

Using Best Management Practices:

- > Boating facility construction can pollute lakes and rivers
- > BMPs are available to minimize water pollution
- > Planning is required for site-specific BMPs
- > Project costs may be affected by water quality BMPs

Construction BMPs



Boating fun

Image Courtesy of NRCS

Clean Water

Water is an essential part of boating. Clean water not only makes boating and water recreation more enjoyable, it is also part of a healthy environment.

Fish, animals, and people all need clean water, so we should all do our part to keep pollutants out of the water. Of course this means no trash, chemicals, or sewage should be released in lakes, rivers, or streams. That includes accidental spills or runoff from

dry land activities. For example, rain can wash parking lot residue or fertilizer into streams. But did you know that putting dirt and rocks in the water can also harm water quality?

That's right - the tiny bits wash off into the water making it murky, or turbid. Even things that occur naturally in the water, like mud on the riverbed, can be harmful.

Once disturbed, these sediments can mix

with the water making it turbid, and toxic chemicals can be washed from the mud and dissolved in the water. Pollutants can be obvious things like oil, garbage, and herbicides, or natural materials like gravel.



No water = No fun

Image Courtesy of NRCS

Challenging Construction

Boat ramps and docks help move boats, gear, and people from land to water and back again. By necessity these structures are located at the water's edge.

This presents a special challenge to those

charged with building or rebuilding these types of



Newly built boat ramp

structures. Building and working in, over, under or even close to the water requires special techniques to avoid causing water pollution.

OSMB photo

Quick Start Index

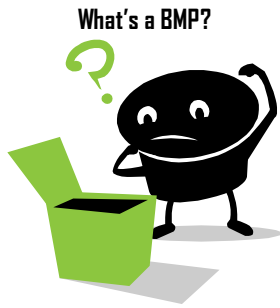
BMP Introduction	2
Changing BMPs	3
Goals & Objectives	5
More Information	6
Who We Are	7
Construction BMPs	8

What are BMPs?

Things that can be done to prevent or lessen pollution are called Best Management Practices or “BMPs.”

BMPs also include ways to stop erosion and sediment movement, which are types of water pollution. BMPs may include actions that need to be done, things that should not be done, (a list of Dos and Don'ts) or instructions on how to do things a certain way.

An example of this type of BMP is a list of suggestions on how to store chemicals properly and what to do if they leak or spill. BMPs can also be things or tools, such as ditches or pipes to carry stormwater runoff away from the construction site.



BMPs are a list of Dos and Don'ts to help stop pollution.



Image Courtesy of NRCS

Clean water for fish

When are BMPs used?

Some BMPs can be applied during project planning and design, while others deal mostly with physical construction. Both types of BMPs are included in this guide, though the planning or design BMPs are mostly informational. BMPs do not replace construction specifications or design standards.

All boating facility projects should be planned by a design professional or engineer as appropriate and should follow appropriate design standards, such as *Design Guidelines for Recreational Boating Facilities*. See the section called “More Information” for more details.

PROJECTS ARE UNIQUE—BMPs ARE NOT

No two boating facilities are exactly alike.

Parts of the boating facility must be adjusted and customized to fit the site, and to work properly in the soil, water, and weather conditions found there.

That means no two facility construction projects are quite that same. Project plans and construction specifications are specific for each site.

For example, some projects with rock or hardpan might require impact pile driving, while others with softer soils might not.

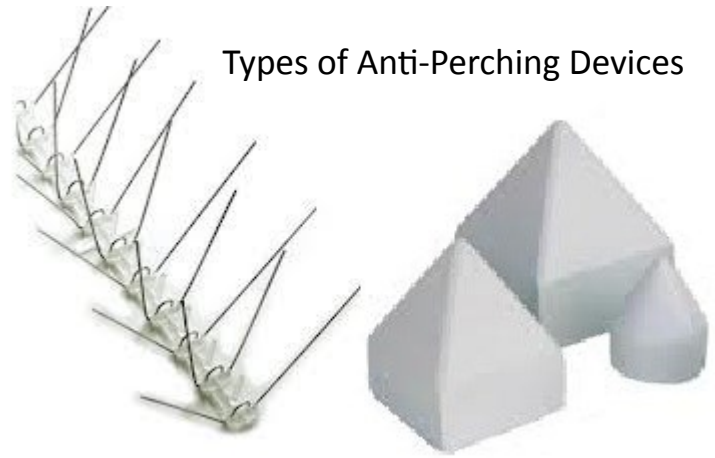
Another example: some ramps may be constructed in dry conditions at low water, so that use of precast concrete planks is not required.

