



- on providing some guidance on the circumstances (the cases) where pipes might be used on fish streams,
- on the subject of shrub and deciduous tree restoration, and
- on the acceptability and design of fords.

It is best to remind operators in the Kamloops District that the Federal Fisheries Act supercedes the Forest Practices Code of British Columbia Act. DFO staff are not signatories as Designated Environmental Officials and may impose other conditions under their mandate. No authorization to alter, disrupt, destroy, or introduce deleterious substances to fish habitat is expressed or implied with these measures. Such authorization is the exclusive purview of the Department of Fisheries and Oceans (DFO). It is the responsibility of the proponent to contact DFO regarding any activities that fall under the federal *Fisheries Act*.

This package will be re-evaluated when a new Fish Stream Crossing Guidebook is released (2001,2002?).

### **1. Referral Process for In stream work in the Kamloops District**

In-stream activities consistent with the timing windows and measures in this document do not require referral to the Designated Environmental Official (DEO) unless specifically requested. Works conducted under the authority of the *Forest Practices Code of British Columbia Act* do not require *Water Act* referral. Where extenuating circumstances require site-specific variance, alternative timing windows and/or measures must be requested from the DEO.

#### **Year round work window**

Proponents should plan to conduct all work within the specified in-stream work timing windows described in the September 2001 Instream Work-Window List. This list may be updated from time to time, with a new List posted on the Known Information FTP site and Licensees informed by mail and/or e-mail. However, a January 1 to December 31 timing window will apply to the construction, modification, and deactivation of stream crossings during forest operations if any of the following conditions are met:

- The structure does not encroach below the high water mark, no work is proposed below the high water mark of a fish stream, and measures will be taken to prevent the delivery of sediments into fish habitat.
- Work is in a non-fish stream and measures will be taken to prevent the delivery of sediments into downstream fish habitat.
- During installation or deactivation activity there is no running water at the crossing of a non fish bearing stream.
- The stream in question is not tributary to a fish stream, or is a hillside channel which flows down onto an alluvial fan on the valley floor where the flow dissipates into the ground with no direct channel connection to a fish stream.
- Deactivation activity on a non-fish stream is carried out by isolating the work area and working in the dry by temporarily pumping, or otherwise diverting, the flow around the work site while in-stream activities occur.

### **Data needed for a referral**

If a situation arises where the conditions in the year round work window cannot be met, the DEO will need the following data to assess a crossing:

- the default stream class as per district maps
- the proposed stream class as the result of classification inventory
- bankful width (width to top of the obvious bank) and depth
- wetted channel (width of water at time of survey) width and depth
- channel gradient for the site and the reach (if different).
- If a pipe crossing is proposed as a replacement a stream gradient profile for 50m upstream and downstream is required, including detail on the existing crossing gradient. This is to establish whether the new culvert gradient is reasonable, and corrects any prior perching or gradient flattening problem.
- If a pipe crossing is proposed as a first time crossing, the pipe must be established at the profile gradient, and not cause cutting down or scouring.
- substrate composition of stream bed (items that project into flow)
- presence and depth to bedrock (if known)
- a photograph of the work site
- assessment of sediment, debris loading or any other condition that may influence the choice, design and location of a structure
- evidence that the structure will not encroach on stream channel, how the crossing will provide safe fish passage.
- Proposed pipe width plus degree of, or measurement of embedding proposed, and
- Description of the pipe-fill materials
- how sedimentation will be prevented
- how spawning and other fish habitat will be protected.

Should WLAP or DFO staff be able to field review the proposal, a lesser information package would be acceptable

### **Reviews**

The Department of Fisheries and Oceans requires all crossings of fish bearing streams to be referred to them, if the crossing is not a replacement. Replacements must be significant and successful improvements to fish passage. Referral is the responsibility of the proponent, not WLAP.

### **Active streams**

Crossing sites on fish streams in areas where streams are highly active (streams that are meandering, braided, or are in alluvial fans) must be referred to the DEO.

### **Machine only crossings**

In crossing a stream once or twice to place a structure no referral to the DEO is needed, so long as the following conditions are met:

- The crossing is within a non fish bearing stream or within an instream work window (see Appendix) in a fish bearing stream.
- All machinery that contacts the water or working on the stream banks is to be cleaned of silt and all petroleum products (grease, oils, fuel) prior to the work commencing.

