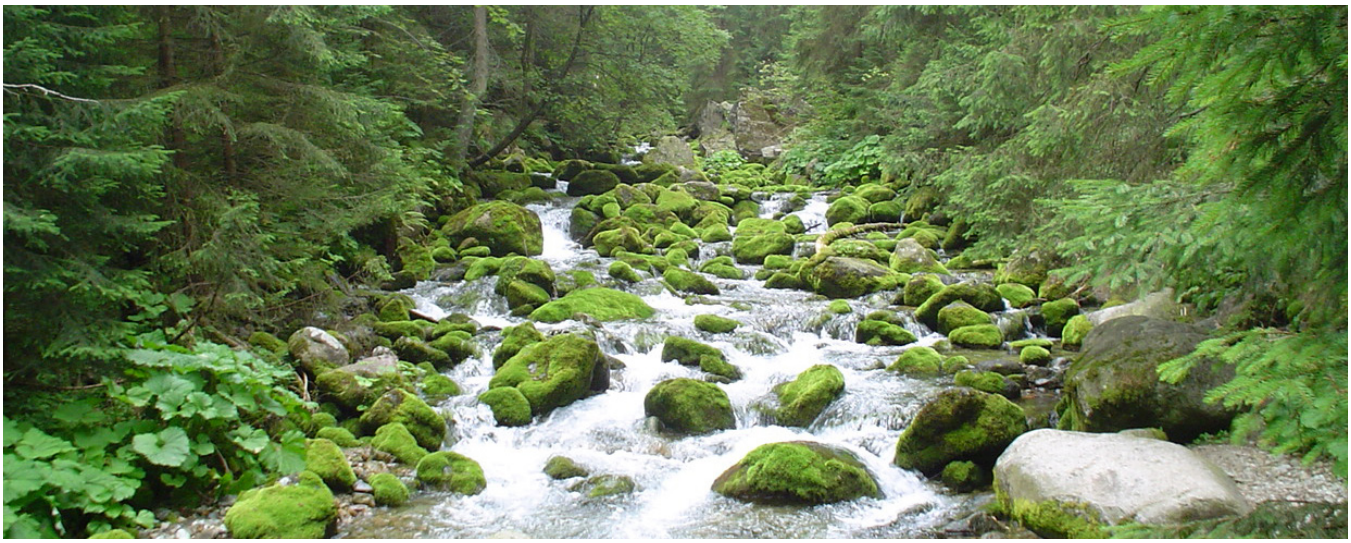
Standards and Best Practices for Instream Works



General BMPs & Standard Project Considerations

Version 1.0

Other Guides in this Series

- **Users Guide**
- **Bank Stabilization**
- **Beaver Dam Removal**
- **Bridges**
- **Channel Maintenance**
- **Culverts**
- **Habitat Enhancement & Restoration**
- **Miscellaneous Works**
- **Pipeline Crossings**
- **Public Utility Works**
- **Urban Stormwater Management**
- **Wharf, Pier, Dock, Boathouse & Mooring**

Supporting Documents

- **General BMPs & Standard Project Considerations**
- **Regional Timing Windows**
- **Contact List**
  B.C. Ministry of Environment Contacts
  Fisheries and Oceans Canada (DFO) Contacts
- **Glossary**
- **MOE/DFO Notification, Approval & Authorization Instructions & Forms**

You have accessed this document to obtain further information on General Best Management Practices (BMPs). If your project involves any work in and about a stream, you will need to ensure that you:

- apply the appropriate General BMPs to fulfill the *Water Act* Regulation's Protection of Habitat Section 42(1) and Protection of Water Quality (Section 41) Standards; and,
- understand the federal *Fisheries Act* and ensure that you are in compliance with Section 35 of the *Act* which prohibits the Harmful Alteration, Disruption or Destruction (HADD) of fish habitat and Section 36 of the *Act* which prohibits the release of deleterious substances to a watercourse. Every effort should be made to incorporate applicable Regional Operational Statements into your project. Operational Statements outline measures and conditions for avoiding HADDs to fish habitat and thus allow works to proceed in compliance with subsection 35(1) of the *Fisheries Act*.