BMPs are not specific. Just the opposite is true – they are general. They describe how things are typically done, or general concepts of pollution control.

There will always be exceptions to those general, typical methods. Because specific construction methods vary by site, not all BMPs will apply to all boating facility construction projects.

Coordination is Key

Coordination between the project planner, designer, construction supervisor, and site owner is important to make sure that each team member selects and uses the BMPs that best match the work being done. Once selected, BMPs will probably require some minor changes or customization to fit the site.



Change is Good—Sometimes

Once in a while you just have to make changes. For example, one BMP suggests that all new pilings should have anti-perching devices to keep birds off the piling. Plastic

cones called pile caps are usually used for that purpose. Sometimes pilings are installed to brace or support other pilings and pile caps will not fit the support piling as

shown in Figure 1. That is the kind of situation where the BMP may need to be customized or modified for that certain project. Read on to find out how that is done.

BMPs will probably require some minor changes or customization to fit your site.

How to Change a BMP

BMPs describe the way that is normally best to reach the goal, which is keeping water clean. Sometimes the best way just does not work. So what is the next best way? It is up to the project team to decide what is the best fit for the project.

Let us go back to our example BMP suggesting anti-perching devices on pilings.

Each BMP tries to solve a certain problem. In this case the idea behind the BMP is to keep birds away. If the BMP does not fit a project, then two questions must be answered to find out why.

Question 1 is “Will this project cause that problem?”

Question 2 is “What is the next best way to solve the problem?”



OSMB photo

Figure 1. Pile Caps and Braced Piling

Will your project cause problems?

Question 1 is “Will this project cause that problem?” If the answer is no, the project will not cause the problem then the BMP does fit and can be ignored for this project. Imagine that only a boat ramp is being built. There is no

dock and no pilings. Because the project will not cause the problem of birds perching at the site, the answer to Question 1 is no. We see that the project can safely be completed without this BMP. Now imagine building a debris

boom like Figure 1. One piling is being supported by a second piling. The pile cap does not fit the support piling. In this case the pilings will be a place for birds to perch, so the answer to Question 1 is yes, there is a problem.



Projects without pilings, like the one shown here in Figure 2, do not need anti-perching devices.



OSMB photo

Figure2. Boat Ramp without Piling

Who can change a BMP?

The second question, Question 2 is, “What is the next best way to solve the problem?” Asking this question tells us that you know you need to do something, you just need to figure out what it is. For our imaginary debris boom project, you might think of several ideas, and then pick the best one. For example, you could attach the support piling so that it has less space for birds to

perch. You could use other types of anti-perching devices, like bird control spikes or wires. Another option would be to put pile caps only where they fit, as shown in the Figure 1. The answer to this question requires some thought and will be decided by the best judgment of the project team. If the solution is to change the project plans in some way, then it may be up to the designer

to say what will work and what will not work. If the answer is using a different product then it may be up to the builder to work out whether it could be installed or up to the owner to find out if it is affordable to purchase.

If BMPs require a change in plans, the designer must say what will or wont work.



What BMPs are *NOT*

BMPs describe common techniques to reduce pollution when doing certain types of construction activities; however, they are not laws or rules. The Environmental Protection Agency and Oregon Department of Environmental Quali-

ty enforce laws relating to pollution. The Army Corps of Engineers and Oregon Department of State Lands enforce laws relating to working in the water. Permission (permits) from these agencies may be required for your project.