- Machinery must be in good working order to minimize the risk of petroleum products from entering the stream.
- A spill kit must accompany all equipment involved in fish stream crossings.
- Crossings are to minimize disturbance (displacement, compaction, erosion) to the substrate, riparian vegetation and stream banks by crossing where the banks are lower and preferably at the footprint of the structure or downstream of the structure. In fish bearing streams the channel substrate at the crossing should be larger (>10 cm diameter) and the machinery should use protective pads or logs to protect the channel bed. (See page 52 of Stream Crossing Guidebook, 1997/8)
- Spawning substrates (gravels greater than 0.5 m<sup>2</sup> in area) should not be disturbed.
- Any crossing of stream should retain the following habitat structures that are naturally present: larger boulders, imbedded large organic debris, natural gradient, and energy dissipation structures.
- If more than two machine crossings are required a referral is needed to the DEO and DFO.
- If crossings within a work window and all the above conditions are met no referral or notification is needed to the DEO. *If crossing a fish bearing stream outside the in stream work window then a referral is needed.*

## **2. Terms and conditions for in stream work:**

Timing windows and these measures are to be followed in the construction, modification, maintenance and deactivation of stream crossings to adequately manage and conserve aquatic resources. The objectives are to:

1. conserve fish habitat and protect channel integrity
2. provide for fish passage, adult and juveniles in most cases
3. prevent impacts to fish eggs and alevins that are present in the gravel, or on adult and juvenile fish that are migrating or rearing,
4. reduce the risk of sediment release and other deleterious substances during work at stream crossings.
5. provide direction to licensees and proponents to enable them to proceed without having to refer plans to WLAP, providing the following timing windows and measures contained herein are complied with.

The following measures apply to all construction and modification of fish stream crossings; and deactivation activities for all stream crossings, whether fish-bearing or not. Proponents should plan in-stream work to occur within the windows to the greatest extent possible in order to prevent negative impacts on fish and fish habitat.

### **Documentation**

- 4.1 *Upon request* from the DEO, documentation must be provided that shows
  - (a) the crossing structure does not encroach on the stream channel,
  - (b) how a crossing structure and associated works will provide safe fish passage;
  - (c) how sedimentation and loss of riparian vegetation will be minimized; and

(d) how spawning and other fish habitats will be protected.

### **Crossing Structures**

- 4.2 Crossing structures for fish streams are limited to
- (a) clear-span bridges for **S1** and **S2** streams.
  - (b) clear-span bridges, box culverts or other bottomless structures for **S3** and **S4** streams (see also 4.3 & 4.4 below).
- 4.3 Despite section 4.2, **S3** and **S4** streams may be crossed using winter snowfill temporary crossing structures as described in the *Stream Crossing Guidebook for Fish Streams: a working draft for 1997 and 1998*. The structures must be removed prior to the spring thaw to prevent damage to the stream. Location must be approved by DEO and DFO.
- 4.4 Proposals for the installation of pipe culverts (round, elliptical, flat bottom or other) or baffled culverts in **S3** or **S4** fish streams require specific application to the DEO. There are several sets of circumstances where approval might more readily be granted, subject to submission of the information package listed in Section 1 of this document. The Cases all include generous sizing, embedding and pipe-filling :
- **Case#1.** The oversized culvert is a replacement of a structure with impaired fish passage or channel narrowing, and the natural bankful width is less than 2.5m, and the natural stream gradient that the pipe will conform to is less than 3.5%.
  - **Case#2.** The oversized culvert is a replacement of a structure with impaired fish passage or channel narrowing, and the natural bankful width is an **S3** greater than 2.5m, and the natural stream gradient that the pipe will conform to is less than 2%. There is a level of cost and difficulty in achieving fish passage for larger **S3** crossings. More detail is required for submissions.
  - **Case#3.** The oversized culvert is a first time crossing, and the natural bankful width is less than 2.5m, and the natural stream gradient that the pipe will conform to is less than 1.5%. DFO must be consulted on the HADD question particularly in the case of first time crossings (not replacements), see 4.5
  - **Case#4.** The oversized culvert is a replacement of a structure where the fisheries system is lake-headed and there is a high likelihood that rainbow trout only move downstream because of high gradients between the lake and the proposed crossing location. Stream gradient at the crossing will be in excess of 5%.
- 4.5 If this culvert installation will likely result in harmful alteration or destruction of fish habitat (**HADD**) then an authorization and compensation is required under the federal Fisheries Act. Application must be made to the local DFO office. Cases (crossing circumstances) where parameters exceed those in 4.4 examples will require more time for resolution and approval by both DFO and DEO.
- 4.6 Foundations and/or cross-struts of mini-span bottomless arches must be embedded 30 cm or 20 percent of the structure height, whichever is greater.

