Fish Habitat Restoration Methods Concept Specification
SandWand

Purpose:

- To remove sand and silt from gravel-cobble bed streams

Conditions Where Applicable:

- Instream location and cleaning design must be approved by an Adopt-A-Stream Biologist.
- Sites where the sand and silt content of the stream bed exceeds 10%.

Advantages:

- Removes sand and silt for the stream substrate with minimal impact of invertebrates and not impact on resident fish.
- Allows natural flows to reform meander pattern and riffle pool pattern reducing stress on stream banks.
- Brings stream habitat substrate to optimum condition for spawning, rearing and migration of stream fish.
- No instream structures and can be done in remote sites.
- Aesthetically pleasing.
- No maintenance requirement.

Disadvantages:

- Can increase substrate permeability drying up stream sections during low flow. .

Design Criteria:

- At least one AaS staff that has received training will be in charge and on site at all times the equipment is in use.
- A minimum of two people will be on site during operations, one to work the wand and the other to tend the pumps and the discharge hose.
- Each proposed restoration site will be assessed and the work laid out/flagged on site by a AaS habitat restoration staff at the start of the work.
- The pools and spawning areas are to be cleaned deeply up to 40cm down to provide cover for all life stages and species of fish and insects and to clean spawning gravels for salmonids.
- No cleaning at crest of riffles to ensure low flows continue to maintain pool water levels

- Light clean of riffle areas to increase insect habitat and cover for salmon juveniles.

Implementation:

- Sand and silt disposal will be in the riparian zone with the landowner's permission. Sand and silt deposition in riparian areas is a natural occurrence for the sediment flushed through by flood flows. Deposition of sediment in the stream bed has been found to be mainly sand and outflow water turbidity was low as the sand settled out immediately in the riparian area
- The outlet hose is to be moved frequently to prevent a buildup of sand greater than 2 cm deep. This will ensure the vegetation will grow up through it.
- Other silt control techniques will be used to contain the sand and silt if disposal in the riparian area is not possible or effective. These are to include but not limited to the use of silt fences, straw bales, silt bags, sand bag filters. Techniques to contain the sand and recycle the wash water will be used in cases where we need to remove the sand from the site and have limited flows.
- Pumps in operation will be placed 3m + from the watercourse and set in containment trays to catch any oil or gas leakage or spill during refuelling and water leaking from the pumps.
- The system needs 15cm + of water depth to operate. In some cases a water dam or sand bags filled with pea stone and covered with plastic will be used to temporarily raise the water over the work area.
- All the water returns to the stream quickly through the riparian areas and discharge hoses are to be placed in the riparian area upstream of the work site if possible so that water will return to the stream upstream of the work site. This also allows continuous monitoring of the return flow to ensure it is not turbid above guidelined levels.
- The water returning to the watercourse will be monitored to ensure it does not exceed the CCME guidelines for aquatic life. The objective is to achieve no increase in suspended sediments or turbidity above background levels due to the cleaning operation and no bed load size input of sediment. Adjustments should be made to the silt control techniques if the returning water is turbid. Adjustments must be made to the silt control if the levels approach the following levels. All operation must stop if proper silt levels are not achieved.

Suspended sediments

- Clear flow; Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer-term exposures (e.g., inputs lasting between 24 h and 30 d).

- High flow; Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is >250 mg/L.

Turbidity

- Clear flow; Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-h period). Maximum average increase of 2 NTUs from background levels for a longer-term exposure (e.g., 30-d period).
- High flow; or turbid waters Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs.

Deposited bed load sediment

- No sediment of bed load size is permitted back into the stream

References:

Irish Cove Nova Scotia, habitat restoration research project. Nova Scotia Salmon Association Adopt-a-Stream Program 2011