See the section called "More Information" for contact details. If permit agencies give you specific instructions (permit conditions) that differ from BMPs, then follow those instructions. BMPs do not override permits.



BMPs are not law

BMPs are not substitutes for permits.

BMPs as a Target

So, BMPs take a back seat to design standards, construction plans and specifications, and permits. And they are not enforceable. Then what good are they? BMPs do not say what must be done. Instead they set the bar by describing what can and should be done to reduce pollution, if other instruction is lacking. The BMPs are something to aim for, like a target. Though it may not always be

possible to fully use BMPs as written here, they will help direct efforts to keep the water clean. They serve as backup guidance for construction projects without formal construction plans and permit conditions. Pollution control requirements in plans, specifications, and permits may not cover every part of the project. BMPs can also provide guidance to fill any gaps left after applying the require-

ments of those documents. BMPs set the standard for expectations on the way in which construction projects will be completed when using facility grant funds from the Oregon State Marine Board.

Construction projects using Marine Board grant funds are expected to use BMPs .

Aim for Clean Water





More Information

You may need permission from both Oregon Department of State Lands and US Army Corps of Engineers before working in the water. Work is only allowed at certain times of the year. Times are set by

ODFW and are listed in “Oregon Guidelines For Timing Of In-Water Work To Protect Fish And Wildlife Resources,” available online at the link shown below. If you are using facility grant funds from the

Oregon State Marine Board, make sure that you have and follow all applicable permits, including the DEQ 401 Water Quality Certification and NOAA Fisheries Biological Opinion, if any.

Before you start work, make sure you have and follow all applicable permits and approvals.

Other useful information is available from these links:

Department of the Army Regulatory Program

www.nwp.usace.army.mil/Missions/Regulatory.aspx

Department of State Lands

Wetlands/Waterways Removal-Fill
www.oregon.gov/DSL/PERMITS/index.shtml

Department of Environmental Quality

Best Management Practices for Oregon Marinas
www.deq.state.or.us/wq/pubs/bmps/marinas.pdf

Water Quality, Section 401 Certification
www.deq.state.or.us/wq/sec401cert/removalfill.htm

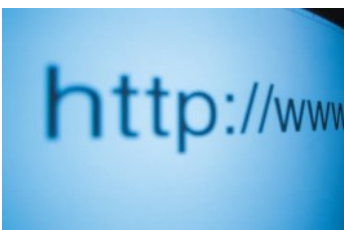
Department of Fish & Wildlife

Oregon Guidelines For Timing Of In-Water
www.dfw.state.or.us/lands/inwater/Oregon_Guidelines_for_Timing_of_%20InWater_Work2008.pdf.

Oregon State Marine Board

Design Guidelines for Recreational Boating Facilities -3rd Edition
www.oregon.gov/OSMB/BoatFac/DesignGuidelines.shtml

OSMB Environmental Programs Foam Encapsulation
www.oregon.gov/osmb/clean/pages/foam_encapsulation/foamapplication.aspx



Online at
boatoregon.com

The State Marine Board was established in 1959. It is Oregon's recreational boating agency dedicated to safety, education and accessibility. The board returns user fees (marine fuel tax and title and registration fees) to boaters in the form of boating safety and clean boating educational programs, marine law enforcement and improved boating facilities.

The board titles and registers recreational vessels, which currently number more than 180,000, and also registers outfitters and guides and licenses ocean charterboats. The board establishes statewide boating regulations and contracts with county sheriffs and the State Police to enforce marine laws. The board provides technical training to marine patrol officers and also provides grants and engineering services to local governments (cities, counties, park districts, port districts) to develop and maintain accessible boating facilities and protect water quality.

The board promotes safe and sustainable boating through several programs. The Mandatory Boater Education program requires all powerboat operators to complete a safety course. The Aquatic Invasive Species Prevention Program protects Oregon waters from costly, damaging invasive plants and animals. The Clean Marina program is a voluntary incentive-based program encouraging environmental "best practices" at Oregon's marinas. The board also provides numerous safety publications.