### **Stream Width and Stability**

- 4.7 Stream channel width of fish streams must be maintained by
- (a) Placing riprap outside the high water mark in the vicinity of bridge abutments.
  - (b) Placing bridge abutments outside the high water mark, and keying associated riprap into the streambank without constricting the channel width. Preferably the natural stream bank is to be maintained.
- 4.8 Stream bed and channel stability of streams must be maintained
- (a) During bridge installation by avoiding damage to stream banks.
  - (b) By minimizing the width of the right of way clearing within the RMA of a fish stream. Trees on the work site or clearing width adjacent to streams must be felled away from the stream to the fullest extent possible. The tree(s) and all resultant debris must be removed from the channel concurrently with felling.

### **Sediment Control**

- 4.9 For work within the high-water mark of a fish stream, the work area must be isolated from the stream flow, and works completed "in the dry". Dry channel work conditions include:
- (a) When the channel of a fish stream is de-watered, fish must be salvaged from the de-watered area and returned to the stream. Fish salvaging requires a collection permit from the WLAP (Fisheries) Regional office and DFO if anadromous species are present.
  - (b) Within the work area, standing water that contains sediment must be pumped to a vegetated area or settling pond that is sufficiently far from the stream to allow for suspended fine particles to settle or be filtered out, prior to reintroducing stream flow to the work area.
  - (c) Stream flow is to be returned gradually to the work site and not in a single sudden rush.
  - (d) Any materials, such as riprap or gabion rock, placed within the stream channel must be free of silt, overburden, or other substances deleterious to aquatic life. Rock used as riprap must be angular in shape and suitably sized to resist movement by stream flows.
- 4.10 Temporary sediment control structures must be used during crossing construction in ditchlines and on fill slopes to reduce the risk of downstream sedimentation, where appropriate. These sediment control structures must be functional, maintained, cleaned out on a regular basis and cleaned prior to removal.
- 4.11 Retaining as much of the natural vegetation as possible in the riparian management area is the preferred sediment control revegetation methodology. Shrubs to be removed from the work area should be kept in a transplantable state so they can be re-established in the disturbed riparian area.
- 4.12 Where there is a risk of sediment delivery to a stream, permanent sediment control structures must be installed and maintained to minimize the delivery of sediment into streams from road surfaces and ditches at the crossing location.

These control structures must be functioning immediately after completion or suspension of the construction (fish streams) or deactivation (all streams) activity. Suggested measures include, but are not limited to, those outlined in the draft *Stream Crossing Guidebook for Fish Streams a Working draft for 1997 and 1998* and the *Land Development Guidelines for the Protection of Aquatic Habitats*. Control structures must be maintained so as to resist road grading impacts.

4.13 To prevent sediment delivery to a stream, the road grade should be elevated to ensure the grade falls away from the crossing for a minimum of ten metres in either direction, where topography permits.

4.14 Disturbance to the stream channel, banks, and riparian vegetation in the vicinity of the work area must be minimized. Disturbance that occurs to the channel and/or banks must be stabilized and the risk associated with sedimentation minimized prior to water being introduced under or through the structure.

4.15 Soils exposed as a result of work activities, and that have the potential for sediment delivery to a stream, must be promptly treated to avoid erosion. Treatment may consist of rip-rap coats, gabions bin-walls or vegetative strategies.

4.16 Seeding with an ecologically suitable seed mix concurrent with the work must occur, so as to maximize the speed and density of re-vegetation. Grass seeding is required by the Code, but where mitigation of stream impacts is important and new bare ground is extensive, shrub and/or fast growing tree establishment is required. Species less palatable to livestock are preferred, to reduce attraction of livestock to the crossing site. Fertilizers must not be applied where they will directly enter a fish stream.

4.17 During periods of heavy or persistent precipitation or other periods of increased stream flow, work must stop if continuing may result in sediment delivery to the stream. Measures must be taken to prevent the risk of sediment delivery to the stream during the shutdown period.

4.18 Road material and gravel on a bridge deck must be prevented from entering the stream.

4.19 Upon completion of the stream crossing structure or deactivation activity, all temporary bridges, culverts, pipe conduits, non-natural or treated wood construction materials, or other structures that are no longer being utilized, must be removed from the stream floodplain. Material is to be removed before the spring freshet. Debris must not be burned within the Riparian Management Area except on the road subgrade or surface.

