

Instream Log Cover



Description

Large woody debris is an important component of rivers and streams, providing varying degrees of channel stability and habitat diversity based on amount and size. Mature or old growth forests adjacent to streams and rivers are the source of large diameter logs which greatly influence pool formation, gravel deposition and cover habitat. It is not uncommon to see 12 to 15 logs in 100 metres of stream of which most are partially submerged. Introductions of large woody debris can significantly favour the production of juvenile and adult fish while also providing habitat for aquatic invertebrates. Watercourses having low volumes of large woody debris, either from the effects of logging or channelization, are candidate sites for introducing instream logs. Irregular shaped cedar or oak logs are anchored to the river bed. These structures may sway, rise and fall depending on river flow and current.

Purpose

Instream log cover tends to attract juvenile and adult fish as a result of providing surface turbulence and overhead cover. It is used in reaches where overhead cover is a limiting habitat. Much like the half log cover, these structures tend to be most suited for streams having stable substrates, limited seasonal fluctuation and little ice formation. In addition, the irregular nature of the logs has a tendency to provide direct overhead cover as well as adjacent cover in the form of surface turbulence.

Application

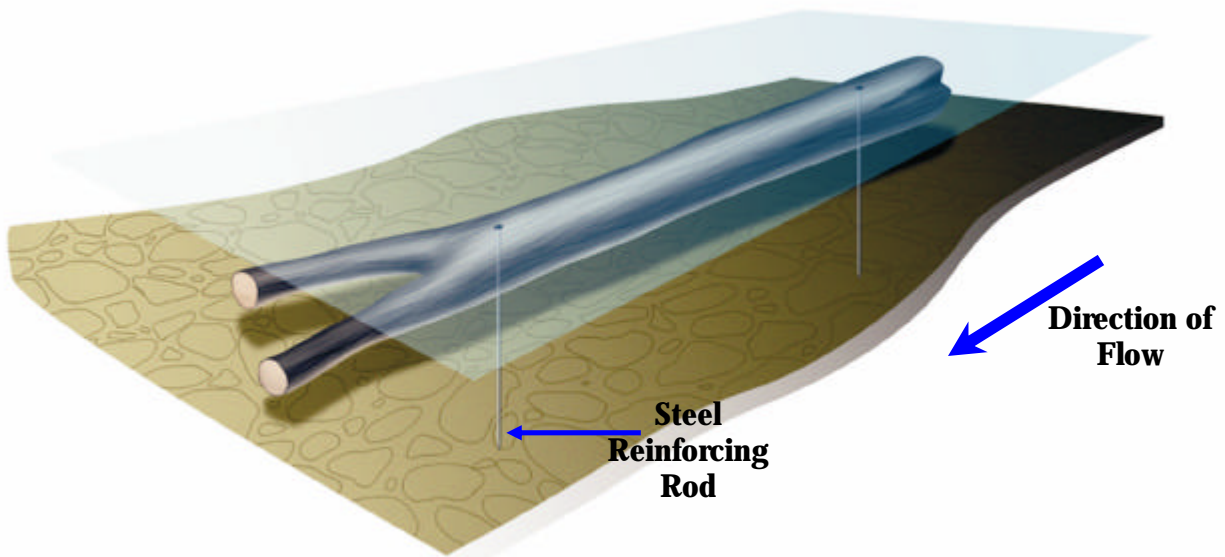
Pools, runs, riffles and backwater areas of moderately sized streams that are 5 to 20 metres wide are well suited for instream log cover. This habitat structure works well floating on the surface, suspended in the water column or anchored to the bottom, as long as it furnishes adequate space underneath for fish. It will tend to float and drift in the current with the rise and fall of the flow. They are usually placed mid-channel.

A basic knowledge of the channel characteristics within a reach of stream or river is needed to determine suitability and placement. The typical characteristics of bedrock, cobble, gravel, sand and silt/clay base, combined with an average channel slope of less than 4%, are your determining features for suitability. Stepped pools or point bars within a meandering channel are good indicators of the choice B and C type watercourses that are appropriate for this type of structure. Instream log cover is susceptible to sediment deposition, debris accumulation and ice damage, so be wary of streams carrying large volumes of sediment during higher flows as they are not suitable candidates. Actively eroding channels with high bedload are also not appropriate.

