4.7. Petroleum Control

Management Measure for Petroleum Control:

Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.

Management Measure Description

Fuel is easily spilled into surface waters from the fuel tank air vent while fueling a boat (if overfilling), and oil is easily discharged during bilge pumping. A small fuel sheen on the water surface near docked boats is not an uncommon sight and can be caused by a spill of only a few drops or a slow leak from a gas tank. Because of the properties of oil, a cup of oil can spread as a very thin oil sheen over more than an acre of calm water. Small amounts of oil spilled from numerous boats can accumulate to create large oil sheens. Gasoline spills are also a safety problem because of gasoline's flammability.

Hydrocarbons are dangerous to aquatic plants and animals both at and below the water surface. Less than half of spilled oil stays in the water; the rest evaporates. Spread over the surface, oil creates a barrier to oxygen movement across the water surface and to animals (for instance, insect larvae) that must breathe at the surface. At and below the surface, oil attaches to plant leaves, decreasing their respiration, and bottom sediments. It can also be ingested by animals directly, or indirectly by feeding on other organisms such as filter feeders (mussels, sponges) that have ingested the oil. The hydrocarbons in oil harm juvenile fish, upset fish reproduction, and interfere with the growth and reproduction of bottom-dwelling organisms. Some oil remains as sediment contamination.

Petroleum spills can also cause structural damage at marinas, such as discoloration on boat hulls, woodwork, and paint, and deterioration of white Styrofoam in floats and docks (because petroleum dissolves this material).

The practices discussed here are used in many marinas, and their use can minimize the entry of petroleum from fueling and bilge pumping into surface waters. Technologies such as air/fuel separators, oil-absorbing pads, and bioremedial pads and socks have been developed in response to a growing recognition of the ecological and cumulative damage that can be done by even small spills of petroleum products into surface waters. These small spills escape the attention of many people, and marina owners and operators can play an important role in bringing the importance of controlling this form of pollution to the attention of their patrons.

Applicability

This management measure is applicable to marina managers and boat owners. Although marina managers have no control over the implementation of many of the BMPs mentioned in this section, particularly those applicable to privately owned and operated watercraft, aware-ness of the issues associated with boat engines and their maintenance is important because engines are potential sources of nonpoint source pollution and their operation and maintenance have the potential to affect marina waters.

Best Management Practices

- *Promote the installation and use of fuel/air separators on air vents or tank stems of inboard fuel tanks to reduce the amount of fuel spilled into surface waters during fueling.*

Often during fueling operations fuel overflows from the air vent from the built-in fuel tank on a

boat. Attachments for vent lines on fuel tanks, which act as fuel/air separators, are available commercially and are easily installed on most boats. These devices release air and vapor but contain fuel before it can overflow. Marinas can make these units available in their retail stores and post notices describing their spill prevention benefits and availability.

♦ *Avoid overfilling fuel tanks.*

Fuel expands as it warms and the temperature in a boat's fuel tank usually is much higher than that in the storage tank, especially an underground tank. While fueling, a distinctive change in sound occurs when a tank is almost full. Filling can be stopped at this time, leaving a small amount of space in the tank to allow for expansion of the fuel with temperature changes. Without this space, fuel in a completely filled tank can spill out when the fuel expands. Automatic shutoff nozzles might not stop fuel flow before some fuel spillage occurs through the air vent, and listening for the sound of the almost-full tank is the best way to know when to stop filling. Having an oil absorbent pad ready to wipe up any drops is also a good fueling practice.

♦ *Provide "doughnuts" or small petroleum absorption pads to patrons to use while fueling to catch splashback and the last drops when the nozzle is transferred back from the boat to the fuel dock.*

Although few of us may be concerned about drops of fuel spilled onto the ground while we fill our car at the gas station, at the marina those drops can go directly into surface waters. There is no oil/water separator or catch basin to prevent drops at the marina fuel dock from entering the water, so using a little extra caution and taking precautions to prevent spills is good practice at the fueling dock. A doughnut placed over the fuel nozzle or a small absorbent pad in hand to catch any backsplash when the fuel tank is full and any drops that fall while the handle is replaced at the pump is an effective and easy way to prevent the small spills that can add up to big problems.

