

Fish and Fish Habitat Protection Best Management Practices for Bridge, Ditch and Road Maintenance Activities within the Peace Region

I. Introduction

The Ministry of Environment in Fort St. John, BC has developed the following set of Best Management Practices (BMP's) to guide proponents conducting bridge, ditch and road maintenance activities in and about Peace Region streams, in an attempt to reduce the risk of adverse impacts from these types of works on aquatic and riparian environments. Proponents planning maintenance activities near watercourses are encouraged to review the document entitled "A Users Guide to Working In and Around Water – Regulation Under British Columbia's Water Act," which is available on-line at http://lwbc.bc.ca/water/brochures/user_guide.pdf, as this document explains the requirements of the Water Regulation, including the Notification process. Changes in and about streams in British Columbia not covered by Part 7 of the Water Regulation must be authorized under Section 9 of the Water Act. Both the Water Regulation and Water Act can be found on the Revised Statutes and Consolidated Regulations of British Columbia website <http://www.qp.gov.bc.ca/statreg/>. Please be advised that these BMP's do not supersede the requirements of the Water Act, Water Regulation, Federal Fisheries Act or any other related legislation and non-compliance with standards, notification requirements and other general conditions could result in penalties under these legal entities. If proposed in-stream activities are thought not to comply with the upfront direction provided within this document, the proponent must contact the Peace Region Ministry of Environment – Ecosystem Management Section at 787-3411, for further direction.

II. Project Development Considerations for the Protection of Fish & Fish Habitat

A) Window of Least Risk

1. The window of least risk refers to the time of year when in-stream activities are likely to have the least amount of impact to fish and fish habitat. The Canadian Federal Fisheries Act (<http://laws.justice.gc.ca/en/F-14/>) defines fish and fish habitat as follows:

Fish - all fish, shellfish, crustaceans and marine mammals, and the eggs, spawn, spat and juvenile stages of fish, shellfish, crustaceans and marine mammals.

Fish Habitat – the spawning grounds, nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

Timing windows reduce the risk of damage to critical spawning, rearing or over-wintering habitat and protect eggs/juvenile fish present in a given system. Appendix A summarizes the window of least risk for several Peace Region fish species. In general however, the window of least risk can be summarized as follows:

Fish Species Affected	Window of Least Risk
Spring Spawners	July 15 – March 31
Fall Spawners	June 15 – August 15
If both spring and fall spawners are known to be present in a system or no fish inventory information is available for a particular stream, the presence of both spring and fall spawners is assumed	July 15 – August 15
Anadromous species	Contact DFO

2. A timing window extending from January 1 through December 31 of a given year exists if:

- i) The stream channel is dry and the maintenance activity will not result in the introduction of sediment to fish habitat
 - ii) On fish streams, the structure does not encroach into the stream channel, no work will be conducted within the stream channel and the risk of sediment delivery to fish habitat is low.
 - iii) On non-fish streams, the maintenance activity is undertaken using an isolated worksite to prevent sedimentation of the watercourse and ensures the protection of downstream water quality.
3. The Department of Fisheries and Oceans Canada (DFO) may require different in-stream work windows for anadromous fish bearing streams. Any in-stream work window requested by DFO takes precedence over the general least risk windows listed previously.

B) Minimum Stream Flow

Natural stream flows must be maintained during all in-stream activities.

C) Isolated Worksite

The in-stream worksite must be isolated from stream flow. Construction site isolation minimizes the erosional and sedimentary impacts that in-stream disturbances can create. Suggested examples of diversions include dam/pump, dam/flume, or other similar structures. In other site specific situations however, silt barriers or fences may be appropriate.

D) Fish Salvage

A fish salvage must be conducted prior to de-watering an area in order to create an isolated worksite on fish bearing streams or streams suspected of being fish bearing. This salvage must be done before any in-stream work activities occur. Fish captured from within an isolated worksite must be returned to a suitable in-stream location. A scientific collection permit is required for salvage operations and can be obtained from the Ministry of Environment – Fisheries Section (Peace Region Office phone: 787-3411). Fish salvage must be conducted by a qualified individual/company.

E) Removal of material from the stream channel, protection of natural materials and vegetation that contribute to habitat or stream channel stability and restoration of the work site after the change has been made.

1. Care must be exercised during all phases of the in-stream work to prevent silt or debris from entering the stream.
2. Retain as much existing riparian and upslope vegetation as possible, when conducting maintenance activities near watercourses, to reduce the erosion potential.
3. As per section 44 (1) (a) (i) and (b) (ii) of the Water Regulation, equipment used to perform in-stream works must operate from the dry (i.e. from the stream banks or dry channel, not from within the wetted perimeter of the stream).
4. Any disturbed or eroded mineral soils occurring as a result of the in-stream activities must be re-contoured and re-vegetated (seeded/planted) using all appropriate measures to stabilize the site and prevent further erosion. Certified seed mixes are to be utilized for reclamation purposes, to reduce the risk of weed invasion and exotic introductions. Monitoring of the reclaimed site must occur to ensure successful plant cover establishment.
5. Excavated material must be stored in a stable area adequately above the high water mark of the stream to prevent this material (sediment or debris) from re-entering the watercourse. If

excavated material is temporarily stored within the floodplain, it must be removed prior to freshet.