Construction Guidelines

Instream log cover is a simple and inexpensive habitat enhancement structure that can be anchored to the exposed bedrock, a boulder or stable substrate in the river using steel pins or aircraft cable. Logs can be anchored to boulders by fixing aircraft cable into drilled holes in the rock using epoxy cement. Logs should be 25 to 40 cm in diameter and 3.0 metres or more in length. Using crooked logs with limb stubs increases the cover benefits of the structure by introducing surface turbulence and substrate scour. Be sure to orient the log in the current such that the limb stubs point downstream. This will reduce the amount of debris accumulation.

In small headwater streams, logs can be anchored into the stream using T bar posts or 1.0 m lengths of 12cm steel reinforcing rod. The log is fixed into a position that does not allow it to move.



In some cases, it may be desirable to have the instream log moving with the current of the river. Using a 1.5 cm diameter wood auger, drill a hole through the trunk of the log at least 20 cm from the thickest end. Insert a 3.0 metre long piece of aircraft cable through the hole, around the trunk and back through the other hole. Be careful to leave a 25 cm section for the crimp to the main cable. Using the crimping tool, fasten them together and fix the wrapped section of cable to the trunk with the fence staples. You should have 1-1.5 m of cable leftover. Securely anchor to the bed of the stream using a T bar post or pin and install on a slight angle upstream. A 10 cm section of post with a pre-drilled 0.6 cm diameter hole located 5 cm from the top should remain for cable attachment. Drag the floating log into position and secure with the rope to maintain desired aspect. Carefully insert cable into the hole in anchor, tighten, wrap once and crimp. Cut off excess cable and release rope. The log should float freely in the current.



Alternatively, the log can be fixed to an instream boulder. Drill one 1.5 cm hole through the trunk of a log. Two 1.5 cm holes, 15 cm deep, need to be drilled in the top or side of a large instream boulder using the width of the trunk to guide the distance between the holes. Make sure the holes are free of dust and dirt. The boulder should be dry in the location of the drilled hole to properly anchor the aircraft cable with epoxy resin. Place the trunk of the log onto the boulder and using rope, temporarily secure the log into position. Insert the aircraft cable through the log and the two ends into the boulder and fill the holes with industrial grade epoxy cement. Allow 24 hours for the resin to cure and dry. Remove the rope.

Materials

You will need the following items for installing instream log cover:

- sledge hammer and post pounder
- gas-powered drill with 1.9 cm auger bit, 30 cm long
- 5 metres of 0.6 cm diameter stainless steel aircraft cable
- matching 0.6 cm diameter crimps or clamps
- crimping tool or cable cutting tool and pliers
- crooked, irregular surfaced cedar or oak logs at least 3.0 metres long, 25-40 cm diameter with limb stubs or root mass
- 1.0 to 2.0 metre T bar posts or steel reinforcing rod
- hammer and 3.5 cm fencing staples
- chain winch for large logs
- 5 to 10 metres of heavy rope

For anchoring to instream boulders, you will also need:

- 1.9 cm diamond-tipped drill bit
- Hilti c-10 epoxy cartridges

Cost and Maintenance Needs

It is a simple and inexpensive technique that can be easily installed by a crew of three in a couple of hours. Cost is less than \$30.00 per unit. In stable channels, the expected life of the structure is 5 to 10 years provided the recommended type of wood is used and the location is not subject to sediment deposition or ice scour. Expect the log to become waterlogged in time. Frequent monitoring is required for the first year to ensure proper installation. Annual observation is recommended after the first successful year.

Integration

Instream log cover can be integrated into other stream rehabilitation projects such as:

- boulder placements
- K dam
- wedge dam



INSTREAM LOG COVER

- cabled log jam
- deflectors

Demonstrations

This type of habitat structure has been applied in the following demonstration projects:

- Project #7, North Creek
- Project #73, Hopefull Creek Rehabilitation
- Project #109, Morningside Tributary Aquatic Habitat Rehabilitation Project
- Project #118, Rouge River Headwaters Rehabilitation Project

For More Information

Please refer to the following authors and their respective publications located in the bibliography:

Cedarholme, C. J., L. G. Dominguez and T. W. Bumstead, 1997

Crispin, V. , R. House and D. Roberts 1993

Hunter, C. J. 1991

Hunt, R. L. 1993

Rosgen, D. 1996