PO Box 14145
Salem Oregon 97309-5065
Telephone: 503-378-8587
TTY: 503-378-8587
Fax: 503-378-4597
Email: marine.board@state.or.us

Fine Print

This version of recreational boating facility construction BMPs is primarily written as a guide to those building boating facilities. It is anticipated that this document will also serve as a quick reference to anyone with an interest in boating facility construction projects.

Facility owners will be better able to budget and plan for such projects after seeing what addi-

tional work may be required to reduce project related pollution.

Regulators will be better able to evaluate project proposals after seeing what pollution control methods are typically employed during inwater construction work.

Workers will be better able to prepare for construction activities having upfront access to detailed expectations on how the work will be done.

For more in-depth treatment of BMPs, refer to the document, "Best Management Practices (BMPs) White Paper for Recreational Boating Facility Construction and Replacement," available from OSMB.



- ▶ Cut/fill
- ▶ Clearing
- ▶ Boat Ramps
- ▶ Docks
- ▶ Piling
- ▶ Dredging

435 Commercial Street NE
PO Box 14145
Salem Oregon 97309-5065
Telephone: 503-378-8587
TTY: 503-378-8587
Fax: 503-378-4597



General Construction

Construction sites, by their very nature, are a large source of sediment, debris and pollutants.

Solution Concept: Keep pollutants out of the water.

Do all construction work in phases. Complete clearing operations one stage at a time to take advantage of existing ground cover that provides a natural filter for sediment and other pollutants. Establish final vegetation and cover with mulch as soon as portions of the site are completed.



Image Courtesy of NRCS

Runoff carries soil and pollutants

Keep work areas clean. Clear out waste and litter at the work site daily. Sweep paved surfaces that flow to the storm-drain system or waterway. Collect and dispose of sweepings properly.

Control runoff during construction and divert it from areas of exposed soil using berms, ditches or pipe drainage systems. Reduce runoff velocities with vegetation or check dams.

Protect storm drains close to your construction site against runoff with filters or other inlet protection.

Staging areas, refueling areas, and material and equipment storage areas should be located as far away from the water as possible, preferably in an existing parking area.

Collect and dispose of concrete wash water from construction sites promptly and properly. When cleaning concrete trucks and vehicles, use off-site facilities or wash in designated and contained areas only.

Prepare and use a Spill Response Plan that includes key emergency contacts, cleanup instructions and locations of spill containment and clean up devices.



Construction Site Spill Kit

- ▶ Cut/fill
- ▶ Clearing
- ▶ Boat Ramps
- ▶ Dredging

435 Commercial Street NE
PO Box 14145
Salem Oregon 97309-5065
Telephone: 503-378-8587
TTY: 503-378-8587
Fax: 503-378-4597



Erosion Control

Earthwork disturbs soils, which can wash away with rain.

Solution Concept: Keep sediment out of the water.

Do not dig or remove plants outside of the project area. If trees must be removed from the riverbank, replace each tree with two seedlings.

Use plants where possible to stabilize streambanks and control erosion. Where plants alone are not enough, use large wood, riprap, or other structures. Place riprap on a layer of geotextile fabric and key it into the streambed.

Surround the work area with a floating silt curtain in the water and sediment fence on land. Use a floating silt curtain to separate the work areas from the water. Place sediment fences around the disturbed area, below exposed slopes, and around temporary stockpiles.

Keep an emergency supply of silt fence and straw bales on hand to fix any problem spots.



Image Courtesy of NRCS

Runoff carries away soil



Protecting plants near worksite



Plants and Woody Debris Stabilizing Bank

- ▶ Cut/fill
- ▶ Clearing
- ▶ Boat Ramps
- ▶ Dredging
- ▶ Piling
- ▶ Dredging

435 Commercial Street NE
PO Box 14145
Salem Oregon 97309-5065
Telephone: 503-378-8587
TTY: 503-378-8587
Fax: 503-378-4597



Work Area Isolation

Working in the water can muddy the water and hurt fish.