British Columbia
The Best Place on Earth

Fisheries and Oceans Canada
Pêches et Océans Canada

General Operational Best Practices

General BMPs detailed below provide Best Management Practices for any project undertaken in and about a stream. General BMPs have been organized into eleven (11) work-site categories and, if applicable, should be incorporated into your project:

1. **qualified professionals (QPs)**;
2. monitoring;
3. timing of works (work windows);
4. **deleterious** substance control/spill management;
5. concrete works;
6. isolation of the work area;
7. salvage of fish and/or wildlife;
8. **erosion** & **sediment control**;
9. vegetation (riparian) management;
10. site restoration; and,
11. temporary diversion.

1. Qualified Professionals (QPs)

In order to assess and manage your project correctly it is strongly advised that you consult an appropriately **Qualified Professional (QP)** or team of professionals, depending on the scale and scope of your project.

Ensure that the assessment and design of your project completed by the professional considers the following:

GBP01	location of **stream** within the **watershed**, **stream** type and **stream** order;
GBP02	seasonal variations in **stream** flow (perennial, intermittent or **ephemeral stream**);
GBP03	local soil characteristics, composition and stability;
GBP04	compliance with the fedaral *Species at Risk Act* and provincial Red and Blue lists;
GBP05	existing or potential fish and wildlife use, aquatic and riparian habitat;
GBP06	access-related disturbances from machinery or other equipment (if required);
GBP07	existing bank morphology and potential impacts or changes to the channel;
GBP08	site **erosion** dynamics;

GBP09 potential **erosion** or sediment movement resulting from proposed works. Local currents and associated patterns of sediment transport, deposition, local shoreline and accretion dynamics should be considered in lake settings;

GBP10 stabilization techniques (e.g. vegetated or integrated) for implementation to prevent **Harmful Alteration, Disruption or Destruction (HADD)** of fish habitat through the release of **deleterious** substances (see **General BMPs and Standard Project Considerations: Erosion and Sediment section**);

GBP11 habitat features, such as planting of native vegetation ecologically suited to the site conditions (i.e., suited to the **biogeoclimatic subzone** and **site series**) above the **high water mark (HWM)**;

GBP12 use of natural materials, such as live vegetation and, where required, natural **acid free rock**;

GBP13 use of native shrubs, live stakes or live bundles techniques into proposed rockwork, together with sufficient rooting soil to ensure vegetation growth and survival;

GBP14 maintenance of existing wildlife access to the watercourse;

GBP15 prevention of anthropogenic material use (e.g. broken concrete, tires and other materials);

GBP16 design and/or locate the project to minimize the project works **footprint** and associated **foreshore** disturbance;

GBP17 addressing prevention of spread or colonization of **invasive species**;

GBP18 avoidance of impacts to other properties or services;

2. Monitoring

GBP19 construction activities for your project should be monitored full-time during start-up through to project completion for works including instream activities, sensitive activities (e.g. **fish salvage**) and any other construction activities;

GBP20 use of a qualified **environmental monitor**, who is an appropriately **qualified professional** and is provided with written authority to modify or halt any construction activity if it is deemed necessary to do so for the protection of fish and wildlife populations or their habitats;

GBP21 post a sign at the entrance to your job site or in the immediate vicinity listing the monitor's name, affiliation and phone number;

GBP22 a copy of the section of this document listing the Standards and Best Practices for your works and all appropriate plans, drawings, and documents should be provided to contractors and crew supervisor. This information should be readily available on-site while your work is proceeding;

GBP23 a pre-construction meeting should be held that includes the **environmental monitor** and persons undertaking work on-site to ensure a common understanding of the Best Practices for the project, safety, responsibilities reporting, Response Plans, etc;

GBP24 complete and submit a Monitoring Report from the project **environmental monitor**, if required, within 60 days of project completion to the authority (e.g. municipality, DFO and/or MOE) requesting monitoring be conducted;

3. Timing of Works

GBP25 where fish or **Species at Risk** are present, schedule works during reduced risk **Regional Timing Windows**. If absence cannot be definitively confirmed, complete in-channel or bank work during reduced risk **Regional Timing Windows** as identified by the Ministry and DFO;

GBP26 protect nesting birds by only clearing vegetation for worksite access during **Regional Timing Windows**;