6. Sediment and erosion control contingency plans must be written and in place for each project in the event there is:

- An increase in stream flow due to greater precipitation inputs, or
- An increase in overland runoff, or
- Saturation of the work area.

Additional information regarding sediment and erosion control is obtainable from the “Fish-Stream Crossing Guidebook” and the document entitled “Land Development Guidelines for the Protection of Aquatic Habitat.” The FPC document is available on the web at <http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/FishStreamCrossing/FSCGdBk.pdf>, and the DFO guidelines at http://www-heb.pac.dfo-mpo.gc.ca/publications/pdf/guidelines/ldg_e.pdf.

7. Work is to be suspended if the sediment control measures are ineffective. In the event of uncontrolled sediment release, proponents are directed to stabilize and correct the uncontrolled sediment release into streams as soon as possible, and to immediately notify MWLAP and DFO.

F) Addition of substances, sediment, debris or material to the stream or stream channel.

1. As per section 41 (a) (i) and (ii) of the Water Regulation, no substance, sediment, debris or material that could adversely impact the stream (with the exception of approved fish habitat enhancement works) is permitted to enter the stream or stream channel without the specific consent of MWLAP and DFO.
2. Ensure equipment utilized during in-stream works:
 - Is clean and in good operating condition (i.e. no hydraulic leaks)
 - Is fuelled at least 100 m away from any watercourse
 - Has an appropriate number of spill kits.
3. Any rock used as rip rap for erosion control/stabilization material must be:
 - Durable, clean and free of organic debris
 - Angular in shape, large enough in size and keyed into the banks to prevent movement under various hydrological conditions
 - Placed in a manner that does not constrict the stream channel.
4. Any cast in place concrete must be isolated from fish bearing waters until completely set (approximately 48 hrs).

Mitigation

1. No net loss of habitat is authorized by this document.
2. DFO habitat technologists may authorize a net loss of fish habitat where mitigation/compensation packages can be negotiated between themselves and the proponent.

III. Requirements of the Department of Oceans and Fisheries Canada (DFO)

DFO is to be consulted for those projects/activities in and about a stream that can negatively impact fish and/or fish habitat (HADD's). DFO habitat staff can be reached at the following:

Department of Fisheries and Oceans Canada - Habitat Enhancement Branch, Prince George, BC
Phone: (250) 561 – 5366 Fax: (250) 561 - 5534

IV. Best Management Practices

A) Bridge Maintenance

Maintenance Objectives: Remove dirt, de-icing compounds, and winter abrasives from structures to ensure the long-term integrity of the structure.

Fish Habitat Objective: Ensure that fish habitat and water quality are protected from the negative effects of bridge cleaning through appropriate timing of operations, routing silt laden or otherwise contaminated waters away from watercourses and appropriate screening of pump intakes for stream water diverted for bridge cleaning.

1. All drain holes must be plugged prior to any bridge cleaning activities, to ensure wash water is not discharged directly into the watercourse.
2. All loose materials on the bridge deck must be initially swept (i.e. vacuum sweeper, hand swept etc.) or shoveled off prior to proceeding with pressure washing or cleaning.
3. Swept material is to be disposed of a minimum of 15 meters from the stream bank, and not into a ditch or channel directly connected with the stream, regardless of ditch or channel flow at the time of removal.
4. Pressure washing of the bridge should proceed in such a manner that dirty water, salts and other materials are flushed towards either or both ends of the bridge approaches, where the topography and soils make this feasible, (i.e. will not erode the banks or abutments). This action will allow some filtering of pollutant-laden water prior to its entry back into the watercourse.
5. Bridge washing operations using ingredients other than water, such as degreasers or other chemicals must be pre-approved by the Department of Fisheries and Oceans (DFO) and the Ministry of Environment.
6. If water is extracted from a fish bearing watercourse, it must be diverted under approval of the Water Act. To prevent death or damage of juvenile salmonids, the water intake must be screened to the specifications outlined in the DFO document “Freshwater Intake End-of-Pipe Fish Screen Guideline.” This guideline is available at <http://www.dfo-mpo.gc.ca/Library/223669.pdf>.
7. Bridge washing should be carried out during the period of time in the region, typically May and June, where flows are naturally high and turbid and sediment load is at its maximum. This will provide sufficient dilution of the polluted wash water.
8. As per the direction provided within the Fish-Stream Crossing Guidebook, when grading bridges and their approaches, gravel, sediment and other deleterious materials (such as winter salts), must not be permitted to enter watercourses. The installation of gravel guards on bridge decks, curbs along bridge approaches and grading away from the bridge deck are mitigative options that will reduce the risk of these substances entering the stream during grading.

