Best Management Practices (BMPs)

White Paper

for

Recreational Boating Facility

Construction and Replacement

Oregon State Marine Board
2012

Introduction

In-water work associated with recreational boating facility construction, replacement, or dredging activities can degrade water quality by adding sediment, chemicals, or other pollutants to the waterway.

During all in-water work the BMPs listed below should be used to minimize potential water quality impacts. Throughout all in-water work, all construction related debris should be managed so that no debris, garbage, or fuel enters the water. Visual monitoring for excessive turbidity, floating debris, trash, or oil sheen should be performed continuously to ensure water quality is being protected.

Site appropriate BMPs should be implemented during each of the in-water construction activities to minimize potential water quality impacts. Typical BMPs are described below.

General Construction Management Practices

Measures should be implemented to avoid or minimize the adverse effects of construction activities in or near the water.

Work should be completed using equipment having the least impact, e.g., use of rubber tired vehicles versus tracked vehicles. No motorized equipment should be operated (driven) in the water. Construction impacts should be confined to the minimum area necessary to complete the work. Damaged areas should be restored to pre-work conditions, including use of native plant species where appropriate. Care should be taken to prevent any petroleum products, chemicals, or deleterious materials from entering the water during construction. Work should be performed in a manner that does not inhibit fish passage.

Only clean material should be used as fill. No fill should be placed in spawning areas or areas with submerged aquatic vegetation. Temporary fills should be entirely removed and the site restored to pre-existing elevation. Excavated materials should be disposed of at an off-site, upland location.

All practicable steps should be taken to control erosion during construction and to establish permanent erosion protection upon completion of the work. Sediment fencing and floating silt curtains should be installed and maintained as needed to prevent movement of soil and sediment. No uncured concrete should be allowed to enter the water.

Pollution and Erosion Control Best Management Practices

Measures should be implemented to avoid or minimize the adverse effects of pollution, sedimentation, and erosion by limiting soil disturbance, scheduling work when the fewest number of fish are likely to be present, managing likely pollutants, and limiting the harm that may be caused by accidental discharges of pollutants and sediment.

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. No vegetation removal or soil disturbance should be allowed outside of the project area. Preservation of existing vegetation is typically a key measure for preventing erosion. To the maximum extent practicable, existing vegetation should be protected during construction. Vegetation removal should be confined to the smallest portion of the project area necessary for completion of the work. Project limits should be clearly marked to avoid unnecessary plant loss or ground disturbance. Only

vegetation within 20 feet of the construction limits should be removed. All other vegetation not within the construction area should be left in its current condition, unless the vegetation interferes with site access or if the vegetation is a noxious weed. When practicable, vegetative material including plants and topsoil containing seeds, roots, tubers (i.e., the seed bank) should be salvaged and stockpiled for use in site restoration after the project is completed.

Removal of mature trees providing soil or bank stabilization within the riparian area of any waterway should be coordinated with ODFW or other appropriate regulatory agencies. In the event removal of mature trees is necessary in riparian areas, two seedlings should be replanted for each tree removed. The location of the replanted trees should be chosen to ensure that they do not pose a future threat to public safety or the facility.

Streambank areas should be stabilized to control erosion. Bioengineering solutions should be considered as a means to minimize riprap use in locations above ordinary high water where success is probable and the safety of structural elements are assured. Where vegetative control alone is not feasible, structures such as large wood, riprap, or other measures should be used as designed by a licensed professional engineer. Riprap, if used, should be placed on a layer of geotextile fabric to prevent the underlying sediment from being washed out through the openings of the riprap. Riprap should be keyed into the streambed to ensure its stability and effectiveness in protecting the facility.

Construction and demolition work should be confined to the footprint of the structure where possible. The project area should be enclosed by a floating silt curtain (inwater portion) and sediment fence (out of water portions). Vegetated swales or vegetated buffer strips may also be used when possible to intercept runoff allowing sediment to settle out and be captured by the vegetation.

Structural controls should be installed where appropriate to trap sediment, reduce runoff velocity, and allow for settling of turbid waters. To ensure proper functioning and to avoid catastrophic failure, all structural controls should be regularly inspected, maintained and repaired as needed. Controls should be inspected at least weekly during the rainy season and at two-week intervals during the non-rainy season. Structural controls include the following.

Sediment or silt fences should be used in areas of upland disturbance to trap sediment and filter sediment laden runoff during construction. Fences should be used along the perimeter of the project, below the toe or down slope of exposed and erodible slopes, along streams and channels, and around temporary spoil areas and stockpiles. Fences should not be installed in streams, channels, drains, or areas of concentrated flows.

Sediment fences should be installed and maintained to maximize sediment control. Fences should be entrenched and keyed to prevent runoff from escaping beneath the fence. Fences should be installed parallel to the slope with the ends of the silt fence turned uphill so water does not flow around the fence. Fences should remain in place until the disturbed area is permanently stabilized. Split, torn, slumping, or weathered fabric should be repaired or replaced immediately. Accumulated sediment should be periodically removed in order to maintain the effectiveness of the fence. Sediment should be removed when the accumulation reaches one-third of the barrier height.

Detention basins or settling basins may be used to capture runoff and settle sediments. Check dams may also be used to reduce flow velocity and contain sediment. Structure Inlets and outlets

should be regularly monitored for damage or obstruction and repaired as needed. Accumulated sediment should be periodically removed in order to maintain the effectiveness of the structures. Sediment should be removed when the accumulation reaches one-half of the structure's storage volume.

For dredging projects, dredged areas should be confined to the areas used for navigational access to the facility. Dredged areas should be enclosed by a floating silt curtain. If upland spoil disposal areas are used, they should be constructed to contain the spoils and prevent the dredged materials from reentering the waterway after removal. Such disposal areas should be enclosed by a sediment fence.

A supply of erosion control materials (e.g., silt fence and straw bales) should be on hand to respond to sediment emergencies as appropriate. Sterile straw or hay bales should be used when available to prevent introduction of weeds.

For projects where some or all of the work area may be inundated, project operations should be suspended should high flow conditions threaten to inundate any spoil disposal area or areas on the bank where construction equipment is operating.

Tarps, nets, or other measures should be in place to prevent construction debris from dropping into the waterbody. Any material that does enter the water should be removed with a minimum disturbance to the streambed and water quality.

Onsite workers should be trained in identification, storage, and disposal of hazardous and solid waste. All hazardous waste should be collected, removed, and disposed of at authorized disposal areas.

All pollutant leaks and spills should be cleaned up immediately. For significant or hazardous spills that cannot be controlled by properly trained onsite workers, the appropriate emergency responders and regulators should be notified and a spills contractor or a Haz-Mat team should be employed as needed for site cleanup.

Work Area Isolation Management Practices

Measures should be implemented to minimize the adverse effects of water quality impacts by installing a barrier to separate the work area from flowing water and fish.

A floating silt curtain should be used during ground-disturbing activities to isolate inwater work areas from the waterway during construction. Use of the floating silt curtain should help contain turbid water and facilitate settling of suspended sediments. Use of the floating silt curtain should also effectively exclude fish from the work area. Upland work areas, including spoil disposal areas, should be enclosed by a sediment fence.

The silt curtain should be made from appropriate materials such as high strength woven geotextiles or monofilament fabrics that are impervious to sediment and fish. Curtain installation should include a chain ballast or other weight along the lower edge of the curtain to extend the curtain to within approximately 1 foot of the streambed, or according to manufacturer's instructions.

The work site should be isolated from the waterbody prior to construction. No dewatering of the site should occur. Isolation materials should not be removed from the site until after construction

is complete.

Work should be completed during the period when ODFW guidelines indicate fish are least likely to be affected and fish presence is minimized. No capture of fish is typically necessary. In the event that any ESA listed fish are trapped in the work area, such fish should be captured by ODFW staff or a competent fisheries biologist in accordance with all applicable rules and guidelines, after which all fish should be released at a safe release site.

Safe fish passage around the project area should be maintained. Upstream and downstream fish passage should not be impaired during or after project completion.

Removal of Existing Structures Management Practices
Measures should be implemented to minimize potential effects on the aquatic environment from removal or demolition operations.

For monolithic concrete structures, such as cast-in-place boat ramps and abutments, concrete should be broken into manageable pieces and removed from the waterway. Individual concrete components such as concrete ramp planks should be removed whole to the extent practicable. Site preparation for the replacement structure may require excavation of any existing riprap abutting the project site. If any excavated riprap is found to be suitable for reuse (durable, angular rock), it should be temporarily stockpiled above the water line. All other demolition spoils should be disposed of in an appropriate upland location.

Existing docks should not be demolished on site, but should be removed from the waterway for disposal.

Existing pilings should be extracted and removed from the waterway according to *Piling Removal Management Practices*, below.

Piling Removal Management Practices
Measures should be implemented to control turbidity and sediments re-entering the water column during pile removal, and to dispose of removed piles and debris.

Existing pilings within the project footprint should be extracted using direct pull and/or vibratory techniques in accordance with the following resource protection measures.

Vibratory extraction is the preferred method of piling removal and should be used where available and feasible depending on piling condition and substrate type. Vibration reduces friction between the pile and substrate to avoid disturbing large amounts of sediment. Typically little or no sediment remains attached to the pile during vibratory withdrawal.

When appropriate for the substrate type and structural integrity of the piling, a crane or excavator may be used to pull the pilings out of the sediment. To the extent practicable, pilings should be removed in their entirety; however, no jetting, excavation, or other significant disturbance of the sediment should occur to facilitate piling removal.

Work should be done during low water/ low tide to the extent possible. Individual piles should be removed slowly to ensure sediment disturbance and resulting turbidity in the water column is minimized. All sediment and contaminants associated with removed piles should be contained during handling and transport to prevent re-introduction to the water. No effort should be made to remove sediment or other material from chemically treated piles, either in or over the water. After

removal, the pile should be moved directly from the water to a sediment containment area.

In the event that the pile breaks at or near the existing mudline and cannot be removed, the pile should be cut off at least 1 foot below the mudline. For creosote treated piles, the remaining stump should be covered with clean sediment. Any other holes remaining after piling removal should not be filled.

All floating surface debris should be collected and disposed of along with the piling. All wooden piling treated with preservatives, together with associated sediments, and debris from piling removal should be permanently removed from the water and disposed of at a facility approved for collection of hazardous waste. Extracted piles and debris should be placed in a lined stockpile area or directly loaded into transport container or vehicle. Appropriate controls should be used to prevent runoff from leaving the stockpile and entering surface water or ground water. Steel pipe piling may be recycled or reused if the piling condition is suitable for reuse.

Piling Installation Management Practices
Measures should be implemented to minimize both the potential injury to fish in the project area from pile driving operations, and the effects on predation in the aquatic environment. To avoid water quality degradation from contaminants, piling materials should be limited to concrete, steel or other inert materials; no treated wood should be used.

Piling should be driven with a vibratory hammer to the maximum extent possible, with limited impact pile driving as necessary. If impact pile driving is required, a sound attenuation device, such as a bubble curtain, should be employed.

All installed pilings should be fitted with devices to prevent perching of birds.

Launch Ramp Construction Management Practices
Measures should be implemented to minimize potential water quality effects due to boat ramp construction. Where appropriate for the site conditions and characteristics, consideration should be given to designs including use of trench drains, trapped catch basins, or other features to manage and treat stormwater runoff after construction is complete.

The boat ramp site should be isolated from the waterway using a floating silt curtain to exclude fish and to contain turbid waters resulting from excavation, grading, and placement of fill materials.

No uncured concrete or runoff from uncured concrete should be allowed to enter the water. The concrete boat ramp should consist of pre-cast concrete planks below the active waterline, and all cast-in-place portions of the ramp should be completed in the dry. Pre-cast concrete planks should be poured and cured at an upland facility located offsite. Use of cast-in-place concrete for ramp construction should be limited to portions of the ramp located two or more feet above the water surface elevation at the time of construction.

Launch Ramp Armoring Management Practices
Measures should be implemented to minimize potential water quality effects due to riprap placement.

Cut or fill slopes below normal high water elevation should be armored with clean (i.e., free of fines) riprap.

Riprap should be placed along both sides and at the toe of all boat ramps to prevent current, waves, boat wake, and prop wash from eroding or undermining the structure. Typical riprap size is ODOT Class 100 in lakes and reservoirs and ODOT Class 700 in rivers and at all ramp toes.

The armored area should not exceed two feet wide on the ramp edges or four feet wide at the ramp toe. Riprap should be clean and free of fines. Geotextile fabric should be installed to prevent the underlying sediment from being washed out through the openings of the riprap. Riprap should be placed in a controlled manner to minimize sediment disturbance.

Dock Construction Management Practices
Measures should be implemented to minimize potential water quality effects due to dock construction.

Use of wood treated with preservatives for docks construction should be minimized. All use of treated wood should comply with specific permit conditions for each individual dock project. Dock sections should be constructed at an upland facility located offsite. Synthetic flotation material should be permanently encapsulated to prevent dispersal of foam particles in the water.

Completed dock sections should be launched from the adjacent boat ramp, if available, or lowered into the water using a crane, excavator, or similar equipment operating from the top of bank. Dock sections should be connected together and anchored to piling and/or the boat ramp abutment. No portions of the dock should be allowed to ground out on the bed of the waterway. When installed in reservoir locations, the dock may be designed for ground contact during reservoir drawdown.

Dredging Management Practices
Measures should be implemented to minimize sediment resuspension, and potential effects on the aquatic environment from dredging operations.

Wherever possible, dredging should be conducted using an environmental clamshell bucket that seals closed in order to minimize the release and redistribution of dredged material to the water column during dredging. In the event that large woody debris or other obstructions must be removed from the dredge prism, or the environmental bucket cannot successfully remove sediment or substrate, a standard clamshell bucket may be used.

Dredging should be accomplished in a manner that minimizes the resuspension of sediment in the water column. Suction dredging may cause less turbidity in the waterbody than clamshell, dragline or other mechanical removal methods; however, removal of excess water from spoils generated from hydraulic dredging creates additional runoff that should be treated to remove sediment and contaminants before returning to the waterway.

For mechanical dredging, full depth cuts should be taken whenever possible to completely fill the dredge bucket with sediment. No stockpiling of material below the water surface should be allowed. The filled bucket should pause at the water surface to release excess water. The bucket should be completely emptied of sediments before returning the bucket to the water. Spoils should be dewatered in an enclosed spoil disposal area to allow regulation and treatment of supernatant as needed to meet water quality requirements for return water.

Barges and other floating equipment should be operated in a manner to avoid grounding at all

times. The contractor should ensure that no fuel, garbage, or debris enters the water from the dredge or any vessels associated with the project.

Additional Information
In water work typically requires authorization from Department of State Lands and US Army Corps of Engineers. All such work designed or funded by the Oregon State Marine Board should be performed in accordance with applicable permits and their attachments, including the DEQ 401 Water Quality Certification and NOAA Fisheries Biological Opinion, if any. Work should be conducted during the ODFW in-water work period as specified in "Oregon Guidelines For Timing Of In-Water Work To Protect Fish And Wildlife Resources," dated June 2008, or the latest superseding edition.

When extenuating circumstances require in-water construction work during other time periods, written approvals must be obtained from regulatory agencies for such in-water work outside of the authorized work window. ODFW inwater timing guidelines are available online at: http://www.dfw.state.or.us/lands/inwater/Oregon_Guidelines_for_Timing_of_%20InWater_Work2008.pdf.

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

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