GBP27 avoid in-channel work wherever possible when the presence of **species at risk** are known or expected, as **species at risk** typically have no window of reduced threat;

GBP28 undertake works during favourable weather and low water conditions to minimize impacts to the watercourse and prevent release of **deleterious** substances to a watercourse and **Harmful Alteration, Disruption or Destruction (HADD)** of fish habitat;

GBP29 avoid work during wet and rainy periods to prevent release of **deleterious** substances to a watercourse and **Harmful Alteration, Disruption or Destruction (HADD)** of fish habitat;

GBP30 complete works as quickly as possible once they are started to minimize impacts and disturbance to fish and wildlife species;

4. Deleterious Substance Control/Spill Management

GBP31 prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate, or any other **deleterious substances** into any ditch, watercourse, ravine, or storm sewer system. Consult DFO's **Land Development Guidelines for the Protection of Aquatic Habitat**, MOE's **Develop with Care** and **General BMPs and Standard Project Considerations: Erosion and Sediment Control** section of this document for sediment and erosion control management measures;

GBP32 ensure that equipment and machinery are in good operating condition, clean (power washed), free of leaks, excess oil, and grease. Do not refuel or service equipment within 30 m of any watercourse or surface water drainage;

GBP33 ensure hydraulic machinery, if required, uses environmentally-sensitive hydraulic fluids that are non-toxic to aquatic life and that are readily or inherently biodegradable;

GBP34 keep a **Spill Containment Kit** readily accessible onsite in the event of a release of a **deleterious substance** to the environment and ensure on-site staff are trained in spill response. Immediately report any spill of a substance of reportable quantities that is toxic, polluting, or deleterious to aquatic life to the ***Provincial Emergency Program*** Environmental Emergency Management Plan Incident Reporting Hotline **1-800-663-3456** and DFO's Observe, Record and Report Hotline **1-800-465-4336**;

GBP35 do not use treated wood products in any construction areas near the stream channel, to prevent the release of preservatives that are toxic to fish (see DFOs **Guidelines to Protect Fish and Fish Habitat from Treated Wood Used in Aquatic Environments** for further information);

5. Concrete Works

GBP36 to prevent release of **deleterious** substances ensure that all works involving the use of concrete, cement, mortars, and/or other Portland cement or lime-containing construction materials will not deposit (directly or indirectly) sediments, debris, concrete, leachate concrete fines, wash or contact water into or about any watercourse;

GBP37 cast in place concrete must remain isolated from water inside sealed formed structures until cured (approximately 48-72 hours), as concrete leachate is highly toxic to fish and other aquatic life;

GBP38 ensure a carbon dioxide (CO2) tank with regulator, hose and gas diffuser is readily available during concrete work to neutralize pH levels should a spill occur. Staff must be trained in its proper use;

GBP39 provide containment facilities for wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment;

GBP40 immediately report any spills of sediments, debris, concrete fines, wash or contact water of reportable quantities to the **Provincial Emergency Program** Environmental Emergency Management Plan Incident Reporting Hotline **1-800-663-3456** and DFO's Observe, Record and Report Hotline **1-800-465-4336**. Implement emergency mitigation and clean-up measures (such as use of CO2 and immediate removal of the material);

GBP41 monitor pH frequently in the watercourse immediately downstream of the isolated worksite until the works are completed. Emergency measures should be implemented if downstream pH has changed more than 1.0 pH unit, measured to an accuracy of +/- 0.2 pH units from the background level, or is below 6.0 or above 9.0 pH units;

GBP42 prevent any water that contacts **deleterious** uncured or partly cured concrete (during activities like exposed aggregate wash-off, wet curing, or equipment washing) from directly or indirectly entering any watercourse or stormwater system;

GBP43 isolate and hold any water that contacts uncured or partly cured concrete until the pH is between 6.5 and 8.0 pH units and the turbidity is less than 25 nephelometric turbidity units (NTU), measured to an accuracy of +/- 2 NTU;

6. Isolation of the Work Area

GBP44 isolate your work areas from all flowing water, but do not cut off flow to downstream portions of the stream at any time during construction (see **General BMPs and Standard Project Considerations: Temporary Diversion** section for further information) and adhere to the appropriate mitigation measures as identified by the Ministry and DFO;

