NRCS Natural Resources Conservation Service Washington

CONSERVATION Showcase

Program helps restore hydrology, wetlands, cultural resources on Yakama lands

Tracy Hames unfurls a three foot map across the hood of his vehicle. Nearby, birds chirp excitedly as they flutter amid the branches in a willow grove. A pair of ducks takes wing in the distance. Across the expanse of tule reeds, cattails and shallow ponds, shorebirds feed – silently pacing along the water's edge, stabbing at insects with their spear-like beaks.

Even in the heat of the mid-day sun, the land is teeming with life. But this life has returned in abundance only recently – as the result of an expansive and innovative restoration effort.

Tribal Wildlife Biologist Tracy Hames, right, and NRCS Tribal Liaison Roger Amerman, pause near one of the 28 engineered grade control structures that have helped restore the natural hydrology to Mid-Toppenish Creek.

"We take a different angle on how we do management and restoration," Mr. Hames says sweeping his hand across the map that depicts the 21,000 acre Toppenish Creek restoration project in the Yakima Valley of south-central Washington. Clearly, he doesn't need the map to know where he is or what this project's about. After almost 18 years of leading the project, the Yakama Nation wildlife biologist knows the land like the back of his hand. The map is there for illustrative purposes only.

"We don't ask, 'How can we set this up to provide the most benefit for a specific use?'" he says referring to the Tribe's resource management and restoration philosophy. "We're saying, 'This is an important area for the Yakama people. They've used these areas for thousands of years for a lot of different purposes. They've really culturally evolved in these natural areas here.'

"We look at this area and ask, 'What did this place look like historically? How did it function ecologically? What's changed since a couple hundred years ago? And what can we do to bring it back to some semblance of – in a modern context – how it was?'"

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At right, NRCS has committed more than $340,000 to the Yakama Nation's Tribal wetlands restoration efforts, seen here in the foreground with majestic Mt. Adams as a scenic backdrop.

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Roger Amerman
NRCS Resource Conservationist and Tribal Liaison

Fixing the water, restoring the land

The key to bringing it back, the biologist for the Confederated Tribes and Bands of the Yakama Nation says, is restoring the hydrology. "And that's where Wetlands Reserve Program (WRP) comes in," he says.

Mr. Hames says the natural hydrology of Toppenish Creek is significantly different than it was historically. "So," he says, "we're trying to restore the hydrology – to get the water working the way it used to. That's what we're talking about when we talk about hydrologic restoration. The first thing we want to do on a project like this is 'fix the water.' Then you can start working on all of the other components."

In this case, Mr. Hames says, "the WRP was the key to fixing the water." The WRP is administered by USDA's Natural Resources Conservation Service (NRCS) and provides financial incentives to develop habitat for fish and wildlife on private and Tribal lands.

"This was a perfect fit for WRP," says NRCS Resource Conservationist and Tribal Liaison Roger Amerman, "especially because this gave us an opportunity to contribute to a restoration project on a watershed scale."

Mr. Hames explains that historically, Toppenish Creek was just a small stream with multiple channels. Over time, natural levees developed from the heavier substrate flood water deposits, which naturally raised the bed of the main channel higher than the side channels. In addition, beavers built dams to hold the water levels high, which helped flood the wetlands through the side channels. But in the 1800s there was a concerted effort to remove the beavers and to convert the wetlands to agricultural purposes.

By late 1800s, the beavers were all but gone as were their dams. Eventually, the existing beaver dams failed, the creek busted out, and the creek's water was captured by a minor side channel to the south in a lower elevation of the flood plain.

When the flood waters came out of the mountains as part of the natural snow runoff cycle – because the water could no longer spread itself out – it caused the main channel of the creek to dig deeper and deeper. It's a geologic phenomenon known as incision. "Eventually you get a stream so disturbed that even the beavers can't bring it back on their own," he says.

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Bringing back the floods, naturally

Consequently, a critical part of the restoration effort focused on restoring the stream's hydrology, so the floods can re-occur. "You can't restore ecosystems and natural flood plain habitat if the land doesn't flood," Mr. Hames says.

Through NRCS' program, the Tribe has installed 28, man-made grade control structures to lift the base level of the creek up several feet, in order to allow the beavers to begin restoring it again and to allow the floods to perform their hydrologic role.

With the grade control structures in place, a backhoe operator breaches a temporary de-watering dam, allowing water from Mid-Toppenish Creek to flow along its historic channel. (Photo courtesy Tracy Hames.)

"The next step is to get the beavers in and get them working in the system along with our restoration here," Mr. Hames says. There's evidence, he says, that the beavers are already returning.

"Eventually," Mr. Hames says, "we'll have a channel running with wetlands and side channels that flood and drain according to the water that's coming down through the system here."

Before designing and installing the structures, the NRCS, worked with the Tribe, Ducks Unlimited, and Geomax Inc. to develop a topographic survey of the floodplain. In the end, the 28 grade control structures affected 1600 acres of restored floodplain wetlands.

