Hillslope Watershed Restoration Projects

A Strategy for Implementation, Effectiveness, and Validation Monitoring of Habitat Restoration Projects

E. Beamer, T. Beechie and J. Klochak. 1998

Project Description

These two examples are from the Skagit River Basin in Washington. The Illabot Creek sediment reduction project, located in Washington's Skagit River Basin, addressed road erosion and sedimentation using storm-proofing and decommissioning treatments. This project was considered a 'protection' project because there appeared to have been little road-related increase in sediment supply to Illabot Creek over the past few decades. Road storm-proofing was expected to reduce the existing risk of catastrophic failures into Illabot Creek and its tributaries. Road decommissioning was expected to have the same effect as road storm-proofing, but since the road fills in the drainages were removed, the risk of failure was expected to be lower.

Storm-proofing on Forest Road 16 included sidecast pullback, installing additional and larger culverts, adding road dips, lowering and reconstructing fills and rip-rap protection. Road decommissioning on Roads 1600012 and 1600012a spur included removing fills and culverts in stream channels, removing cross culverts and installing dips, pulling back sidecast material, and outsloping the road. All disturbed areas were seeded and mulched with a minimum of 4 inches of straw. Approximately 24 miles of road were treated.

Criteria for Restoration Evaluation: Aerial photographs, channel cross sections, width to depth ratio, LWD and pool/riffle composition.

Two active USGS stream flow stations were used to estimate the magnitude of peak flows experienced by Illabot Creek in 1995 and 1996. Historical sediment supply to Illabot Creek was assessed from 1950-1991. Changes in channel widths over time were measured by canopy opening width on aerial photos.

In-channel habitat conditions were monitored prior to the completion of the sediment reduction project (summer 1994) and one year following the project (summer 1996). Monitoring parameters included: changes in channel type, reach length, average channel width, average residual pool depth, number of pools, and amount of key-sized or larger LWD per 100 m of stream length.

Using habitat-based models to identify the spatial relationship between juvenile fish rearing potential and position in the Illabot Creek watershed, it was possible to estimate end-of-summer parr production of coho salmon and steelhead trout.

Lessons Learned

- Mass wasting has significantly increased due to roads in the last decade, but land use overall has caused relatively little mass wasting compared to that from mature forests and naturally unvegetated areas in the Illabot watershed.
- For pools formed by LWD, about half of the variation in residual pool depth is explained by the height of a log or LWD jam. In general, larger obstructions tend to create deeper pools, indicating that a change in the size of LWD over time should lead to a change in residual pool depths. This relationship is important for demonstrating that changes in residual pool depth that may be measured in the future are (or are not) a function of change in LWD size, rather than a change in sediment supply.
- Without an external control or reference watershed it may not be possible to discriminate the effects of treatment from natural variation. ▲

Based on: Beamer, E., T. Beechie and J. Klochak. 1998. A Strategy for Implementation, Effectiveness, and Validation Monitoring of Habitat Restoration Projects. Mount Baker – Snoqualmie National Forest, Mount Baker Ranger District, Woolley, Washington.