GBP45 temporarily divert, enclose, or pump water around the worksite. Ensure that the point of discharge to the creek is located immediately downstream of the worksite to minimize disturbance to downstream populations and habitats (see **General BMPs and Standard Project Considerations: Temporary Diversion** section);

GBP46 if it is not possible to fully isolate and divert flowing water from your work area (due to water depth and volume) isolate works with a structure (e.g., silt curtain, sheet pile, sand bags, aqua dam, etc.) to keep silty water from entering the watercourse;

7. Salvage of Fish and/or Wildlife

GBP47 complete a fish and amphibian salvage before the start of works if any portion of the wetted channel will be isolated or dewatered. An appropriately **Qualified Professional** must complete the salvage. It is the responsibility of the salvage crew to obtain the necessary permits required by B.C. ***Wildlife Act*** and Canada ***Fisheries Act*** before conducting salvage activities (see MOE **Application to Collect Fish for Scientific Purpose** and contact local **DFO office** for salvage permits);

GBP48 choose low impact salvage methods such as trapping and **seining** before opting for higher impact methods such as **electrofishing**;

GBP49 use special techniques and extra caution when completing salvages that might involve species at risk. If species at risk are expected to be present, contact the **regional MOE office** or Environment Canada's website (**www.sararegistry.gc.ca**) for information regarding assessment and salvage requirements for species at risk;

8. Erosion & Sediment Control

GBP50 ensure that machinery is operated from the bank and not in the stream channel to avoid disturbance to the banks of the watercourse and HADD of fish habitat and to minimize impacts and better enable mitigation of **sedimentation**;

GBP51 remove excavated material and debris from the site or place to a stable area above the **high water mark (HWM)** or **active floodplain** of the stream, as far as possible from the channel and preferably outside the **riparian** zone;

GBP52 use mitigating measures to protect excavated material from being eroded and reintroduced into the watercourse. Such measures include, but are not limited to, covering material with **erosion control blankets** or seeding and planting with native vegetation;

GBP53 when material is moved offsite, dispose of it in a manner that prevents its entry into any watercourse, floodplain, ravine, or storm sewer system;

GBP54 contingency plans must be designed and in place to address unforeseen storm events with associated potential overland erosion from rainfall impact and storm water run-off;

GBP55 minimize the amount of instream work required and complete the work as quickly as possible;

GBP55 use a **Qualified Professional** to establish an effective **Work Plan** that considers location, timing and construction techniques to avoid erosion and minimize impacts of sediment release;

GBP56 restrict the work area to as small an area as possible and isolate it from the rest of the watercourse (see **General BMPs and Standard Project Considerations: Isolation of Work** section), achievable through control-at-the-source and **sediment interception**;

GBP57 schedule instream activities during appropriate **timing windows** to reduce or eliminate sediment and turbidity impacts. Confirm **Regional Timing Window** and contact **regional DFO offices**;

GBP58 adopt instream sediment controls (e.g., **silt barriers**, **cofferdams**, instream **weirs**, **retention basins** or **settling basins**, **wet ponds** or pools) together with land-based **erosion controls** and proper construction practices, to minimize the amount of **deleterious** sediment introduced into a watercourse and prevent **Harmful Alteration, Disruption or Destruction (HADD)**. A **qualified professional** (QP) should be on-site during construction/installation of sediment and erosion controls (see **Sediment Control**, **Stormwater and Erosion Module of Aggregate Operators Best Management Practices Handbook** and **Best Management Practices Guide for Stormwater** documents for further information);

GBP59 design **silt barriers** to isolate instream work areas from as much of the watercourse as possible. Consult a **Qualified Professional** for appropriate silt barrier design;

GBP60 **cofferdam** installations should be designed and approved by **Qualified Professionals** following completion of geotechnical and hydrological studies. See **General BMPs and Standard Project Considerations: Coffer Dam Isolation** section for further information;

GBP61 **outlet protection** is required at the outlets of all ponds, stormwater systems, pipes, culverts, ditches and anywhere runoff is conveyed to a natural or man-made drainage feature such as a **stream**, **wetland**, lake or **ditch**;