A small absorbent pad temporarily attached to the hull below the fuel tank air vent during fueling provides an added precaution against fuel spilling directly into surface waters. Pads that attach to vertical or horizontal surfaces with suction cups are commercially available. Properly dispose of all petroleum-containing materials as hazardous waste, or according to your local hazardous waste authority's recommendation.

> At Battery Park Marina on Lake Erie, staff cut absorption pads into squares, then cut an X-shaped hole in the center for the fuel nozzle to pass through. Any splashes while fueling are absorbed by the pad (USEPA, 1996: *Clean Marinas—Clear Value*).

♦ *Keep engines properly maintained for efficient fuel consumption, clean exhaust, and fuel economy. Follow the manufacturer's specifications.*

Well-tuned and maintained engines burn fuel more efficiently, improve mileage, and lower exhaust emissions. Mixing fuel for 2-cycle outboard engines according to the manufacturer's specifications (usually 50:1 fuel to oil) can help prevent inefficient burning.

♦ *Routinely check for engine fuel leaks and use a drip pan under engines.*

The best way to keep fuel and oil out of bilge water is to check for and fix small leaks, including making sure fuel lines are secure and inspecting them for wear.

♦ *Avoid pumping any bilge water that is oily or has a sheen. Promote the use of materials that capture or digest oil in bilges. Examine these materials frequently and replace as necessary.*

Marina operators can advertise the availability of oil-absorbing materials or can include the cost of installation of such material in yearly dock fees. A clause can be inserted in leasing agreements that requires boaters to use oil-absorbing materials in their bilges.

One oil spill response agent uses microbes to assist in cleaning up petroleum pollutants. Because it uses natural organisms, it is completely nonhazardous, nontoxic, and biodegradable. In independent tests by the National Environmental Technology Applications Corporation (NETAC), oil pollutants treated with the agent were reduced by up to 98 percent within 8 weeks.

The agent can be sprayed as a loose powder onto an oil spill, where it bonds with the oil and keeps it from sinking and harming aquatic life. Special socks containing the agent can be placed directly in boat bilges to absorb oil there. The socks can immediately absorb twice their weight in oil, and they continue to degrade oil so that one sock can be used for an entire boating season. Once the oil has been degraded, the agent degrades itself and the empty sock can be thrown away. Consumers should make sure that they are using an oil spill response agent that actually "eats" the oil rather than seemingly similar products that are pills made of biodegradable detergents. These are actually emulsifiers that only break oil down into smaller particles to be discharged into the water.

- *Extract used oil from absorption pads if possible, or dispose of it in accordance with petroleum disposal guidelines.*

If a container for recycling oil is available, boaters should place extracted oil into it. Recycled oil should be handled by a commercial waste oil hauler. If recycling is not an option, boat owners can place used pads in a sealed plastic bag and dispose of them with other oily wastes. All fuel- or oil-soaked materials should be stored together and removed by a certified waste hauler. Some booms can be cleaned and reused. Some materials can be recycled or burned as a heat source. If a marina doesn't have a used oil collection receptacle or program, a local department of environmental protection can be contacted for the location of the nearest used oil recycling station or collection point.

- *Prohibit the use of detergents and emulsifiers on fuel spills.*

Soaps, detergents, and emulsifying products should not be used on oil or petroleum spills because they only hide spills and seemingly make them disappear. They actually cause petroleum products to sink into the water, where the combination of fuel and detergent can harm aquatic life and make the pollutants difficult to collect. Use of detergent bilge cleaners is illegal and subject to a high fine imposed by the U.S. Coast Guard. Many bilge cleaners are actually detergents and their use should be discouraged as well because environmentally friendly alternatives exist.

BMP Summary Table 7 summarizes the BMPs for Petroleum Control mentioned in this guidance.

BMP Summary Table 7. PETROLEUM CONTROL MANAGEMENT

MANAGEMENT MEASURE: Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.

APPLICABILITY: Marina managers and boat owners.

