

## BEST MANAGEMENT PRACTICES FOR INSTALLATION AND MAINTENANCE OF WATER LINE INTAKES

### **Background**

Careful planning of the installation and maintenance of water line intakes can help minimize the potential impacts to fish, wildlife and their habitat. Many streams and lakes are subject to low flows/levels in the summer, fall and occasionally the winter months. Intakes that are unscreened or improperly screened can allow fish passage into the intake and result in injury or death to the fish. Construction activities associated with the installation or maintenance of water intakes can impact fish and fish habitat through the deposit of materials, like sediment, that are deleterious to fish and fish habitat. Loss of riparian vegetation on the banks of streams and lakes can result in bank instability and erosion which can damage spawning substrates. Proper construction and maintenance of water line intakes can also help minimize impacts to rare and endangered species or habitats associated with riparian areas.

### **Objectives**

To ensure installation and maintenance of water intakes is done in a manner that protects water quantity, water quality and aquatic and shoreline species and their habitat.

### **Applicable Provincial Legislation**

#### **BC Water Act**

If the installation of the water intake is for domestic purpose, and is on a water body which is not fully recorded (fully licensed) you are not required to obtain water license or water approval to install the works. In that circumstance please refer to the best management practices outlined in this document to assist in compliance with applicable legislation. For all other purposes a licence must be secured prior to undertaking works to divert water and may be applied for through Front Counter BC. Please contact your local Front Counter BC office (250) 372-2127 to determine if the body of water, your works are proposed in, is fully recorded. Water licensing Information is also available online at

[http://www.env.gov.bc.ca/wsd/water\\_rights/licence\\_application/index.html](http://www.env.gov.bc.ca/wsd/water_rights/licence_application/index.html)

and Water Act Section 9 "Works in and around a stream" information is available at [http://www.env.gov.bc.ca/wsd/water\\_rights/licence\\_application/section9/index.html](http://www.env.gov.bc.ca/wsd/water_rights/licence_application/section9/index.html)

#### **BC Wildlife Amendment Act, 2004**

Recent amendments to the Wildlife Act, prohibits the killing, harming, harassment, capture or taking of species at risk and the damage or destruction of a residence of a species at risk except as authorized by regulation, permit or agreement. Additional information regarding the BC Wildlife Amendment Act, 2004, is available at [http://www.legis.gov.bc.ca/37th5th/1st\\_read/gov51-1.htm](http://www.legis.gov.bc.ca/37th5th/1st_read/gov51-1.htm). Additional information

regarding the BC Wildlife Act is available at [http://www.qp.gov.bc.ca/statreg/stat/W/96488\\_01.htm](http://www.qp.gov.bc.ca/statreg/stat/W/96488_01.htm).

### **Riparian Areas Regulation, 2004**

The Riparian Areas Regulation, enacted under Section 12 of the Fish Protection Act in July 2004, calls on local governments by March 31, 2006, to protect riparian areas and their features, functions and conditions during development. Check with your local government as to the applicability. Development refers to a variety of activities associated with or resulting from regulation or approval of residential, commercial or industrial activities or ancillary activities to the extent that they are subject to local government powers under Part 26 of the Local Government Act. Additional information is available at [http://www.env.gov.bc.ca/habitat/fish\\_protection\\_act/riparian/riparian\\_areas.html](http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/riparian_areas.html).

### **Other Applicable Provincial Legislation**

Your works may also require authorization under the Local Government Act (formerly the Municipal Act; see [http://www.qp.gov.bc.ca/statreg/stat/L/96323\\_00.htm](http://www.qp.gov.bc.ca/statreg/stat/L/96323_00.htm)). Local bylaws may amplify federal or provincial legislation for working in or near water. You should contact your local municipality or regional district to find out which local bylaws may apply to your proposed works.

There may be other provincial acts that are applicable. These are detailed in the BC Ministry of Environment (BC MOE) publication *Standards and Best Practices for Instream Works (March 2004)* Chapter 5 see <http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

### **Applicable Federal Legislation**

#### **Fisheries Act**

The federal Fisheries Act provides protection for all fish and fish habitat in Canada. The Fisheries Act defines 'fish habitat' as "spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes." This definition indicates that watercourses, including but not limited to streams, ditches, ponds and wetlands, that provide water or nutrients to a fish bearing stream are considered fish habitat even if they do not directly support fish and/or if they only have temporary or seasonal flows. This definition also indicates that not only the watercourse itself but also vegetated streamside (riparian) areas that provide nutrients and shade to the stream are considered fish habitat.