GBP62 ensure that material such as rock, **riprap**, or other materials placed on the bank, or within the **active channel** or **floodplain** of the watercourse, is **inert** and free of silt, **overburden**, debris, or other substances **deleterious** to aquatic life;

GBP63 minimize the disturbance to existing vegetation on and adjacent to the stream banks as part of erosion control measures in order to prevent sediment release;

GBP64 construct any **ditches**, **water bars**, or water diversions within the work area so they do not directly discharge sediment-laden surface flows into the stream. Divert such flows to an adequately vegetated area (**vegetated filter strip**) where flows can slowly infiltrate;

9. Vegetation Management

GBP65 minimize the **riparian area** and/or watercourse temporarily disturbed by access activities along the adjacent upland property, and preserve trees, shrubs and grasses near the shoreline by using existing trails, roads or cut lines as access routes;

GBP66	limit machinery and equipment access and direct disturbance to **streambank** areas to prevent **Harmful Alteration, Disruption or Destruction (HADD)** to fish habitat;
GBP67	consider other options when contemplating the need to remove vegetation, as it is very often not the best choice and may cause **Harmful Alteration, Disruption or Destruction (HADD)** to fish and wildlife habitat and species. If vegetation removal is unavoidable, avoid grubbing and use vegetative maintenance and removal techniques such as pruning, mowing, girdling, topping and select tree removals that allow the root system to remain intact, to help bind the soil and encourage rapid colonization of low-growing plant species;
GBP68	wildlife trees are important for many wildlife, bird, and amphibian species. Avoid vegetation removal or management activities that will affect trees used by all birds and other wildlife while they are breeding, nesting, roosting or rearing young. **Section 34 (a)** of the ***Wildlife Act*** protects all birds and their eggs and ***Section 34 (c)*** protects their nests while they are occupied by a bird or egg. Different areas of the province have different breeding periods for birds, and therefore have different vegetation removal or management periods of least risk to nesting birds. To find out what the vegetation removal and management period of least risk is for the protection of breeding birds in your area, contact the **Regional Timing Windows**, **DFO office** and/or Environment Canada's **Species at Risk** website;
GBP69	**Section 34(b)** of the ***Wildlife Act*** protects the nests of eagles, peregrine falcons, gyrfalcons, ospreys, herons and burrowing owls year-round. Trees or other structures containing such a nest must not be felled or disturbed, even outside of the breeding season;
GBP70	if trees within the work area are suspected of being hazardous, then have them assessed by a qualified professional **arborist** who is also a **Wildlife Danger Tree Assessor**, to determine the presence and nature of the hazard;
GBP71	in cases where the topping or removal of a dead limb can eliminate the danger, do this rather than remove the entire tree;
GBP72	when falling or topping trees prevent branches from entering the stream channel;
GBP73	if any branches do inadvertently end up in the channel, remove them from the site to where they will not enter the channel during high flows;
GBP74	removal of limbs from the channel must be completed in a manner that will not disturb aquatic organisms;
GBP75	where the entire tree must be removed the **tree replacement criteria** should be applied;
GBP76	retain **large woody debris** (LWD) and the stubs of large diameter trees where it is safe to do so. These are important for preserving fish and wildlife habitat and populations;
GBP77	fall the tree away from the channel unless there is an immediate threat to the public, and remove the material within the instream work window;
GBP78	fall the tree across the stream only when no other method of tree removal is possible because of safety concerns (e.g., to protect fallers or buildings);

GBP79 removal of a felled tree must be completed in a manner that does not damage the banks or bed of the stream. If possible, leave and anchor the trunk, letting it remain as **large woody debris** within the **riparian zone**;

GBP80 schedule vegetation removal and the management or removal of **hazard trees** or limbs within the window of least risk for breeding birds and before the instream window, wherever possible. This will help to prevent work delays and allow your works to be scheduled within the instream work window;

GBP81 vegetate all disturbed soils, banks and riparian areas by seeding and/or planting trees and shrubs in accordance with the DFO guidance on **Riparian Re-vegetation**. Cover seeded and vegetated areas with appropriate measures to prevent soil erosion and to help seeds germinate. If there is insufficient time remaining in the growing season for the seeds to germinate, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring;