Solution Concept: Contain turbid water and keep fish out of the work area.

Use a floating silt curtain to separate wet work areas from the water and screen fish out of the work area. Use a sediment fence around dry work areas and spoil disposal piles.

Make sure the silt curtain and sediment fence are made from appropriate materials, such as high strength geotextiles, and are installed according to manufacturer's instructions.

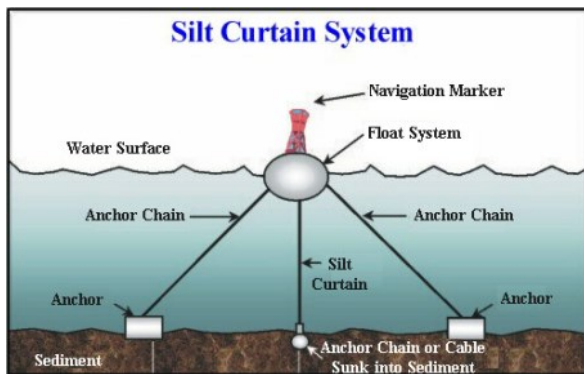
Separate the work site from the water before starting construction. Do not pump water out of the site. Isolation materials should not be removed from the site until after construction is complete.

Do not trap fish in the work area. If fish are trapped in the work area, contact Oregon Department of Fish and Wildlife for assistance.

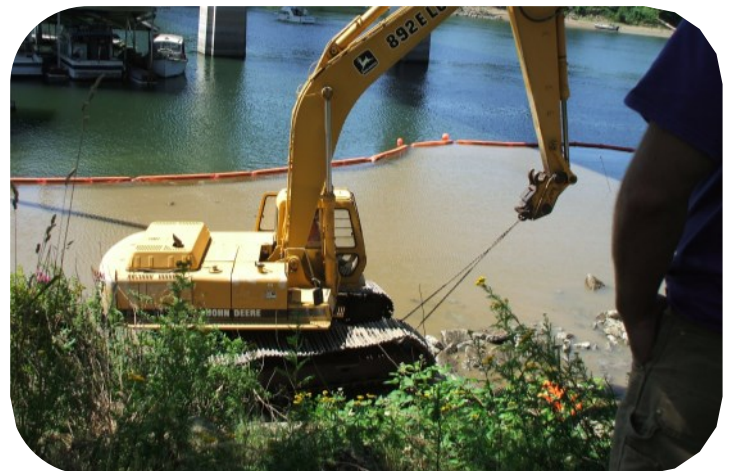
Make sure that fish can swim past or around the project area. Place the floating silt curtain so that fish can move both upstream and downstream past the project.



Improper Isolation



Floating Silt Curtain Parts



Properly Isolated Work Area



Demolition

Removing old structures can leave debris in the water.

Solution Concept: Collect and remove all debris from the work area.

Remove concrete parts whole if you can. Otherwise, break concrete into large pieces and remove it from the water.



If riprap can be reused, stockpile it temporarily out of the water.

Remove all demolition debris from the site and dispose of it in an upland landfill. Poorly Managed Debris

Do not demolish docks at the site. Instead, remove docks from the water and dispose of them in an upland landfill.

Remove existing pilings as described in *Piling Removal*, below.



Removal of Whole Concrete Pieces



Temporary Offsite Debris Storage



Piling Removal

Removing old piling can release toxic chemicals in the water.

Solution Concept: Do not expose fresh creosote to water.

Use a vibratory hammer to loosen and remove piling if possible. Otherwise, use an excavator or other equipment to pull out the pilings. Try to pull piles in one piece, but do not dig or wash away the sediment to get the piling out.



Broken Creosote Piling

If the piling breaks off and cannot be removed, cut it off 1 foot below the mudline. If creosote treated piles are cut off, cover the remaining part with clean sediment. Do not fill holes after pulling untreated piling.

Pull piles during low water if possible. Once pulled, move the pile to a place where sediment will not fall or wash back in to the water. Collect and dispose of all floating surface debris along with the piling.