A kinder and gentler structure

"They look like real simple structures, but there's a lot of engineering in them," Mr. Hames says standing atop a row of the columnar basalt rocks, which comprise the structure and stretch across the stream. "The rock is taken from a place here on the reservation and the structures are engineered such that they form and inverted 'V' so the point of the 'V' faces upstream, forcing the flow toward the middle of the stream to reduce bank erosion. They also act like natural cascades, making it much easier for the fish to pass upstream – unlike many irrigation structures," he says, kneeling near the spot where the clear water cascades gently over the rocks into a shallow pool about a foot below. At first glance, it's hard to believe it's a man-made structure.

But Hames says the lack of obvious engineering is by design.

"You go out on this project and you don't see a three-mile dike," Mr. Hames says. "You don't see big, ugly structures you have to put in for your management. Visitors come to the project and often say, 'What did you do here? I don't see any management.' It's not obvious," he says. "and we don't want it to be obvious."

NRCS' Amerman says the natural look and feel of the structures required a "softer engineering approach" that his

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agency utilizes often in its restoration efforts. These "softer" engineering practices, Mr. Amerman says, rely less on concrete and steel and more on working with nature's ecosystems and processes.

"Success in this project is measured by the great natural restoration improvements across the landscape," he says, "yet one can barely discern that humans have been working there." NRCS' Amerman says that engineering with nature tends to yield better results in the long run. "Plus," he says, "the structures generally require less maintenance and are more cost-efficient over time."

In addition to restoring wetland hydrology, upland plantings, like this stand of basin wild rye, were established to enhance wildlife habitat throughout the restoration project.

The rock water control structures are also kinder and gentler for fish. "Fish coming upstream can swim right through these points," Hames says pointing to where the water spills over the rocks. "Because like a notch in a beaver dam," he says, "the water doesn't churn coming through the structure. That's important for fish heading downstream, too."

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This fish-friendly aspect of the design is especially important because Toppenish Creek and Satus Creek (the two watersheds contained on the Yakama Nation) are responsible for somewhere between 50 and 75 percent of all of the Mid-Columbia Steelhead production in the Yakima River Basin, Mr. Hames says. "This species was listed as 'threatened' a few years ago," he says, "so that makes Toppenish Creek the most important place for steelhead in the Yakima basin right now."

After conducting fish population surveys, biologists discovered that the juvenile steelhead come down the stream with the winter rains as early as November each year. "We found out that they're hanging out in this area over the winter where, historically, there were beaver dams, wetlands and side channels," he says. "When we catch them in November and December they're only 3-4 inches, but when we catch them later in the spring, they're significantly larger. We've discovered that this is an important winter rearing area for the steelhead."

That discovery was a revelation for researchers. And for Hames, it underscored the importance of restoring the natural conditions in the flat, lower elevation wetland areas. "Fish need complex habitat like those found in wetland areas like this so they can stay away from predators, so they can have the bugs – all the things they need to survive," he says.

With the project only a year old, it's too early to tell if the restoration efforts have had a positive impact on the steelhead numbers, but the Tribe is closely monitoring the fish population and a number of other environmental conditions, including ground water levels.

"What we've documented here is that

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once we'd put one of these grade control structures in, the wells influenced by that structure rose two feet," Mr. Hames says. "So we were immediately affecting the groundwater resources." That's important, he says, because a significant portion of the water flow from creeks and rivers occurs underground.

Monitor, learn and tweak

The Yakama Nation is also monitoring wildlife response, and have vegetation transects, photo points, and flow gages in place – all to monitor and evaluate the restoration impacts.

Above, Katrina Strathmann, restoration biologist, (left) and Camella George, vegetation technician, are conducting plant inventories throughout the riparian corridors of the project to determine the effects of restoration activities on plant communities.

Monitoring is a critical component in managing the restoration, Mr. Hames says, because the basin's hydrology remains altered due to upstream irrigation. "Even once you get the channels back," he says, "the water still isn't acting the way it did historically, because upstream from us there have been impacts. What that means is sometimes you use water level control as part of management," Mr. Hames says. "We use these water level control structures to raise and lower the water levels in the wetlands to mimic the natural conditions."

He admits that because of the size and scope of the project, managers may "need to do some tweaking here." But, he says, that's one of the design advantages of these structures. "If we need to lower the elevation, we can do so fairly easily with a backhoe or other piece of machinery," Mr. Hames says. "That's the beauty of this kind of work."

Restoring resources, restoring culture

"It's not about emphasizing one resource over another," he says. "It's about bringing the watershed back into balance, as it was years ago. By re-creating these landscapes from top-to-bottom, the Yakamas look at this as cultural restoration – not just resource restoration," Mr. Hames says.

"We want to restore areas that can actually be of use to the Yakama people. We want them out here interacting with their landscape," he says, "and to bring back the cultural resources of the Yakama people."

"When you see what the restoration of these natural resources means to the Yakama Nation," NRCS' Amerman says, "you realize that WRP isn't just about wetlands. It's also about people. It's about restoring hope. It's about restoring a unique plateau heritage that is intimately connected with the natural world. "And," he says, "it's about perpetuating and restoring the cultural watershed of the Yakama people."

Written and photographed by Ron Nichols, NRCS, July 2007