10. Site Restoration

GBP82 **grade** disturbed areas to a stable **angle of repose** after work is completed. As well, **revegetate** areas to prevent surface erosion and subsequent **siltation** of the watercourse;

GBP83 protect disturbed soil areas on the banks and areas adjacent to the stream from surface erosion by **hydroseeding** with a heavy mulch, **tackifier**, and seed mix; by installing erosion blankets; or by heavily revegetating;

GBP84 retain existing instream and **riparian** vegetation and other features, including trees, bushes, shrubs, weeds or tall grasses along any stream bank; mats of floating vegetation; overhanging vegetation; natural **large woody debris** and large boulders;

GBP85 restore all in-channel or **active floodplain** habitats that have been disturbed (and requiring DFO/MOE approval) during the completion of works to their original state and/or identified by DFO/MOE approvals. This meets the DFO goal of **no net loss** of fish and **wildlife habitat**;

GBP86 remove any remaining sediment and **erosion control** measures (i.e., silt fence). Ensure all equipment, supplies, and non-biodegradable materials have been removed from the site; and,

GBP87 ensure a qualified professional complete post-construction vegetation monitoring, as required by MOE and/or DFO, to ensure your revegetation meets full survival (see **Riparian Areas and Revegetation** and **Riparian Revegetation** for further information).

11. Temporary Diversions

GBP88 if pumps, pipes or conduits are used to divert water around or through the worksite:

- pumps, pipes or conduits must be sized to divert the 1 in 10 year maximum daily flow for the period of construction; and,
- any pump or intake withdrawing water from fish bearing waters must be screened in accordance with the Department of Fisheries and Oceans Fish Screening Directive (see **Freshwater Intake End-of-Pipe Fish Screen Guidelines**);

GBP89 if **cofferdams** are used, isolate successive parts of construction at the worksite:

- ensure **cofferdams** are designed by a professional engineer and constructed in accordance with that design; and,
- design the natural channel, remaining outside of the **cofferdams**, to adequately pass the 1 in 10 year maximum daily flow during the period of construction.

GBP90 if ditches are to be used to divert water flow around the worksite:

- allow diverted water to remain within the stream channel;
- design and construct ditches to divert the 1 in 10 year maximum daily flow around or through the worksite and protect from any anticipated **Harmful Alteration, Disruption or Destruction (HADD)** of fish habitat through erosion during the period of construction; and,
- backfill ditches and return the area as closely as possible to the natural state upon completion of works.

GBP91 ensure diversion design and implementation adheres to professional engineering specifications;

GBP92 if dewatering of the site is required, an **Environmental Monitor** holding all necessary permits required by fisheries agencies to collect and transport fish, should make the final decision regarding the need for a **fish salvage** program;

GBP93 if a **fish salvage** is necessary, recover and relocated fish to a safe area outside of the influence of the worksite (see **General BMPs and Standard Project Considerations: Salvage of Fish and/or Wildlife**);

GBP94 the work area should be isolated from all flowing water in a manner that does not cut off flow to downstream portions of the stream at any time during construction;

GBP95 ensure the point of discharge to the watercourse is located immediately downstream of the worksite to minimize disturbance to downstream fish populations and habitats;

GBP96 any machinery must work from the top of the bank of the stream and not in the stream channel;

GBP97 remove and stockpile the top 300 mm of spawning gravel substrate material, if channel substrates are to be removed, and replace upon completion of works;

GBP98 upon completion of works, remove the diversion from the upstream end first;

GBP99 upon completion of works, restore and stabilize the watercourse to its original configuration to prevent bank erosion around the temporary diversion;

GBP100 restore all in-channel or active floodplain habitats that have been disturbed during the completion of works to its original state;

Pumps, Pipes or Conduit Diversion

GBP101 ensure where pipes or conduits are required for temporary diversions, adequate consideration is given to flow capacity, size and length of pipes or conduits, area and depth of excavated area and stability of the stream bed substrate during excavation;

GBP102 isolate watercourse flow starting from the bottom end of the diversion channel, working upstream to minimize sediment production;

GBP103 complete diversion works as quickly as possible (preferably in a single day) during low flow periods;

