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# LANDSCAPE ARCHITECTURE MAGAZINE

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## CHANGE AGENTS

### IN OREGON, BEAVERS ARE HELPING TO RESTORE INCISED STREAMS.

BY LISA OWENS VIANI

The latest river restoration tool in the American West has sharp yellow teeth that can snap a willow sapling in half in seconds. Long regarded by flood control and even wildlife agencies as a troublesome pest, the North American beaver (*Castor canadensis*) is beginning to be more positively recognized as a partner in efforts to increase fish populations and biodiversity, particularly where erosion has caused streams to incise—that is, to downcut lower than their floodplains.

“They’re the original landscape architect,” says biologist Brock Dolman of the Occidental Arts and Ecology Center’s WATER (Watershed Advocacy, Training, Education & Research) Institute in Northern California, who recently convened a one-day conference on the benefits of beavers. Dolman is part of a groundswell of scientists, environmentalists, resource managers, and open-



minded landowners who want to change old mind-sets about the paddle-tailed critter.

And there’s new research to back their efforts. National Oceanic and Atmospheric Administration (NOAA) Fisheries scientist Michael Pollock has been observing the work of beavers on Bridge Creek, a tributary to the John Day River in ↘

**ABOVE**  
Long regarded as a nuisance species, beavers are now being considered a river restoration tool.

HEIDI FERRYMAN, WORTH, DAM, MARTINEZ, CALIFORNIA

**BELOW**

No sooner had scientists installed wooden posts across Bridge Creek than beavers came and built their dams behind them.

**BOTTOM RIGHT**

Beaver dams have created pools and swampy areas on Bridge Creek, boosting fish habitat and biodiversity.

→ Oregon, for the past nine years. After white settlers came to the area in the early 1900s, the creek bed eroded so that the main channel was three to 10 feet deeper than its former floodplain in many places. This caused the water table to lower, drastically reducing the area that could support a riparian forest and recharge the creek with cool water during the summer months.

In sections of the river where a small beaver population thrived, the beavers' dams were helping to raise the level of the river and the water table as sediment filled in behind the dams—a process called aggradation. But during high flows, the dams were blown out, one by one. By themselves, the beavers might be able to restore the river, but it would likely take centuries.



**AREAS THAT WERE ONCE COVERED IN SAGEBRUSH HAVE BECOME WILLOW THICKETS.**



Waiting, however, was not an option. "The [chinook] salmon are going extinct now," says Pollock, so in 2008 NOAA decided to help the beavers along. At four sites, researchers drove in wood fence posts perpendicular to the ground, in a series of lines across the creek. In between the posts at some sites, they wove in willow and cottonwood branches, favorite building materials of the beaver.

After the structures were installed, beavers moved in from other areas, and they began to build dams behind the structures, where, as expected, sediment then began to accumulate on the streambeds. In some places, the sediment raised the beds by about three feet in less than a year, says Pollock. Then the research team came back and built another series of structures on top of that new raised bed, and the beavers built more dams. That started pushing water up onto the floodplain terraces.

The creek is spreading out more over the floodplain now. Areas that were once covered in sagebrush have become willow thickets, and the amount of pool habitat—deep water positively correlated with fish

abundance—has increased dramatically, says Pollock. The researchers have seen an increase in steelhead trout, a federally threatened species, at the sites where the beavers built their dams. Chinook salmon, another federally listed species, remarkably have also begun spawning in and around one of the restored sections, presumably because of the increase in the number of deep pools, which help them survive the dry season.

Pollock points out that beavers may disturb human-designed and built stream restoration projects—but that's not a bad thing, he thinks. "This complex habitat they create is better than a static channel that just maintains its form for 10 to 20 years." Pollock says a dynamic stream provides a rich tapestry of different habitat types essential for salmon survival. "A static channel often looks nice but provides limited habitat benefits. If you watch beaver for a long time you realize they are the masters of creating dynamic habitat, and that is where all the fish and wildlife are."

He and others who are working with the animals may soon get some legislative help: A bill before the Washington state legislature acknowledges the multiple benefits of beavers and encourages their use in restoration (although it does not provide funding).

Dolman is eager for California to get on board. "The majority of our waterways are legally and socially acknowledged to be in pretty bad shape," he says, "yet the economic crisis keeps us from fixing them." Encouraging beavers could be an inexpensive solution in many places. ●