ENVIRONMENTAL CONCERNS: Although more than half of the oil that spills into the water evaporates, less than a cup of oil can create a very thin sheen over more than an acre of calm water. Small amounts of oil spilled from numerous boats can accumulate to create a large oil sheen, that blocks oxygen from moving through the surface of the water and can be harmful to animals and larvae that must break the surface to breathe. The hydrocarbons in oil harm juvenile fish, upset fish reproduction, and interfere with the growth and reproduction of bottom-dwelling organisms. Oil and gas ingested by one animal can be passed to the next animal that eats it. In a marina, petroleum spills also dissolve the white Styrofoam in floats and docks and discolor boat hulls, woodwork, and paint. Gasoline spills, which evaporate quickly, are also a safety problem because of the flammability of gasoline.

PETROLEUM CONTROL PRACTICES

Best Management Practice Examples	Marina Location & Usage	Benefits to Marina	Projected Environmental Benefits	Initial Cost Estimate	Annual Operation & Maintenance Cost Estimate	Notes
Promote the installation and use of fuel/air separators on air vents or tank stems of inboard fuel tanks to reduce the amount of fuel spilled into surface waters during fueling	Boat; generally recommended	MODERATE benefit to boater; saves fuel and keeps hull cleaner	MODERATE; eliminates small but common spills from air vents	LOW	LOW	
Avoid overfilling fuel tanks	Fuel dock; universally recommended	HIGH; marina policy for staff and fuel dock customers will reduce small spills, saving cleanup costs and reducing visible oil slicks	HIGH; reduces small spills from air vent when boats return to slips as fuel warms up and expands	NONE	NONE to LOW	Fuel expands as it warms, and the temperature in a boat fuel tank might be higher than that in the fuel storage tank, especially an underground tank; very effective when coupled with installation of fuel/air separator in fuel vent line
Provide “doughnuts” or small petroleum absorption pads to patrons to use while fueling to catch splashback and the last drops when the nozzle is transferred back from the boat to the fuel dock	Fuel dock; universally recommended	HIGH; absorption pads are inexpensive and easily cut into smaller sizes for use by boaters; low technology and easy to use	HIGH; significantly reduces amount of small fuel spills in marina and visible petroleum sheens	LOW	LOW	If fuel absorbed is gasoline, do not store pad in an enclosed space until fumes have dispersed
Keep engines properly maintained for efficient fuel consumption, clean exhaust, and fuel economy. Follow the manufacturer’s specifications	Marina area; universally recommended	LOW for marina; HIGH for boater; well-tuned and maintained engines burn fuel more efficiently; fewer exhaust fumes	HIGH; well-tuned and maintained engines produce fewer emissions and leak less to the water	LOW	LOW	

BMP Summary Table 7. (cont.) PETROLEUM CONTROL MANAGEMENT MEASURE

Best Management Practice Examples	Marina Location & Usage	Benefits to Marina	Projected Environmental Benefits	Initial Cost Estimate	Annual Operation & Maintenance Cost Estimate	Notes
Routinely check for engine fuel leaks and use a drip pan under engines	Boat storage area; recommended	MODERATE	MODERATE	LOW	LOW	Unattended boats with slow leaks can contaminate groundwater.
Avoid pumping any bilge water that is oily or has a sheen. Promote the use of materials that capture or digest oil in bilges. Examine these materials frequently and replace as necessary	Boats with inboard engines; universally recommended	MODERATE to HIGH; can sell oil-absorbing materials to customers; require that customers use oil-absorbing/ digesting materials in their bilges at all times while in marina	MODERATE to HIGH; an economical and effective approach to preventing release of oil in bilge water into surface waters	LOW	LOW	Prior to turning on the bilge pump, inspect the bilge to ensure that no oil or fuel is in the bilge water
Extract used oil from absorption pads if possible, or dispose of them in accordance with petroleum disposal guidelines	Marina; recommended	MODERATE; recycling and reusing (where possible) makes good economic sense	MODERATE to HIGH; recycling and reusing reduces raw material use	LOW	LOW	If recycling is not an option, boat owners should dispose of used pads in a sealed plastic bag for landfill disposal.
Prohibit the use of detergents and emulsifiers on fuel spills	Marina basin; universally recommended	MODERATE; using detergents is illegal and can result in fine by the U.S. Coast Guard	HIGH; soaps, detergents, and emulsifiers cause petroleum products to sink into water, making them impossible to remove	NONE	NONE	Because better alternatives exist, discourage use of detergent bilge cleaners