

## Abstract

This paper discusses the historic geomorphic impacts of beaver populations in the Pacific Northwest and resulting influence on riparian habitat. Trapping and landscape alteration following post-European settlement resulted in an order of magnitude reduction in beaver population, with dramatic alteration of hydrology and sediment distribution in river systems. Population reduction diminished wetland acreage, altered channel complexity and reduced salmonid production potential by as much as 60%. Recent studies suggest that the ecological significance of beaver dams in the Pacific Northwest is far greater than originally believed, hence replenishing beaver populations is a key component of salmonid recovery strategies.

### Introduction

The focus of this project is on the effects of beavers and the dams they create in river systems. The immediate area that the beaver dam would affect in a river environment is referred to as the riparian zone (Figure 1). When beavers are put into an area they naturally build dams that can create sediment traps as well as raising the water level around the area to better water the whole habitat. At the same time that this can help it can also be a problem in a couple cases due to the raised water level flood plains also rise. Another positive factor for beavers is the diversity that they bring to an environment and the dams that other animals can use to cross a river, or the fish area they could create by the dams making ponds with slowed flow.

Figure 1. Schematic diagram of the riparian environment.



# The Role of Beaver Dams in Riparian Habitat of the Pacific Northwest

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### **Project Overview**

There are a few key concepts that should be highlighted and kept in mind when it comes to beavers and their impact on an area.

**Riparian Habitat:** A riparian habitat refers to the area of land that surrounds a river on either side; it can partially or fully include the floodplain depending on how the land is situated.

Sediment Traps: When we think about a sediment trap, the idea is that with a dam present in a river it will slow water down to the point where a lake or pond will form behind it, with entrapment of sediment (Fig. 2).

**Channel Complexity:** Figure 3 illustrates what happens to a section of river when beaver dams are added; the complexity and diversity of the stream increases significantly.

**Fish Populations:** In a study done on Bridge Creek and Murderers Creek in Oregon, researchers tracked steelhead in the two rivers prior for over two years prior to the addition of the dams, with increased survival rates following dam construction (Fig. 4).



### References

Pollock, Michael, Chris Jordan, Nick Bouwes, Joseph Wheaton, Carol Volk, Nicholas Weber, Jason Hall, and Josh Goldsmith. "Northwest Fisheries Science Center." Working with Beaver to Restore Salmon Habitat -. NOAA Fisheries. Web. 10 May 2016.

Gurnell, Angela M. The Hydrogeomorphological Effects of Beaver Dam-Building Activity. Birmingham: U of Birmingham, 1998. Web.

Pollock, Michael M., Joseph M. Wheaton, Nick Bouwes, Carol Volk, Nicholas Weber, and Chris E. Jordan. "Working with Beaver to Restore Salmon Habitat in the Bridge Creek Intensively Monitored Watershed." NOAA (2012). Web. 12 May 2016.



Figure 3: Beaver dams help a stream to progress from an incised trench (a) to an aggraded channel (e–f) by creating a positive feedback loop that changes physical processes and vegetation to improve habitat for themselves and other species.



Figure 4: Graph comparing survival rates of steelhead in two streams from John Day River Basin, Oregon.

With the addition of beavers into the environment many different parts of the riparian habitats will be affected and benefited. A huge benefit would be to the beaver population as a whole. Beavers are an endangered species and unless we allow them back into their natural habitat where they can reproduce and create colonies and dam complexes it is likely that the population of beavers will never rise. When considering the environmental impact that a larger beaver population would present it is a positive addition of extra rich sediment and structure to river areas. The extra trees and vegetation that arise from the enriched soil due to sediment traps from beaver dams provide extra root strength to help mitigate landslides as well as provide a better ground for organisms in nature to live and thrive. Another branch of benefit from beaver environment restoration would be to the fish habitat and fish population. It is seen in Figure 4 that through the addition of beaver dams the survival rate of steelhead in the given streams went up. This will help to improve the ecosystem as a whole and make sure that a fish population is not cut out completely from the world.

### Conclusion

- increased fish populations.
- channel complexity.
- with nutrients.
- riparian habitats.

### Go Beavs!

### Discussion

Restoration of beavers back into a river habitat are beneficial to rivers systems.

Increased beaver dams are associated with

Beaver dams create sediment traps and

Rising water levels reintegrate floodplains, improving water quality and enriching soils

Beaver dams promote species diversity and enhanced ecosystem services in

