BEST PRACTICES

Beaver (*Castor Canadensis*): As a Restoration Tool For Streams & Salmon

In the past, beavers were abundant and ranged over the entire North American continent, creating ponds and wetland habitats used by many fish and wildlife species. It is estimated that before the fur trade, beaver populations were as high as 200 million. Today, it is estimated that there are less than 1 million beavers living in North America.

Beaver are nature's ultimate engineer. Beaver fell trees and use the tree branches as construction material to form dams in shallow rivers and streams. They then use mud and vegetation to bind and seal the branches together creating a still water ponded reservoir behind the dam. The dams they create provide beaver with a place for food storage and safety from large predators while also providing refuge habitat for fish such as coho salmon and steelhead.

For decades, beavers have been severely misunderstood as their dams were thought to block access during salmon migration and that the water behind the dam was too warm for cold water fish. Not so! What we have learned is that beavers and salmon have evolved together. Even though a dam may seem impassable to migrating fish, they cleverly find a way through and around, migrating upstream to the gravel reaches to spawn. Only during the lowest flows are fish unable to migrate but once winter rains arrive they quickly move upstream. It has been documented that fish production in streams with beaver dam habitat produce larger and more numerous native salmon species. Research has also shown that ponds created by beaver serve as ideal nurseries for juvenile fish. The beaver's ponded water provides a perfect place for macro-invertebrates to grow which young fish feed upon (Pollock et al. 2007).

The ponded waters from beaver dams also provide many habitat functions that are crucial to the health of a watershed and to salmon production. One important function is the storage and recharge of groundwater. In a stream system occupied by beavers, the stream often has a large primary pond and many secondary ponds. These pools increase the surface water storage capacity, recharging the groundwater and increasing the underground soils saturation zone known as the water table.

Water table refers to the saturated zone in the soil. Below the water table, groundwater fills the spaces between rocks and sediment.

The ponded waters stored behind a beaver dam also positively affects stream flow, often changing the timing and delivery of stored water and nutrients. In the summer, water is captured and stored in the ponds, creating protection for fish while providing water flow to the stream channel throughout the summer's low flow period. During flood flows, the dammed ponds slow the water current, reducing or preventing erosion and the loss of incubating eggs in the gravel in addition to providing a calm refuge for smaller fish.

Biologists are currently reintroducing beavers to watersheds where streams have been degraded in order to restore geomorphic, hydrologic and ecological functions. By doing so, beavers help recreate natural stream channels, restoring off channel refuge habitats in ponding water created by the construction of primary and secondary dams. Through the felling of trees, beavers provide pool-forming, in-stream habitat features. The building of beaver dams also traps sediment needed to fill in incised streambeds, providing gravel substrate for spawning.

In areas where snowpack is decreasing due to changes in climate, beavers are being reintroduced to help ease low water impacts. By increasing the amount of beaver ponds and the size of ponded areas in an affected watershed, diminished water can be stored to recharge groundwater reserves and stream flows, providing essential habitat for fish and wildlife.

To learn more about beavers in restoration, visit tinyurl.com/y4kdgt8m.

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