

Fish Habitat Restoration Methods Concept Specification

Tree Revetments

Purpose:

- Protect banks from scour and erosion.

Conditions Where Applicable:

- Instream location and sizing must be approved by an Adopt-A-Stream Biologist.
- Low to moderate velocity settings with non-cohesive banks that are prone to toe erosion.

Habitats Created:

- In some cases it provides cover.
- Main purpose is to capture sand and silt to prevent sedimentation of adjacent habitats.

Advantages:

- Provide good protection from bank erosion and instream cover during high flow periods.
- Work best on streams with stream bank heights under 3.7 m (12 ft) and bankfull velocities under 2 m/s (6.5 ft/s).
- Use inexpensive, readily available materials.
- Capture sediment and enhances conditions for colonization of native species particularly on streams with high bed material loads.
- Species that are resistant to rot are best because they extend the establishment period for planted or volunteer species that succeed them.
- Where appropriate, tree revetments should be used with soil bioengineering systems and vegetative plantings to stabilize the upper bank and ensure a regenerated source of streamside vegetation.

Disadvantages:

- Large trees must be cut down.
- Moving large trees and digging a proper ditch to anchor them may require heavy machinery.
- If not done properly, digging a trench along a stream bank may cause extensive sedimentation.
- Wire anchoring systems can present safety hazards.
- Limited life and must be replaced periodically.
- Might be severely damaged by ice flows.

- Not appropriate for installing directly upstream of bridges and other channel constrictions because of the potential for downstream damages should the revetment dislodge.
- Should not occupy more than 15 % of a channel's cross sectional area at bankfull level.
- Not recommended if debris jams on downstream bridges might cause subsequent problems.

Design Criteria:

- It is very important that the individual trees be anchored tightly to a stump with galvanized wire or nylon cable, while inflicting minimal damage to the stream banks.
- Do not anchor to live trees.
- Each end of the treated section of stream bank must be well protected.
- For streams less than 5 m wide: A row of interconnected trees can be attached to the toe of the stream bank or to a deadman log. The trees reduce flow velocities along eroding stream banks, trap sediment, and provide a substrate for plant establishment and erosion control.

Implementation Steps:

- Obtain whole, freshly cut coniferous trees.
- They may be cabled to tree stumps on the bank as shown in Fig 1 by anchoring whole trees to stream banks with the butt end pointing upstream.
- Or they may be used in combination with root wads (see root wad factsheet) as outlined below.
- At moderate energy sites, stream banks can be treated with an integrated tree-rock-root wad – live cutting structure built in an interlocking matrix.

References:

British Columbia Ministry of Environment, Lands, and Parks and Ministry of Forestry. 1997. Fish Habitat Rehabilitation Procedures, Watershed Restoration Technical Bulletin No. 9.

Federal Interagency Stream Restoration Working Group (FISRWG). 1998. Stream Corridor Restoration: Principles, Processes and Practices.

Adapted from Ecological Restoration of Degraded Aquatic Habitat: A Watershed Approach 2006 Published by Fisheries and Oceans Canada Oceans and Science Branch Gulf Region ISBN: 0-662-42818-8 Cat. Number: Fs104-4/2006E

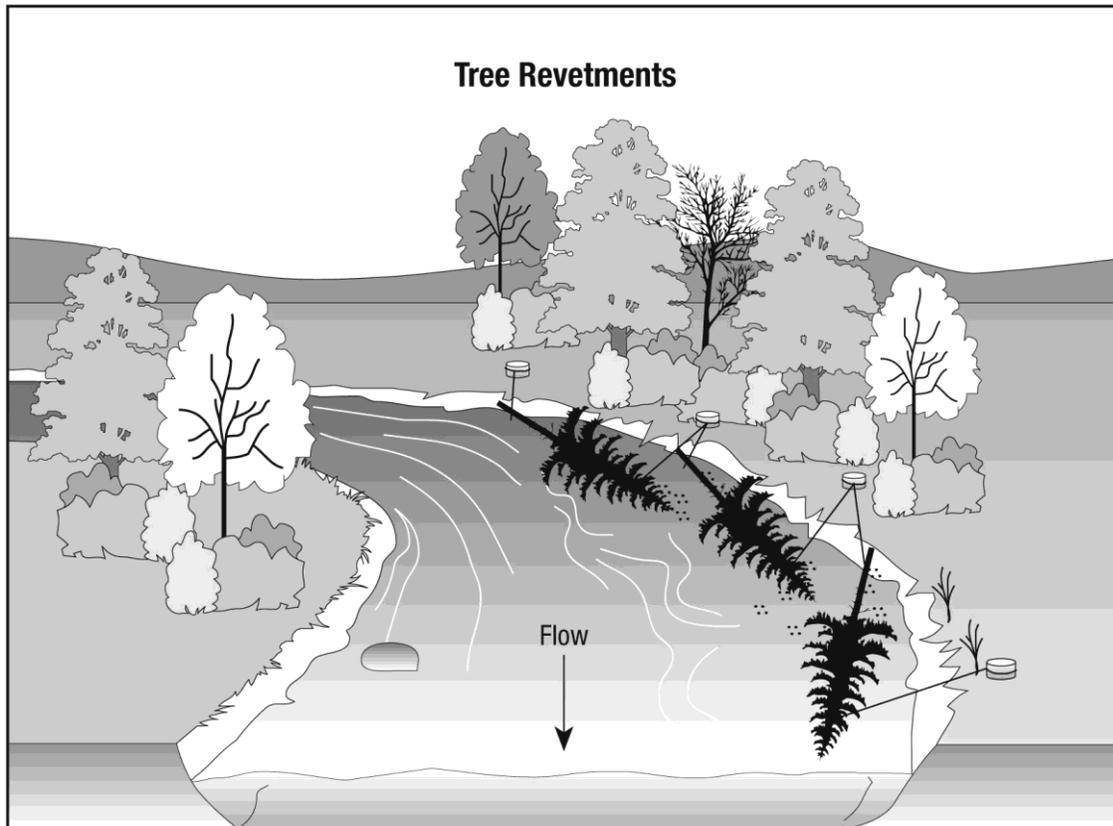


Figure 1. Conceptual drawing of tree revetments to protect stream bank from erosion (USDA, 1999).