Section 35 of the Fisheries Act in particular prohibits any harmful alteration, disruption or destruction (HADD) of fish habitat that is not authorized in advance by Fisheries and Oceans Canada (DFO). Depositing sediment or any other 'deleterious substance' into

streams supporting fish is also prohibited under Section 36(3) of the Fisheries Act. The Fisheries Act can be found online at <http://laws.justice.gc.ca/en/F-14/>.

Note that some repair works or construction of new works in fish bearing waters could result in a HADD of fish habitat. Please check out the website [http://www-heb.pac.dfo-mpo.gc.ca/publications/publications\\_e.htm](http://www-heb.pac.dfo-mpo.gc.ca/publications/publications_e.htm) or consult a qualified professional to ensure your proposed works do not result in a HADD. For further information regarding works that may result in a HADD of fish habitat please contact your nearest DFO Field Office.

All water intakes must be properly screened as stipulated in Section 30 of the Fisheries Act and the DFO "Fish Screening Directive". Additional information regarding screening requirements is provided by the DFO *Freshwater Intake End-of-Pipe Fish Screen Guideline* (see [http://www-heb.pac.dfo-mpo.gc.ca/publications/publications\\_e.htm](http://www-heb.pac.dfo-mpo.gc.ca/publications/publications_e.htm)).

### **Species at Risk Act**

Impacts to the habitat of threatened or endangered species can have catastrophic effects on a species' or local population's survival and should be avoided at all times. Some species at risk have no "window" of least risk during which instream works may be permitted because of the risk of harm to the animal. Before planning any work, review the website <http://www.env.gov.bc.ca/atrisk/> for further information on the species at risk in your area and follow the links provided there to the Conservation Data Centre and other resources. The "Species Explorer" at the same link can help you to find out what species at risk may be in your area. The absence of a record does not confirm that a species is not present. The legislation guiding the protection of species at risk, the federal Species at Risk Act, is detailed at the following website: [http://www.speciesatrisk.gc.ca/index\\_e.cfm](http://www.speciesatrisk.gc.ca/index_e.cfm).

### **Best Management Practices**

These Best Management Practices (BMPs) are directed to the installation and maintenance of intake works affecting lakes, streams or other surface water areas. Following the BMPs will help guide works to protect fish, wildlife and their habitat and avoid conflicts with the Fisheries Act and other applicable legislation

### **Design Best Practices**

Design and location of water line intakes may be critical to the protection of fish, wildlife and their habitats and meeting legislative requirements. Ensure that your professional/contractor provides an assessment and design that considers the following factors:

- local soil characteristics;
- erosion dynamics of the stream or shoreline;

- existing lakeshore/stream morphology and potential impacts or changes;
- existing or potential fish and wildlife use, aquatic habitat, and riparian habitat;
- potential access related disturbances from machinery or other equipment, if required, and the ability to access and repair intake works in the future;
- potential erosion or sediment releases resulting from proposed works;
- minimizing the footprint of the works and associated foreshore disturbance;
- minimizing direct and indirect impacts to riparian vegetation, fish and wildlife individuals, populations, species, and habitats;
- avoiding direct and indirect impacts to other properties or services;
- ensuring that the line is carried out far enough to prevent exposure to freezing even at low water levels; and,
- providing a conduit to allow for maintenance of the lines without excavation.
- potential for the spread of or colonization by invasive plants.

## **Operational Best Practices**

### ***Installation Procedures***

The installation method used will vary with habitat conditions, substrate and available access. Installation usually falls to either open trenching, directional drilling, auguring, boring or pushing. Whatever installation method is used, it should be appropriate to the issues outlined in the design criteria and the additional direction provided below.

Common maintenance problems that occur with water intakes are exposed pipes due to low water levels and an inability to access and maintain pipes. Correcting these problems often places the proponent in a position of impacting the fisheries resource as fish may spawn in areas where waterlines are located. It is better to plan and design your intake to avoid these problems; however, when maintenance must proceed to prevent damage to exposed pipes, etc. outside of the least risk window, the following protocol should be followed in conjunction with other operational BMP's.

