oil Changes

The following pollution prevention strategies should be considered when changing the oil in your engine.

- ▷ **Oil Spill Control:** Use drip pans with absorption pads inside to catch and soak up any spills. Avoid mixing different hazardous liquids, a practice that can make them unacceptable for recycling and can seriously increase disposal costs. Always have a sufficient supply of oil absorbent pads near all engine work, whether in a boat or shop, to mop up any drips or spills.
- ▷ **Spill-Proof Oil Changes:** Purchase equipment that will conduct spill proof oil changes. These vacuum systems draw crankcase oil out through the dipstick tube. You can rent these systems to Do-It-Yourselfers so they conduct their own oil changes. Some manufacturers of these systems are listed in Appendix C.
- ▷ **Recycle Used Oil:** Establish a safe and effective method for collecting, storing, and arranging for transport of used oil for recycling. Used oil collection should be conducted by trained staff only to avoid potential for cross-contamination. The used oil storage area should be safe and secure. If your facility works year-round, you may want to consider used oil as a heating source on-site. See Section 4.10 for more information on recycling and reusing used oil.

Engine Cleaning

Engine cleaning will remove build-up of grease and grime on your engine. The following list of BMPs should be used to make sure the pollutants you remove do not reach coastal waters.

- ▷ **Pre-Cleaning Methods:** Before using solvents, clean the engine using environmentally-sound alternatives. One easy example is to loosen the engine grime with a brush and then wipe it away with a rag.
- ▷ **Use Solvents Properly:** Use non-VOC (Volatile Organic Compounds) solvents where possible to wash engine parts and tools. If VOC-based solvents must be used, catch excess solvents in a pan below the engine and reuse them. Keep VOC-based solvents in tightly closed containers to reduce the amount of VOCs that are released into the air. Many marinas use the services of companies that provide parts washing equipment and solvents, which are collected regularly for recycling.

Hazard Alert

Oil absorbent materials include pads, booms, and granules that can be used to quickly absorb small drips and spills. Regular use of these materials will help keep the marina clean and reduce the amount of petroleum falling on the land or escaping to the water. Used pads must be disposed of as hazardous waste if oil can be squeezed from them. Store them with other hazardous waste for pick-up by a hazardous waste hauler. Companies that sell oil absorbent products are listed in Appendix C.

Safe Practice

Popular with marinas in the northeast is the drip-proof tank, which uses a vacuum to suck old oil and dirt from the bottom of the boat engine during oil changes. Once inside the tank and with the valve closed, no oil can spill should the tank tip over or fall into the water. It is a simple to use, clean, quiet, efficient, and inexpensive way to change oil and protect the environment.

- ▷ **Bioremediating Systems:** Explore the use of bioremediating systems that use microbes that eat oil and grease. These solvents either contain natural enzymes or live bacteria, which digest many petroleum products. Since they are based on naturally occurring organisms, they pose less of a risk to the marine environment. Some companies that offer bioremediating systems are listed in Appendix C.
- ▷ **Solvent Alternatives:** Encourage the use of solvent alternatives by distributing a list of non-hazardous cleaning products. A list of some of these products is provided on a fact sheet in the inside pocket at the back of this guide.

Boat and Engine Winterizing

Specific considerations apply to boat and engine winterizing. Appropriate BMPs are listed below.

- ▷ **Use Environmentally-Preferable Anti-Freeze:** Traditional antifreeze can kill on contact or when swallowed. Antifreeze is soluble in water and will sink into the water column. If spilled, it can cause immediate harm to plankton and small fish. The “green” colored ethylene glycol antifreeze, commonly used in automobile engines, will kill dogs if they drink it from a spilled puddle. Unfortunately, it tastes good to animals. Switch to less toxic products, such as propylene glycol (orange or pink color), when possible. Propylene glycol anti-freeze is available at most marine supply stores.
- ▷ **Fuel Stabilizers:** Add stabilizers to fuel to prevent degradation. Stabilizers are available for gasoline, diesel fuel, and crankcase oil. Stabilizers protect engines by preventing corrosion and the formation of sludge, gum, and varnish.
- ▷ **Fuel Protection:** Fill fuel tanks to between 80 and 90 percent capacity prior to winter storage to minimize the build-up of flammable fumes and reduce condensation that can lead to corrosion. Make sure the gas cap is on tight to prevent fuels from volatilizing. Do not fill the tank more than 90 percent to keep fuel from spilling out of the fuel vent in the springtime when it warms up and expands.
- ▷ **Drain Water from the Fuel System:** Rather than using anti-freeze, drain as much water from the water system as is possible. Some marinas successfully use air pressure to blow the lines empty. If there are traps that cannot be drained completely, use a diluted solution of water system-approved antifreeze, such as propylene glycol.
- ▷ **Use Canvas Covers and Recyclable Shrink-Wrap:** Encourage the use of canvas covers or recyclable shrink-wrap for winterizing your boat. Information on shrink-wrap recycling is provided in Section 4.9.
- ▷ **Train Employees:** Train employees to be on the lookout for engine maintenance activities by Do-It-Yourselfers that may be harmful to the coastal environment.

Useful Contacts

1. US Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Program — Call **(617) 918-1615** or look on-line at **www.epa.gov/owm/sw/industry/msgp** for information about the NPDES Multi-Sector General Permit and its requirements.
2. The Department of Defense Pollution Prevention Equipment Program Work Book is available on-line at **www.lakehurst.navy.mil/P2/index.htm**. This reference provides information on innovative pollution prevention strategies.
3. Used Oil Coordinator, Massachusetts Department of Environmental Protection — Call **(617) 292-5898** with your questions about used oil requirements in Massachusetts.
4. Massachusetts Environmentally Preferable Products Procurement Program — **www.state.ma.us/osd/enviro/products/motoroil.htm**. Call for information on propylene glycol and other environmentally preferable products.



ENGINE MAINTENANCE

Complete this checklist if engine maintenance occurs at your facility.

Activities that occur at the facility: Routine Maintenance Oil Changes
 Engine Cleaning Boat and Engine Winterizing

Check either the “Yes” or “No” column to indicate if you are using each of the BMPs listed below. If the BMP does not apply (you are using a different BMP or the activity does not occur at your marina), put “NA” in the “Yes” column. In the “Action” box, list the next steps for all BMPs where you have checked the “No” column.

BMP	YES/NA	NO	Refer to Page	Action
*Designated Maintenance Area			4-15	
*Proper Waste Disposal			4-15	
Clean Work Areas			4-15	
*Prohibit Hosing Down of Maintenance Areas			4-15	
Provide Absorbent Pads			4-15	
Inform Do-It-Yourselfers			4-16	
Oil Spill Control			4-16	
Spill-Proof Oil Changes			4-16	
Recycle Used Oil			4-16	
Pre-Cleaning Methods			4-16	
Use Solvents Properly			4-16	
Bioremediating Systems			4-17	
Solvent Alternatives			4-17	
Use Environmentally-Preferable Anti-Freeze			4-17	
Fuel Stabilizers			4-17	
Fuel Protection			4-17	

BMP	YES/NA	NO	Refer to Page	Action
Drain Water from Fuel Systems			4-17	
Use Canvas Covers / Recyclable Shrink-Wrap			4-17	
Train Employees			4-17	

***BMP will assist with regulatory compliance.**

NOTES:
