

**Highway Maintenance
Specification Sections**

**2.260 Drainage
Appliance
Maintenance**

Available at:

http://www.th.gov.bc.ca/BCHighways/contracts/maintenance/Schedule_21_Maintenance_Specifications.pdf

5.7 Shore, Bank, and Watercourse Management

To protect highway safety and stability, shore, bank and watercourse management activities include the removal of obstructions, beaver dams, and debris from natural and man-made shores, banks, and watercourses and the placement of riprap for bank protection.



Environmental Issues

Primary environmental issues relating to routine shore, bank and watercourse management activities are summarized in the following table. It should be noted that site-specific conditions might present additional issues you will need to address in planning and undertaking your works.

Work Activity	Potential Environmental Impacts	Performance Standards and Legal Requirements
Obstruction, Beaver Dam, and Debris Removal	May introduce sediment or other deleterious substances to a watercourse through removal activities	No release of any substance that could be deleterious (toxic) to fish or fish habitat (<i>Fisheries Act</i> , Sections 34(1) and 36(3)). Deleterious substances include, but are not limited to, gasoline, oils and sediment.
	May damage riparian vegetation or disturb wildlife through the removal of trees adjacent to watercourses	No harmful alteration, disruption or destruction of fish habitat without authorization (<i>Fisheries Act</i> , Section 35(1)). No injury, molestation or destruction of a bird, its egg, and occupied nest, or the nest of an eagle, Peregrine Falcon, Gyrfalcon, Osprey, heron, or Burrowing Owl, unless the species is listed under Schedule C as exempt from this protection (<i>Wildlife Act</i> , Section 34). No killing, capturing, injuring, taking or disturbing migratory birds or damaging, destroying, removing or disturbing their nests, unless permitted under the <i>Act</i> (<i>Migratory Birds Convention Act</i>)

Shore, Bank and Watercourse Management

Work Activity	Potential Environmental Impacts	Performance Standards and Legal Requirements
Obstruction, Beaver Dam, and Debris Removal	May damage fish and wildlife habitat through removal of beaver dams	No harmful alteration, disruption or destruction of fish habitat without authorization (<i>Fisheries Act</i> , Section 35(1)) No disturbance, molestation or destruction of a beaver house or den, unless undertaken to provide irrigation or drainage under lawful authority for the protection of property, or if the action is authorized by regulation (<i>Wildlife Act</i> , Section 9). In these circumstances, specific restrictions including the requirement for landowner approval apply
Bank Protection (Riprap)	May harmfully alter shorelines and channel banks through the placement of riprap materials No harmful alteration, disruption or destruction of fish habitat without authorization (<i>Fisheries Act</i> , Section 35(1)).	No harmful alteration, disruption or destruction of fish habitat without authorization (<i>Fisheries Act</i> , Section 35(1)). No alteration of a stream unless authorized by an approval, licence, or order (<i>Water Act</i> , Section 9), or through a Notification (<i>Water Act</i> Regulation, Part 7)
	May introduce sediment or other deleterious substances to a watercourse through site preparation for riprap placement or the placement of silt-laden or acid-rock riprap materials	No release of any substance that could be deleterious (toxic) to fish or fish habitat (<i>Fisheries Act</i> , Sections 34(1) and 36(3)). Deleterious substances include, but are not limited to, gasoline, oils, sediment, and acid-rock leachate



Environmental Best Practices

The following BPs have been compiled for routine maintenance works that do not require a *Water Act* Notification or further approvals from regulatory agencies (i.e., works on non-fish bearing roadside runoffs, ephemeral channels which do not contain fish habitat). Should your works require a *Water Act* Notification or DFO authorization (i.e., works on ditches or watercourses which contain fish and other aquatic species or fish habitat), more detailed BPs will be provided to you by the regulatory agency in response to your application.

The BPs provided in this document are provided as guidelines to help you ensure your works are completed in compliance with the performance standards and environmental legislation. Please note that the general BPs apply for most work activities within this category; if BPs specific to the activity are available they are also noted below.

Regulatory Agency Contact

- Prior to beginning your planned shore, bank and watercourse management activities, identify any sensitive habitat areas including wetted ditches and natural watercourses—streams, lakes and marine foreshores—found within your work area.

- Determine how much impact your required works will have on the identified areas. Are you planning to install riprap along a bank on a non-vegetated roadside drainage ditch that only conveys storm water or a large area of marine foreshore? Are you required to remove trees from riparian areas to prevent future blockages? Will you be impacting areas of vegetation along a lakeshore as a result of your riprap placement? Are there any areas within your jurisdiction prone to regular debris accumulations or erosion issues? By asking these questions, you should be able to identify any planned works or areas that may be of concern to regulatory agencies.
- Meet with the appropriate regulatory agency contact, as listed in Section 8, to discuss site-specific environmental protection measures. Refer to Section 7 for information on the Memorandum of Understanding with MoE, and the recommended protocol for maintaining regular communications with regulatory agencies.

Assessing Potential Risks

Watercourses can generally be divided into the following three classes based on their habitat value and the level of protection they require:

1. Any fish-bearing wetted channel
2. Any wetted channel where fish may not be present yet which provides food, nutrients, or cool water to downstream watercourses and habitat for other aquatic species
3. Any non-fish-bearing channel which dries after rainfall and provides insignificant food, nutrient or habitat value

Consider what type of watercourse you will be working in when assessing the level of regulatory agency contact your works will require.

If you are planning work in or around watercourses that provide direct or indirect fish habitat, contact MoE and DFO.

Timing of Works

For most work activities within this category, the following general BPs apply:

- Works are preferably undertaken during periods of dry weather (e.g., summer) as this allows easier control of sediment. Typically this is also a less sensitive period for fish and wildlife than other seasons. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances.
- If your maintenance activities require work instream, you must schedule them to coincide with your region's instream work window. Contact your local MoE and DFO offices for further information on timing windows in your District.

Emergency Debris Removal or Erosion Protection Works

- If there is a demonstrable risk posed to highway stability and safety by debris or other materials limiting drainage within or across the highway right-of-way during a flood event, it is appropriate for you to undertake works to reduce the flood threat as soon as possible. Where possible, notify your local MoE Habitat Officers and DFO Habitat Management staff before beginning your debris removal works or as soon as you are able. Limit your work to only that which is required to reduce the threat to the highway and associated structures. Take steps to minimize your impact to watercourse structures and vegetation and ensure that appropriate measures (e.g., erosion and sediment control, re-vegetation) are in place to mitigate any impacts resulting from your work.

Important Note:

The *Water Act* (Section 44 (1)(p)) permits MoT to remove obstructions as an emergency measure if the dams are obstructing bridges or road culverts during flood conditions. The *Water Act* (Section 44 (1)(o)) also permits the construction or placement of erosion protection works or flood protection works during a **flood emergency**. However, DFO may view dam removal works or riprap placement as causing a harmful alteration, disruption, or destruction (or “HADD”) of fish habitat and require you to obtain an authorization for your works under Section 35 (2) of the *Fisheries Act* prior to undertaking the works.

For information on emergency works and application submission requirements, contact your local DFO Habitat Management staff and MoE Habitat Officers or review *MoE's Standards and Best Practices for Instream Works* document at:
<http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

Site Management

- Minimize disturbance to areas surrounding the worksite. Avoid impacts to surrounding trees and shrubs when preparing your worksite and undertaking your maintenance works. To assist with bank stability and invasive plant prevention, leave topsoil and root systems intact within your work area.
- Ensure any riprap works to armour eroding banks or shores retain the pre-work channel or shore conditions (e.g., streambed profile, substrate, channel cross-section) as much as possible and do not constrict the stream width.
- Apply native grass and ground cover seed mixes to exposed soils to reduce the risk of invasive plant establishment.

Beaver Dam and Debris Obstruction Removal

- Remove the dam or obstruction in a controlled manner. Notch the centre of the structure and allow the level of water impounded behind the obstruction to slowly drop.
- Allow water levels on both sides of the obstruction to stabilize before the next level drop; this helps to minimize silt release and reduces the risk of erosion to downstream banks.
- Consider the placement of sediment control measures (i.e., floating silt curtain) downstream to minimize the risk of sediment discharge to downstream areas during obstruction removal.

Tree Removal

- Only remove trees that pose a significant risk of impacting drainage within the highway right-of-way. Vegetation within riparian areas

DFO Operational Statements:

- Aquatic Vegetation Removal in Lakes

- Maintenance of Riparian Vegetation in Existing Rights-of-Way

DFO has developed a series of “Operational Statements” (OS) to streamline the regulatory review of low risk activities completed in and around water. Each OS outlines measures and conditions that must be implemented to be compliant with Subsection 35(1) of the *Fisheries Act* (i.e., no harmful alteration, disruption and destruction (HADD) of fish habitat).

There are OSs for Aquatic Vegetation Removal in Lakes and Maintenance of Riparian Vegetation in Existing Rights-of-Way which you can access at: (http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/operational_statements_e.htm)

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a significant role in maintaining bank stability, water quality, and habitat value. Unnecessary impacts to it should be avoided.

- Ensure that no bird or wildlife species are currently occupying the tree and that the tree does not contain a protected nest.
- If possible, limit your removal activities to topping the tree. Leave the stump and root mass in place.
- If the site conditions permit, buck the cut portion of the tree and leave on site, above the high water mark in a manner that will prevent its future movement into the watercourse.