B) Bridge Vegetation Control

Maintenance Objective: Promote drying and facilitate inspections of bridges.

Fish Habitat Objective: Retain as much riparian vegetation as possible near the stream

1. Brushing adjacent to bridges includes the area under the bridge extending to a maximum of 3 m upstream and downstream
2. To assist in maintaining as much riparian value as possible, the amount of vegetation cut adjacent to the stream will be reduced where the maintenance objective can still be met.

C) Bridge Deck and Superstructure Repairs

Maintenance Objective: Ensure the integrity of the structure by replacing or augmenting deteriorated bridge material.

Fish Habitat Objective: Preventing deleterious materials from entering streams.

Timber Structures

1. Any accumulated dirt on the bridge must be removed before the initiation of repairs.
2. If there is potential for dirt or deleterious wood matter to enter the stream, then the area is to be tarped off prior to the initiation of works. Alternatively, containment berms with hand removal can be pursued.
3. Plan work to minimize the need to cut treated material in place. Cuttings are to be collected where possible and disposed of away from the watercourse or ditches.
4. Cut ends are not to be treated over the stream due to toxicity of treatment compounds.
5. Many wood preservatives (i.e. creosotes, chlorophenols zinc etc.) are extremely toxic to the aquatic environment. If such products are to be used in or near watercourse, proponents must ensure that use is in accordance with the direction provided in the “Guidelines to Protect Fish Habitat from Treated Wood used in Aquatic Environments in the Pacific Region” and “Best Management Practices for the Use of Wood in Aquatic Environments – Canadian Version.” The first document is obtainable from <http://www.dfo-mpo.gc.ca/Library/245973.pdf> and the latter from <http://www.wwpinstitute.org/pdffiles/bmpsinaquatic2.pdf>. Health Canada’s Pest Management Regulatory Agency identifies a variety of wood preservative products approved for use in Canada. More information regarding approved wood preservative products can be obtained from this agency toll free at 1-800-267-6315 or on-line at <http://www.hc-sc.gc.ca/pmra-arl/english/index-e.html>.
6. Prior to replacement, any treated wood should be rinsed several times (ensure wash water is properly disposed of – not discharged into any watercourse) or weathered for 45 days before introduced into the aquatic environment.
7. Where long term structures or pilings are required, steel structures should be considered as an alternative to pressure treated wood products.

Concrete Structures

1. Removal of old concrete must be conducted in a manner that captures broken out materials.
2. As wet cement/concrete is highly toxic to aquatic organisms, there is to be no contact with the stream water either through spillage, hosing off surfaces, rain, cleaning of tools, etc.
3. Cast in place concrete to be completely separated from fish bearing waters until the pH of the compound has reached neutral levels and has fully set (approximately 48 hours). Waterproof forms must be used for cast in place concreting maintenance activities.

Steel Structures

1. No deleterious substances are to enter the stream.

D) Bridge Spot Painting Procedures

Maintenance Objective: Spot painting on steel or wood superstructures to address areas where existing paint has failed.

Fish Habitat Objective: Prevent deleterious materials from entering streams.

1. Rust and other contaminants are to be removed by hand and mechanical means (e.g. chippers, scalers, wire brushes).
2. Sandblasting should be considered only where no other method is practical. If sandblasting is used, precautionary measures (i.e. tarping work area) must be implemented to reduce the risk of abrasive material from entering the streams.
3. No loose rust or paint chips are to enter the watercourse or floodplain zone.
4. Since wet paint is highly toxic to aquatic organisms, care is to be taken to prevent any paint from entering the stream.
5. Painting should be done by hand. Spray painting is permitted where tarping is provided contain overspray.
6. For larger patches, spot painting should conform to DFO's Technical Report No. 1692. – Guidelines for Protection of Fish and Fish Habitat During Bridge Maintenance Operations in British Columbia (Samis et al., 1991).

E) Road and Ditch Maintenance

Maintenance Objective: To maintain the roadway in such a way as to ensure that designed works meet safety and engineering objectives.

Fish Habitat Objective: Minimize erosion, sediment loading and the potential for other deleterious materials from entering watercourse.