In areas where lake shore spawning occurs, directional drilling, boring, auguring or pushing should be the method of choice. Open trenching should not be undertaken below the September 15 water level of the lake where the work is to occur in order to prevent impacts to shore spawning habitat. This water level is recorded by Environment Canada on gauged systems Directional drilling; auguring or rod pushing may be undertaken below this point subject to the following conditions:

- the works will not impact active spawning as determined by a QP;
- the minimum depth of boring below the beach surface is 1 meter; and,
- “drill out” and “pull back” under the wetted beach area is completed without the use of lubricants.

Note that the wetted beach area includes all areas below the September 15 water level. Note also that, if lubricants are required below the wetted beach area, then bentonite should be used rather than Enviro Gel. Additionally, every effort must be made to hold the lubricant pressure back and to minimize the bentonite mix.

In non-shore spawning areas, trenching is acceptable except as listed below:

- If there is no shore spawning but the substrate is a long shallow mud flat and the distance to deeper water is beyond the reach of an excavators boom and bucket, then the first preference is to drill, augur, hand trench or push the pipe; and,
- If there is no shore spawning but the distance to deeper water is greater than the reach of the machine boom/bucket from the non-wetted beach area and the substrate is large rock or cobble, then the machine should operate off a grounded platform or from a barge.
- If there are no occurrences of other species in the area that may be impacted by the works

### ***Monitoring***

- Construction activities should be monitored full-time during start-up and any instream works or sensitive activity, otherwise on a daily basis to the completion of the project. The environmental monitor(s) must be an ***appropriately qualified professional(s)*** and should be provided with written authority to modify and/or halt any construction activity if deemed necessary for the protection of fish and wildlife populations or their habitats. A sign should be posted listing the monitor's company name and phone number at the entrance to or in the immediate vicinity of the job site.
- A copy of this document listing standards and best practices for your works and all appropriate plans, drawings and documents should be forwarded to the contractor/crew supervisor and kept readily available at all times at the site while the work is proceeding.
- A pre-construction meeting should be held between the environmental monitor and the contractor undertaking the work on the site to ensure an understanding of the mitigative strategies for the project.
- Within 60 days of completion of the project, the environmental monitor should complete and submit a copy of a monitoring report consistent with the recommended standard format (see monitoring chapter of *Standards and Practices for Instream Works* to his/her client and a copy to the BC Ministry of Environment (BC MOE) with the Permit No. or Water Licence number noted.

### ***Timing of Works***

**If works are scheduled for fish-bearing watercourses or if fish presence in the watercourse is not known, then in-channel/in lake, or bank work, should be completed during the instream reduced risk work window approved for your particular water body. To find out what the timing window requirements are for your area, check the regional website at <http://wlapwww.gov.bc.ca/okr/wateract/workwindows.html>. If you do not have web access, contact your regional BC MOE office.**

Be advised that for certain fish, amphibians or species at risk there may be no window of least risk as all periods of their life cycle are of high risk. This region supports many

species that are vulnerable, threatened or endangered, some of which are listed under the Species at Risk Act. A helpful resource for determining the presence of species at risk or other wildlife is the Conservation Data Centre (<http://www.env.gov.bc.ca/cdc/>). **The absence of an observation record does not mean a species is not present.** Qualified professionals should be engaged where proposed works pose a risk to species at risk where their presence has been confirmed or could be expected.

Irrespective of timing window requirements, works should be undertaken during favourable weather, and low water conditions, and be completed as quickly as possible once started.

### **Screening**

All intakes must be screened in accordance with Section 30 of the Fisheries Act.