GBP104 screen pump intakes to prevent entrainment of juvenile fish (see DFO's **Freshwater Intake End-of-Pipe Fish Screen Guideline** for more information);

GBP105 ensure the worksite contains back-up pumps, if diversion works require pumping;

GBP106 ensure water pump capacities, if required, are sufficient to handle watercourse flow (including unexpected storms) when moving water around the work site;

GBP107 install sediment traps and appropriate geotextiles along the diversion to prevent **Harmful Alteration, Disruption or Destruction (HADD)** to fish habitat;

GBP108 isolate the worksite both upstream and downstream of the dam to prevent backflow into the work area;

GBP109 discharge water pumped from within a contained work area to a vegetated upland site above the **high water mark (HWM)** to allow for sediment removal before it re-enters any watercourse;

GBP110 construct bypass flumes using durable pipe material that will be able to accommodate water flow;

Coffer Dam Isolation

GBP111 if **cofferdams** methods are to be used, design diversion works to incorporate materials based on the ease of maintenance and removal following construction activities. Suggested materials for **cofferdam** construction:

- rock;
- sand bags;
- wood;
- sheet metal;
- gravel or earthen plugs; and/or,
- synthetic inflatable systems.

GBP112 plan **cofferdams** such that they do not reduce watercourse width and lead to **Harmful Alteration, Disruption or Destruction (HADD)** of fish habitat through erosion of banks both upstream and downstream of the site or impede the movement of migration fish;

GBP113 isolate watercourse flow starting from the bottom end of the diversion channel, working upstream to minimize sediment production;

GBP114 complete diversion works as quickly as possible (preferably in a single day) during low flow periods;

GBP115 screen pump intakes to prevent entrainment of juvenile fish (see DFO's **Freshwater Intake End-of-Pipe Fish Screen Guideline** for more information);

GBP116 ensure your worksite contains back-up pumps, if diversion works require pumping;

GBP117 ensure pump capacities, if required, are sufficient to handle watercourse flow when moving water around the work site;

GBP118 anchor wood or sheet metal dams to the bank to prevent seepage and erosion around the edges of the dam and **Harmful Alteration, Disruption or Destruction (HADD)** to fish habitat;

GBP119 isolate the worksite both upstream and downstream of the dam to prevent backflow into the work area;

GBP120 repair any gaps, holes or scour around the dam immediately to prevent failure and **Harmful Alteration, Disruption or Destruction (HADD)** to fish habitat;

GBP121 the worksite should be isolated both upstream and downstream to prevent backflow into the work area;

GBP122 all water pumped from within a contained work area should be discharged to a vegetated upland site (above the **high water mark [HWM]**) to allow for sediment removal before it re-enters any watercourse;

GBP123 discharge water pumped from within a contained work area to a vegetated upland site above the **high water mark (HWM)** to allow for sediment removal before it re-enters any watercourse;

Ditch Diversion

GBP124 complete diversion works as quickly as possible (preferably in a single day) during low flow periods;

GBP125 the temporary diversion channel must be lined with plastic sheeting, filter cloth and/or clean gravel to prevent siltation from channel erosion;

GBP126 install sediment traps and appropriate geotextiles along the diversion to prevent **Harmful Alteration, Disruption or Destruction (HADD)** to fish habitat;

GBP127 ensure material removal does not lead to stream channel instability or increase the risk of **Harmful Alteration, Disruption or Destruction (HADD)** of fish habitat or **sedimentation** into the watercourse;

GBP128 work within the ditch diversion, including grading and bank stabilization, is to be completed prior to diversion of the watercourse flow to the ditch;

GBP129 any a plug of earth should be of a thickness and height specified by the consulting engineer (to prevent watercourse flow in the ditch during constructions) and retained at either end of the diversion ditch;

GBP130 diversion ditch width must be approximately the same width as the natural watercourse;

GBP131 ensure the diversion ditch contains no ridges or depressions that could trap fish or initiate erosion of the watercourse bottom;

GBP132 ensure diversion ditch side slopes do not exceed 2:1 (horizontal:vertical) ratio and cross-sectional area and gradient are approximately equal to the natural watercourse; and,

GBP133 backfill the diversion ditch upon completion of works and revegetate the area to a state that enhances the original condition.