Sediment management

1. Road surfaces should be graded only as often as required to maintain a stable running surface and adequate surface drainage.
2. Erosion control features should routinely be inspected, maintained and adjusted based on the construction stage or inspection findings.
3. Avoid cutting the toe of slopes or otherwise changing the stability of slopes during maintenance.
4. Snow removal should be done in such a way that barriers to water flow are not incidentally created.
5. Ditch and culvert clean-outs should be conducted prior to spring run-off or after peak flows, when flows are minimal.
6. Materials collected during earth work in and around the road right-of-way should be relocated away from any watercourses and promptly seeded or otherwise stabilized to minimize erosion and sediment transport of these materials.
7. Earthwork should be conducted during dry conditions and promptly stopped during periods of high rainfall.
8. A qualified technician or engineer should help identify areas of erodible soils and unstable areas, and to locate appropriate road surface materials. Subsequently, a qualified technician or engineer should review areas of continual failure or systemic problems to provide an appropriate level of technical advice and design plans to address the problem.

9. Water management should be approached in such a way that flow volumes and velocities are minimized through design features, including dissipating water energy through cross ditches or elevation controls and directing water flow into vegetated areas.
10. Ditch design should take into consideration the physical nature of soils. Appropriate level of design must be incorporated to minimize erosion potential or the potential for failures.
11. In areas of high sediment load and transport, structures such as sediment collection basins, or areas of natural filtration should be incorporated into the ditch design to reduce sediment transport to existing watercourses.
12. Abandoned or decommissioned roads should be reclaimed in such a way to reestablish natural water pathways.
13. Planning and design of sediment control structures should be incorporated into construction plans where significant modifications to the right-of-way are planned. This should include all aspects of new works, such as temporary and long-term permanent erosion control features and should have a level of inspection and monitoring as well as maintenance built into the plan.
14. Reclamation and revegetation should also be promptly completed on borrow pit or quarry areas.

Vegetation management

15. Herbicide should be applied based on manufacturer and Regulatory Agency contract specifications to ensure that these materials do not enter streams after application and that staging areas are not in close proximity to watercourses.
16. During herbicide application, in the event of precipitation, all activities must cease immediately, as there is an increased risk of chemical transport via surface runoff to watercourses.
17. An integrated approach of manual, chemical, mechanical and preventative means should be used for weed and pest control.
18. Herbicide and other pesticides must be used during the optimum time for control of the target species.
19. Vegetation cover must be maintained where possible to reduce erosion potential.
20. Where vegetation control is required, woody species should be removed while maintaining herbaceous species intact.

Dust Suppression

21. Dust suppressant compounds must be applied under suitable dry conditions to minimize the risk of entry into watercourses.
22. Tank flushing must not occur in the field.
23. Gravel berms or other temporary containment works must be utilized in areas where there is potential to enter watercourses.
24. Only those approved products, free of compounds that are detrimental to the environment, are to be used for dust suppression, on roads in close proximity to streams, where the risk is greater of impacting the watercourse.

Additional Sources of Information

Numerous documents were reviewed for the formulation of this BMP. Additional sources of information, excluding those already identified within the text of this document include:

Alberta Environment. April, 2001. Guide to the Code of Practice for Watercourse Crossings - Includes Guidelines for Complying with the Code of Practice. 29 pp.

Best Management Practices (BMP's) for Forestry in Montana.

<http://www.dnrc.state.mt.us/forestry/ServiceForestryPrograms/BMPs.pdf>

Ministry of Environment, Lands and Parks, Environment and Lands Division. 1999. Fish and Fish Habitat Protection Best Management Practices - Vancouver Island Region.

Ministry of Environment, Lands and Parks, Environment and Lands Division. 1999. Bridge Maintenance Best Management Practices - Vancouver Island Region.

Ministry of Water, Land and Air Protection. May, 2002. Conservation Measures and Timing Windows for Peace Region Fish Stream Crossings (Excluding the Mackenzie District). Fort St. John, BC.

Samis, S.C., M.D. Nassichuk and B.J. Reid. 1991. Guidelines for Protection of Fish and Fish Habitat During Bridge Maintenance Operations in British Columbia. Department of Fisheries and Oceans Technical Report No. 1692. Pacific Region - Fisheries Branch. Vancouver, BC. 64 pp.

Water Quality General Best Management Practices

http://wlapwww.gov.bc.ca/wat/wq/nps/BMP_Compendium/General/General_Home.htm

Wisconsin Department of Natural Resources - BMP Field Manual

<http://www.dnr.state.wi.us/org/land/forestry/usesof/bmp/bmpfieldmanual.htm>

Appendix A. Least Risk Windows for a Variety of Fish Species Present within the Peace Region.

Species	Least Risk Window
Arctic grayling	July 15 – March 31
Bull trout	June 15 – August 15
Burbot	June 15 – December 15
Chum Salmon	July 1 – August 15
Kokanee	June 1 – August 31
Lake trout	June 15 – August 31
Lake whitefish	June 15 – August 31
Mountain whitefish	June 15 – August 31
Northern pike	July 1 – April 31
Rainbow trout	July 15 – March 31
Walleye	July 1 – April 30
Other species not identified previously in this list	Contact MWALP – Ecosystems Section for more information