

Lower Deschutes River Gravel Study



Our commitment to the Deschutes Basin

PGE and the Confederated Tribes of Warm Springs – co-managers of the Pelton Round Butte Project – are reconnecting the Deschutes River and restoring healthy, sustainable runs of migratory salmon and steelhead to the Upper Deschutes Basin. We work closely with partners across Central Oregon, including tribal, local, state and federal organizations. Protecting fish, wildlife and their habitats (both in water and on land) is critical to achieving our shared goals.

Overview

The Lower Deschutes River, home to robust populations of native Chinook salmon, steelhead and redband trout, supports both tribal subsistence fishing and a world-class sport fishery. These fish species rely on river gravel to create “redds,” or rocky nests in which to lay their eggs. Some of the most heavily-used spawning gravel bars are found just downstream of the Pelton Round Butte Project. These spots are traditional sites for Native American salmon fishing, and spawning activity over generations has shaped the gravel into a series of dune-like features that can even be seen in aerial photographs.

The need for spawning gravel

When the Pelton Round Butte dams were constructed in the late 1950s and early 1960s, the passage of gravel from upstream tributaries became blocked. Rather than naturally moving downstream, sediment entered Lake Billy Chinook and settled there. Consequently, the first natural source of gravel below the project is Shitike Creek, which enters the Deschutes River three miles downstream of the Reregulating Dam.

The potential loss of spawning gravel for salmon and trout was a major concern raised during relicensing of the hydropower project in the mid-1990s. The number of fall Chinook spawning in the Lower Deschutes River appeared to have declined, and the loss of suitable gravel below the project was a suspected cause. This left PGE, the Tribes and our partners asking: would it be beneficial to supplement gravel below the dams, replacing the river substrate that flows downstream during high water events?

Quick facts

Large inputs of groundwater give the Lower Deschutes River a naturally stable year-round flow.

Pelton Round Butte is operated as a “run of the river” hydroproject. Water released downstream must match inflow levels within 10%.

Ancient floods shaped the Deschutes River channel. Most of the flat terraces now used as recreational campsites were formed around 4,500 years ago.

In recent years, spawning of fall Chinook downstream of the project has reached historic highs.



In Phase 1 of the gravel study, tagged tracer rocks were surveyed, providing information on river flows and use by spawning salmon.

Researching for answers

In order to answer this question, PGE and the Tribes, with help from state and federal agencies, conducted several studies on the geology and hydrology of the Deschutes Basin. The Deschutes has always had unusually stable year-round flows, a product of the watershed's volcanic rock, which allows mountain snowmelt to percolate into the ground and emerge from large springs. Consequently, our initial studies suggested that the rate of gravel loss below the dams is relatively low, with significant sediment transport only taking place during rare flood events.

The Lower Deschutes Gravel Study (a continuation of this preliminary research) was launched in 2007 to further evaluate the potential effects of our hydropower project on gravel transport. This multi-part study has involved extensive field monitoring to measure changes in gravel quantity, quality, movement and salmon/steelhead use.

Phase 1

- From 2007-2014, over 200 rocks (all suitably-sized for Chinook spawning) were tagged with microchips and monitored for movement.
- We utilized Acoustic Doppler Current Profilers to map the river channel floor in seven locations, totaling 34 cross-sections.
- Six natural gravel bars in the Lower Deschutes were extensively mapped and monitored for trout spawning.
- In 2008, we constructed three experimental gravel bars in areas that would naturally have similar deposits. These sites were mapped and closely monitored for gravel movement and fish use.

Results from Phase 1 confirmed that most gravel transport occurs in local, limited areas and the overall rate of gravel loss is low. Despite earlier concerns, trout and salmon were found spawning at sites both upstream and downstream of Shitike Creek, and the available spawning gravel was of excellent quality for developing young fish. Three independent river science experts reviewed the results, and concluded further studies were needed to address additional criteria before making a recommendation on a future gravel augmentation program.



A digital camera suspended from a weather balloon was used to take high-resolution images of our gravel augmentation study sites.



Phase 2

This phase of the study, which began in 2017, is larger in scale and scope than Phase 1, and involves preliminary monitoring of redds, rocks, islands and bedload; augmentation in several strategic locations; and analysis of results. When the study is complete, the Pelton Round Butte Fish Committee will decide how to proceed, with an eye toward our shared, over-arching goal for the Deschutes Basin: the restoration of a connected and sustainable ecosystem.

(Left) In summer 2019, a heavy-lift helicopter placed logs and gravel in the Lower Deschutes at strategic study sites.

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