#### **Other Deleterious Substances**

4.20 All machinery used on site must be in good repair and free from excessive grease, oil, and fluid leaks. All refueling and servicing must be completed outside of the Riparian Management Area. All machinery operating near a stream must have a spill kit.

4.21 If wood preservative treatment is necessary, the chemical to be used is chromated copper arsenate (CCA); the use of creosote is not permitted. Application must be upland, well away from any watercourse; application of treatment solutions must never be carried out to installed materials on or over water. Treated wood must be dry at time of application, rinsed off after application and drying, then weathered for a minimum of 45 days prior to use in or about the stream. Washwaters must be contained and removed off-site for proper disposal. In addition, pressure-treated lumber containing CCA must be allowed to fully react and be weathered for a minimum of 45 days.

4.22 All cast-in-place concrete and grouting must be completely separated from fish-bearing waters for a minimum of 48 hours if ambient air temperature is greater than 0 degrees Celsius or for 72 hours if ambient air temperature is less than 0 degrees Celsius.

4.23 Tracks or wheels of equipment must not be within the wetted perimeter of the stream, except during approved stream crossings or as otherwise authorized by the DEO. Work is to be mainly from the bank or running surface of the road.  
Protection of Redds

4.24 If redds (locations where fish eggs have been laid) are present in or downstream of the work area, work activities must not commence or must be suspended and the DEO notified. Similarly operations should be shutdown and the DEO notified if spawning fish are noted in the area of the work site.

### **Deactivation of Stream Crossings**

4.25 During deactivation, the stream channel, banks, and other affected work areas at the site must be restored to their approximate original configuration and composition. Any fill material that has been added to the stream channel and floodplain must be removed and deposited where it will not re-enter the creek. Sedimentation resulting from channel erosion of the disturbed soil surfaces must be prevented through armouring. Stream substrate must be restored to the approximate original composition.

4.26 During deactivation, the crib of a wooden culvert or bridge must be left if it is stable, and over time has been integrated into the channel and now contributes to fish habitat complexity in the channel. If the upper portion of the crib will decay and fail in time, resulting in sedimentation, then it should be removed and only the lower portion left in place.

4.27 Upon permanent removal of a fish stream crossing, vehicle fords will not usually be allowed because the fording causes stream bottom damage and sedimentation, and any bottom armouring tends to create a fish barrier. The armouring vs barrier issue becomes acute as stream natural gradient rises past 3%. When older culverts are removed, it is common to discover the natural stream profile has been altered, exaggerating either upstream or downstream gradient. A pulled culvert at 3% gradient may be replaced with a natural stream bottom at 6%.

- After a crossing structure is removed from a fish stream, the stream crossing site must be left in a condition that renders the stream crossing impassable to 4-wheel drive traffic or other measures taken to preclude 4-wheel drive traffic accessing the stream crossing site.
- If ATV traffic is anticipated to use the crossing site, an armoured ATV ford may be established limiting vehicle widths to less than 1.5m.
- Variances to the no-fording condition must be approved during the by DEO. Approved fords must be armoured on the bottom, and on the road approaches to prevent long term rutting and sedimentation.

4.28 When a crossing structure is removed from a non-fish stream, an armoured ford must be established to reduce sedimentation, if vehicle use of the crossing is anticipated. Road approaches require armour too.

### **Other Considerations**

#### **Beaver Dams**

4.29 The *Wildlife Act* Section 9 requires authorisation from the Ministry of Environment, Lands and Parks for a person to disturb, molest or destroy a beaver house or den or beaver dam. A culvert blockage created by a beaver is a beaver dam. The removal or modification of a beaver dam must be authorised by a permit issued under the *Wildlife Act* by the Regional Wildlife office. The use of beaver proof culverts or trash racks is encouraged over trapping or harming beaver.

#### **Emergency Actions**

4.30 If emergency actions are required to protect roads, stream environments or crossing structures from catastrophic events, or the crossing has failed as a result of catastrophic events and damage to fish habitat has or may occur, then the incident must be reported in writing to the DEO (or designate) as soon as possible or within 72 hours.

### **3. Appendix – In-stream Work Windows**

This **In-stream Work Windows** document is posted separately on the FTP site and *not attached*. The version at the time of the writing of this Terms and Condition Document is dated *September 2001*. *pjh 01/09/20*