Equipment Use

- Select appropriate equipment and work access routes to reduce damage to riparian vegetation and watercourse banks.
- For smaller scale debris and sediment removal activities, remove materials by hand.
- When working near watercourses, operate equipment from the bank or road shoulder. Do not allow machinery to cross through water.
- Ensure all equipment used on site is well maintained and free of fluid leaks. Refuel and lubricate equipment on dry land away from watercourses. Use drip trays to contain any spillage during equipment maintenance.

Worksite Isolation

- Isolate your work area from any flowing water that may be present. Ensure any flows are temporarily diverted around the portion of the ditch or watercourse where you are working.
- Contain any sediment-laden water generated during your works in your isolated work cell. Use a pump to draw sediment-laden water out of the work cell and discharge it to a level vegetated area where sediment can settle as the water infiltrates the ground.

Waste and Materials Containment

- If machinery will be working on site, have a spill response plan in place and spill kits on site.
- Clean equipment and tools off-site, if possible. Ensure that any wash water generated by cleaning tools and equipment is managed in a manner that will prevent its release to watercourses or road drains.
- Dispose of excess materials, excavated soils, and removed debris away from any watercourse. Ensure that the material is placed in such a manner as to prevent its future introduction into any watercourse by installing silt fencing, seeding, or using similar sediment control BPs.

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Erosion and sediment control

- If excavated materials or any other erodible materials are to be left on site, ensure they are placed in a manner that will prevent the introduction of sediment to any watercourse (i.e., temporary covers, grading and seeding, installation of silt fence around spoil piles).
- Install appropriate erosion and sediment control devices (e.g., silt fence installed below disturbed slopes, rock check dams and temporary silt dikes in low velocity, low volume ditches) to prevent the movement of sediment to downstream watercourses. Ensure that any structures installed are maintained and monitored until they are no longer needed (i.e., vegetative cover on seeded areas is adequate to control erosion).
- Use clean materials, free of fine soils that may contribute sediment to the watercourse, when installing riprap or other shore or bank protection measures.

Ditch and Watercourse Maintenance

- Do not dump ditch waste above or below the ditch where desirable vegetation is established. Instead, dispose of waste materials at a designated disposal site. Record and report the source location of the disposed waste or spill materials.
- Minimize soil exposure and removal of desirable vegetation to prevent the establishment of invasive plants.



Key Information Sources

The documents and websites listed below are recommended resources for shore, bank and watercourse management.

They can provide examples of existing protocols and management strategies, as well as additional information on specific operational BPs (e.g., erosion and sediment control techniques).

MoT Technical Circulars:

There are no relevant Technical Circulars authored to-date for this activity.

All Technical Circulars are available at:

http://www.th.gov.bc.ca/Publications/Circulars/Current_technical.asp

Locally Developed BPs

(Provide with any locally-developed BPs):

- *Riprap – Skeena BMPs for Road Maintenance*. 2003. MoT.
http://www.th.gov.bc.ca/publications/eng_publications/best_practices/bp.pdf
- *Removal of Beaver Dams from Culverts at Pre-approved Locations*. 2003. Skeena BMPs for Road Maintenance. MoT.
http://www.th.gov.bc.ca/publications/eng_publications/best_practices/bp.pdf

Other Resources

Standards and Best Practices for Instream Works. March 2004. Ministry of Water, Land and Air Protection.

<http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

Maintenance of Riparian Vegetation in Existing Rights-of-Way – Pacific Region Operational Statement. 2008. Fisheries and Oceans Canada (DFO).

http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/os-riparian_veg_maint_e.htm

Aquatic Vegetation Removal in Lakes – Pacific Region Operational Statement. 2008. Fisheries and Oceans Canada (DFO).

http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/os-aquatic_veg_e.htm

General Best Management Practices to Protect Water Quality website. June 2004. Environmental Protection Division, Ministry of Environment.

http://www.env.gov.bc.ca/wat/wq/nps/BMP_Compodium/nps_bmp.htm

Manual of Control of Erosion and Shallow Slope Movement. August 1997. BC Ministry of Transportation.

http://www.th.gov.bc.ca/Publications/eng_publications/environment/references/Man_Control_Erosion.pdf

Catalogue of Stormwater Best Management Practices. September 2005.

Idaho Department of Environmental Quality

http://www.deq.state.id.us/water/data_reports/storm_water/catalog/index.cfm

Beaver Management Guidelines. 2001. Ministry of Water, Land and Air Protection. Vancouver Island Region.

<http://wlapwww.gov.bc.ca/vir/pa/Beaver-Guide.pdf>



Checklist for Environmental Protection Requirements

- Is your proposed work considered a “routine” maintenance activity? If not, approvals or permits may be required. Contact your local municipal, provincial, or federal regulatory agency staff.
- Has this project been discussed with local environmental regulatory staff? In addition to the BP information presented, other site-specific conditions may apply.
- Have site-specific environmental protection requirements been identified? List below:
 - _____
 - _____
 - _____
 - _____