

# Criteria for Selecting Stream Crossing Sites for Remediation

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Fish Passage Technical Working Group

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## 1. Purpose

The purpose of this document is to provide transparency around the process for selecting fish stream crossing sites for remediation by the Fish Passage Technical Working Group. This document may be updated yearly as priorities and funding conditions change. Under current funding conditions about 10 sites can be remediated per year. With this small number of sites, a priority will be given to restoring connectivity for species at risk.

## 2. Criteria

### Step One: Selecting potential sites

Using the completed assessments in the PSCIS database select those which:

1. Assessment shows closed bottom structure impedes fish crossing (i.e., a FAIL)
2. Assessment results show site has either medium or high habitat value
3. Road is eligible for funding under Land Based Investment Strategy

### Step Two: Calculate weighted habitat gained and cost effectiveness

For each site within the sub-set of potential sites:

4. Calculate the weighted habitat gained (based on what is known about the habitat and species presence; see Section 4)
5. Calculate cost effectiveness (cost per weighted meter)

### Step Three: Considerations

Select those sites that have both high weighted habitat gained and high cost effectiveness. For these sites consider the following to make a final selection of sites:

6. Local knowledge (e.g., culvert assessment reports submitted by consultants, knowledge held by ecosystem biologist, DFO, BCTS, and licensees);
7. Operational considerations such as whether or not the road is scheduled for deactivation in the coming years;
8. Expert knowledge on the health of specific salmon population units;
9. Spatial distribution of sites to find a balance among the following factors:
  - a. Some clustering of sites may improve cost effectiveness, both operationally and in terms of habitat gained.
  - b. Provincial distribution of remediation projects throughout the four main regions (North Coast, North Interior, South Coast, and South Interior)
  - c. Capacity within each location to complete the work;
10. Potential for restored connectivity to allow movement of exotic species through the drainage basin; and
11. Status of the watershed as a Fisheries Sensitive Watershed (FSW) or candidate FSW.

### **3. Changes from Previously Used Criteria to Identify High Priority Sites for Remediation**

In previous years, licensees applied the methodology outlined in the *Strategic Approach* to guide site selection for remediation. The first three of the criteria listed above have not changed from previous selection processes. Cost effectiveness and habitat gained were also factors in selecting high priority sites. This new method applies a weighting factor to the habitat gained to consider what is known about the habitat and to give species at risk a higher weight than more common aquatic species. The final selection of sites will be based on a number of further considerations that are not captured in spatial or numerical databases.

### **4. Discussion of Criteria 4: Weighted Habitat Gained**

#### **Habitat Weights**

The amount of habitat gained is the length of fish habitat that would be re-connected to downstream habitat if the stream crossing were remediated. In some cases, the amount of habitat is known, in others it is derived from a GIS model (see Mount et al. 2011). There is greater certainty of the value of known habitat compared with modeled habitat and the weights are assigned accordingly (see Table 1).

During the culvert assessment, the habitat value to fish is ranked low, medium or high. Low habitat is removed from the list of potential sites in criteria 2. A weighting factor has been added for habitat value to give a greater value to high value habitat compared with medium value (see Table 1).

#### **Species Weights**

The Conservation Framework (CF) is a tool to help guide resources to achieve the greatest conservation gain (BC Ministry of Environment 2012). The CF has three goals:

- Contribute to global efforts for species and ecosystem conservation
- Prevent species and ecosystems from becoming at risk
- Maintain the diversity of native species and ecosystems

Each BC species, subspecies and ecosystems (together called elements) of conservation concern are ranked for each CF goal based on global and provincial status, trends, threats, stewardship responsibility and feasibility of recovery. The elements are then assigned management actions within three action groups: assessing; planning and listing; and acting.

Using the CF, high priority species are those that have a priority action of habitat restoration, habitat protection or private land stewardship (which includes land tenures). Enough is known about these species to be confident that habitat restoration is the highest priority action that should be taken. Medium priority species are those that have been assessed under the CF but for which the priority action is not habitat restoration, habitat protection or private land. Weighting of these species and sub-species is further stratified by the highest priority ranking under all of the three conservation goals (see Table 2 for a break-down of the weighting categories).

The CF does not, however, rank the conservation status of salmon population units even though populations may be genetically distinct. An exercise to classify the status of salmon stocks on the coast of BC and the Yukon found that many of these stocks were at a high risk of extirpation

(Slaney et al. 1996). Both Cutthroat trout and Coho salmon rely on small coastal streams for rearing habitat (Rosenfeld et al. 2000). Given this dependency and the susceptibility of small streams to habitat deterioration, anadromous Coho are also included as a high priority species.

## 5. Equation for Weighted Habitat Gained

Weighted km gained is calculated for each potential site using the equation:

Weighted km gained = km habitat gained\*weight for known or modeled habitat\*weight for high or medium habitat\*(weight species 1 + weight species 2 + ... + weight species n)

**Table 1: Weights for Habitat Status and Habitat Value**

Proportion of habitat gained	Weight
Known habitat	1.25
Modelled habitat	0.75
High value habitat	1.1
Medium value habitat	0.9

**Table 2: Weighting Table for Aquatic Species of Concern using the Conservation Framework Actions & Ranks**

Filter	CF Highest Priority	Weight
High Priority (anadromous coastal Coho populations)	NA	4
High priority (Listed in the CF and priority action is habitat restoration, habitat protection or private land)	1-2	4
	3-4	3
	5-6	2
Medium Priority (Listed in the CF as a conservation concern)	1-2	1.8
	3-4	1.6
	5-6	1.4
Low Priority (Species not listed in the CF as a conservation concern)		1/n (n = number of species)

## 6. References:

- BC Ministry of Environment. 2012. Conservation Framework. Available at: <http://www.env.gov.bc.ca/conservationframework/> Accessed on January 13, 2012
- Mount, C., Norris, S., Thompson, R., and Tesch, D. 2011. GIS modeling of fish habitat and road crossings for the prioritization of culvert assessment and remediation. Streamline Watershed Management Bulletin. Vol 14:7-13
- Rosenfeld, J. M. Porter, and E. Parkinson. 2000. Habitat factors affecting the abundance and distribution of juvenile cutthroat trout (*Oncorhynchus clarki*) and coho salmon (*Oncorhynchus kisutch*). Canadian Journal of Fisheries and Aquatic Sciences **57**: 766-774.
- Slaney, T. L., K. D. Hyatt, T. G. Northcote, and R. J. Fielden. 1996. Status of Anadromous Salmon and Trout in British Columbia and Yukon. Fisheries **21**: 20-35.