### **Deleterious Substance Control/Spill Management**

- Prevent the release of silt, sediment or sediment-laden water, raw concrete or concrete leachate or any other deleterious substances into any ditch, watercourse, ravine or storm sewer system. The recommendations for sediment and erosion control outlined in the “*Land Development Guidelines for the Protection of Aquatic Habitat*” (Chilibeck *et al.*, 1992) can also be used for reference (see [http://www-heb.pac.dfo-mpo.gc.ca/publications/publications\\_e.htm](http://www-heb.pac.dfo-mpo.gc.ca/publications/publications_e.htm)).
- Ensure that equipment and machinery is in good operating condition, clean (power washed offsite) and free of leaks, excess oil and grease. No equipment refuelling or servicing should be undertaken within thirty (30) metres of any watercourse or surface water drainage.
- Ensure that all hydraulic machinery to be used instream uses environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.
- Keep a spill containment kit readily accessible on-site in the event of a release of a deleterious substance to the environment and train on-site staff in its use. Immediately report any spill of any substance that is toxic, polluting, or deleterious to aquatic life and of reportable quantities to the Provincial Emergency Program 24-hour phone line at **1-800-663-3456**. For definition of a reportable amount please refer to the Spill Reporting Regulation at (<http://www.env.gov.bc.ca/eemp/spillnotification.html>).
- Do not use treated wood products in any construction below the high water mark of the stream or lake to prevent the release of preservatives toxic to fish. For more information on acceptable wood products to use in or near water, consult the document *Guidelines to Protect Fish and Fish Habitat from Treated Wood Used in Aquatic Environments in the Pacific Region* (see <http://www.wwpinstitute.org/pdffiles/treatedwoodguidelines.pdf>).

### **Isolation of the Work Area**

- **Lake or still water:** Isolate your work area from the main water body by using a silt curtain or a silt fence as applicable. A silt fence or Aqua-dam should be erected around trenching works in lakes to minimize impacts upon adjacent areas. The silt

fence may be staked in place or hung as a curtain from boom logs surrounding the instream trench and should be of sufficient area to capture any muddy runoff from the foreshore.

- **Stream/flowing water:** Isolate your work area from all flowing water, but do not cut off flow to downstream portions of the stream at any time during construction. Temporarily divert, enclose or pump the water around the work site. Ensure the point of discharge to the creek is located immediately downstream of the work site to minimize disturbance to downstream populations and habitats.

#### ***Minimize Disturbance***

- Beach substrates should be checked in advance of operations to determine whether: machine pads and/or frozen substrate conditions will be required to minimize foreshore disturbance and whether bedrock is present that will prevent trenching.
- Any trench works required should be as small as possible with a preferred maximum width of 65 centimetres (24 inches).
- The following precaution should be taken if the undisturbed beach material adjacent to the trench works is significantly different from the material to be excavated (e.g. rock versus mud): a layer of plastic or tarp should be placed on the undisturbed surface before depositing the excavated material on top of impervious material to help maintain the original quality of the beach and limit the total width of the impacted area (which must be kept to a minimum).
- Every effort should be made to back fill the trench so that the first layer excavated is the last to be replaced; this is particularly important if the initial surface layer is rocky material.
- Any material that cannot be returned to the trench during back filling should be removed to a point above the high water mark of the lake; this material should not be left in a manner in which it will become a source of silt during periods of rain or snow runoff and should not be dumped into vegetation within 15 meters of the lakeshore.
- Upon completion of back filling, the trenched portion of the lake bottom that was disturbed should be covered with a shallow layer of clean, washed, gravel consistent with surrounding substrates. This should include any part of the shore above the water level that had been covered by rock prior to excavation or that was disturbed by the storage of excavated material. This rock-layer should be 1-2 rocks deep and should bring the back filled trench up to grade.
- All work areas below the high water mark/top of bank of the lake/watercourse should be left in a smooth condition free of any depressions that will result in fry entrapment.

Except as noted above, no fill should be placed, nor should any portion of the new wet well/pump house encroach, below the existing upland onto the foreshore area below the high water mark/top of bank of the lake/watercourse or onto Crown Land without authorization from Land and Water BC and DFO. **Determination of this point may require a professional survey.**

### ***Sediment Control***

- Minimize the disturbance to existing vegetation on and adjacent to the banks of streams and lakes.
- Put sediment control measures in place before starting any works that may result in sediment mobilization.
- Remove excavated material and debris from the site or place it in a stable area above the high water mark or active floodplain of the lake/watercourse and/or restrictive covenant area and as far as possible from the watercourse or lakeshore. Protect this material and any remaining exposed soils within the work site from erosion and reintroduction to the watercourse/lake by using mitigative measures including, but not limited to, covering the material with erosion blankets and/or seeding/planting with native vegetation.
- When material is moved off-site, dispose of it in such a manner as to prevent its entry into any watercourse, floodplain, ravine, or storm sewer system.