Recycle or reuse steel piling, whichever is appropriate. Dispose of all treated wood piling at a hazardous waste facility.



Creosote-Treated Debris on Plastic Liner Awaiting Removal to Hazardous Waste Facility



Steel Pilings and Untreated Woody Debris Collected for Reuse



Piling Installation

Installing new pilings can create loud sounds that injure fish. Pilings can serve as perches for birds.

Solution Concept: Reduce the sound of pile driving. Keep birds off pilings.

Drive piling with a vibratory hammer if you can, and do not use impact pile driving unless it is necessary.

Use a bubble curtain or other sound reducing method if impact pile driving must be used.

Use anti-perching devices on all installed piling to deter birds.



Pile Driving Sounds Harm Fish



Bird Perched On Pile



Vibratory Driver Extractor



Piling Capped with Anti-Perching Devices



Dredging

Dredging can muddy the water.

Solution Concept: Remove and dispose of sediment in a way that causes

Dredge only areas needed for boat traffic.

Hold dredged material or spoils behind a small dike or berm while the excess water drains out. Use weirs, pipes, and erosion controls as needed to filter and return the draining water to the lake or river.



Poorly Confined Spoils

For suction or hydraulic dredging, make sure that you have enough space and capacity to store the slurry while the excess water drains out.



Poor Bucket Control

Keep the suction nozzle in or near the bottom while dredging, so no fish are sucked in.

For mechanical dredging, use a clamshell bucket that seals tightly closed if possible.

Fill the dredge bucket with sediment on each scoop. That will take fewer scoops to remove all the sediment.

Do the work at low water if possible.

Make sure the bucket is empty before putting it back in the water.



Properly Confined Dredge Spoils

- ▶ Cut/fill
- ▶ Clearing
- ▶ Boat Ramps

435 Commercial Street NE
PO Box 14145
Salem Oregon 97309-5065
Telephone: 503-378-8587
TTY: 503-378-8587
Fax: 503-378-4597



Boat Ramp Construction

Building a boat ramp can harm fish. Concrete can poison water. Riprap can replace habitat.

Solution Concepts: Separate the construction site from the water. Keep green concrete out of the water. Reduce the amount of riprap used.

Use a temporary floating silt curtain to keep fish out of the boat ramp site. Digging and filling for the boat ramp creates muddy or turbid water. Use a floating silt curtain to keep turbid waters in the work area.



Image Courtesy of NRCS

Green Concrete is Toxic to Fish

Keep green, or uncured concrete and its runoff out of the water. Use pre-cast concrete planks to build the boat ramp below the waterline. Use cast-in-place concrete only for building the boat ramp on dry land.

Use clean riprap to stabilize cut and fill slopes to the high water mark. Do not use riprap that is caked with dirt. Geotextile fabric should be installed to prevent the underlying sediment from being washed out through the openings of the riprap.

Protect both sides and the toe, or bottom, of the boat ramp with riprap. Put a two-foot wide strip of riprap on the ramp sides. Put a four-foot wide strip of riprap at the toe of the ramp.



Riprap Stabilizing Bank below High Water Mark



Dock Construction

Building a dock can harm fish. Treated wood can poison water.

Solution Concepts: Protect fish from injury or harm.

Use preservative-treated wood to build docks only if necessary. Make sure that using treated wood is allowed by your dock permit.

Build the dock in sections in a shop or other dry land location. Be sure that foam floatation is wrapped or sealed properly. Contact the Clean Marina Coordinator at the Marine Board for assistance.

Launch the finished dock sections from a boat ramp, or lift into the water with a crane or other equipment. Do not drive machinery in the water. Do not drag or slide the dock down the bank.

Make sure that the dock floats. Do not let the dock rest on the riverbed. Docks sitting on the boat ramp are okay. In reservoirs some docks will contact the ground during drawdown.



Treated wood can harm fish



Installing Pre-fab Dock with Crane



Concrete Docks Use Little Treated Wood