### ***Vegetation Management***

- Limit vegetation clearing for access to and within your work area.
- Consider other options when contemplating the need to remove vegetation. It is very often not the best choice for fish and wildlife habitat and species.
- Wildlife trees are important for many wildlife, bird, and amphibian species. You should 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 (e.g. owls nest in winter/early spring, some species nest more than once a season so nests may be occupied in late summer. Also some owls and other bird species may use nest cavities in winter for thermal protection). 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. Nesting periods can be identified by a qualified professional or another source is the book *Birds of the Okanagan Valley, British Columbia by Cannings et al 1987*.
- Section 34(b) of the Wildlife Act protects the nests of eagles, peregrine falcons, gyrfalcons, ospreys, herons and burrowing owls year-round. This means that a tree or other structure containing such a nest must not be felled, even outside of the breeding season. Legislation pertaining to the Canada Species at Risk Act and/or Section 6 of the BC Wildlife Amendment Act 2004 pertaining to species at risk may also be applicable.
- If you are unable to avoid riparian disturbance and are proposing to top or remove trees, then have the trees within the riparian area assessed by an appropriately qualified professional who is also a Wildlife Danger Tree Assessor to determine the presence and nature of any hazards. If you require additional information, then please refer to the BC MWLAP *Best Management Practices for Hazard Tree and Non-Hazard Tree Limbing, Topping or Removal*. Also refer to information on replacement tree criteria required by Provincial and Federal agencies. Try the following website:  
[http://srmwww.gov.bc.ca/sry/csd/downloads/forms/vegetation\\_riparian/treereplcrit.pdf](http://srmwww.gov.bc.ca/sry/csd/downloads/forms/vegetation_riparian/treereplcrit.pdf) or refer to the *Tree and Shrub Replacement Criteria for Fisheries and Oceans Canada (Salmon Arm Subdistrict)*.



- Plant native trees, shrubs and herbaceous plants ecologically suited to the site conditions (i.e., suited to the biogeoclimatic subzone and site series) to revegetate the site and replace impacted riparian vegetation. Often undisturbed riparian areas along the adjacent lakeshore can be used as reference areas for suitable species.
- Revegetation plans should manage for the colonization and spread of invasive plant species. For more information on Invasive weeds see The Weeds BC website <http://www.weedsbc.ca/>

### ***Site Restoration***

- Grade disturbed areas above the high water mark/top of bank of the lake/watercourse to a stable angle of repose after work is completed. As well, revegetate these areas to prevent surface erosion and subsequent siltation of the watercourse.
- Disturbed soil areas on and adjacent to the banks of streams and lakes may be protected from surface erosion by hydroseeding with a heavy mulch, tackifier and seed mix; by installing erosion blankets; and/or by heavily seeding/planting with native vegetation.
- Remove any remaining sediment and erosion control measures (e.g. silt fences).
- Ensure that all equipment, supplies and non-biodegradable materials have been removed from the site.
- Complete post-construction multi-year monitoring to ensure your revegetation meets survival requirements.

### ***Unexpected Problems***

An *appropriately qualified professional(s)* monitoring the work site should be able to deal with unexpected problems that occur in spite of careful planning. In cases where bedrock is found and no other method can be undertaken, the *DFO Guidelines for the Use of Explosives in or near Canadian Waters* should be consulted (see [http://www-heb.pac.dfo-mpo.gc.ca/publications/publications\\_e.htm](http://www-heb.pac.dfo-mpo.gc.ca/publications/publications_e.htm)). Your monitor can determine if blasting will result in a HADD of fish habitat or whether the impacts can be mitigated so work can continue.

### **REMEMBER**

Projects that have been adequately developed using BMP's and the best information available at the time of approval and do not proceed should be revisited if approvals have lapsed and the project is being reactivated. This will ensure that the proposed development considers any new scientific data and conforms to **current** habitat management policy, guidelines and legislation.

This is a **working draft** document for the Okanagan Region of BC MOE outlining general best management practices. More specific guidelines may apply on a project specific basis or within a specific drainage. Contact your nearest DFO Field Office if you have any concerns with regards to your proposal and application of the Fisheries Act. Additional information regarding instream works can also be found in *Standards and Practices for Instream Works (2004)*

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

It is your responsibility to ensure that your project is in compliance with applicable legislation such as the Fisheries Act, Water Act and local government bylaws and regulations. Ensure you keep all reports and information on file to support your use of due diligence as this information may be requested if your works are monitored by provincial or federal agencies.