

Where there's a weir, fish find a way

First big catches a testament to Grand Ronde's Natural Resource efforts

By Ron Karten

Smoke Signals staff writer

The storms of early October swelled Agency Creek and coho salmon began arriving at the Tribal fish weir. (The steelhead are expected in late December or early January.)

These old coho souls were headed a little further up the creek, where their ancestors went, to lay their eggs and settle back for the big sleep.

First, however, Tribal Natural Resources staff members had a job to do. They noted the size, age and sex of each salmon, and netted them as they swam around in the little caged space of the weir.

Staffers punched a hole in the fish gills so if they happened to cross back downstream, they could come through the weir again without all the bureaucratic rigmarole.

It's part of the process of developing a wildlife management plan, said Tribal Natural Resources Fish and Wildlife coordinator Kelly Dirksen.

The plan starts the process of building successful fish habitat further up the creek "to establish steelhead in catchable numbers.

To do that, you have to have accurate numbers about the number of fish moving upstream," Dirksen said.

More than a month after the first October storms, the coho were thicker than ever in the weir. On Nov. 13, Natural Resources staffers caught, weighed and measured 103 fish. That is nearly four times more than the previous one-day total of 28, seen two years ago on the same creek.

At Willamette Falls to date, 1,166 coho have passed through and 252 have been caught. That appears to say that more than 20 percent of the coho in the Willamette Basin are coming up here, Dirksen and Tribal engineer Eric Scott, who designed the weir, said.

"Either their counts are off or we

have some extraordinary habitat," Scott said.

The weir itself is the first of its kind, according to Scott and hydraulics designer Paul Schwinn, West Coast Fluid Power manager of Cleveland, Ohio-based Applied Industrial Technologies.

"One of the things that makes it so unique," Scott said, "is it can be put in a stream that receives a lot of debris. It's a self-clearing system."

However, it's not full-proof. The mechanism designed to tip the gate down when debris clogs it stalled that day.

"We expected to have some bugs to work out with this thing," Dirksen said. "As the only thing like it in the nation, I think it's reasonable to have some problems, but so far, it's been amazingly successful."

"(Operating this weir is) not an exact science," Schwinn said. "Believe me."

The problem has since been worked out, but even before that there was quite a bit of excitement about how well the weir worked.

"We didn't expect to see anything like we're seeing," Dirksen said. "We're less than 1 percent of the Willamette Basin and we're getting more than 20 percent of the fish. That says something pretty phenomenal about our habitat and our efforts."

Computer-driven, the weir's mechanical functions run on solar-charged 12-volt deep cell batteries. It's also designed to change the size of the traps to catch smolt as well as different sizes and species of fish, and to isolate fish from one another.

Previously built Tribal weirs, which were far less substantial, were wiped out by the end of each season, Scott said. This one is more than still standing.

It appears to be a giant step forward in the Tribe's effort to deliver the best fish habitat in Oregon, he said. ■

"We're less than 1 percent of the Willamette Basin and we're getting more than 20 percent of the fish. That says something pretty phenomenal about our habitat and our efforts."

~ Natural Resources Fish and Wildlife coordinator Kelly Dirksen



Riley Bernard, left, a seasonal biology tech for the Tribe's Natural Resources Division, and Jason Bernards, a new forester for the department, measure and tag a coho salmon heading up Agency Creek to spawn in the Tribe's new, computer-driven fish weir.

Photos by Ron Karten

Fish weir explained

In simplest terms, a fish weir is a tool to capture adult salmon and steelhead. But the Agency Creek fish weir is anything but simple.

Agency Creek has been known to increase in depth from less than a foot to more than 8 feet within 48 hours. Logs greater than 4 feet in diameter and debris rafts larger than a car have routinely been seen floating down Agency Creek in high-water events.

So how do you develop a trap that can safely catch fish yet withstand the debris and powerful stream flows? That is no easy feat. The design, development and permits for this project took more than two years to complete.

The fish weir spans 37 feet across Agency Creek. The 8-foot-tall weir gate is made of six welded aluminum panels with vertical bars spaced to allow a one-foot gap between the bars.

The panels are welded to a sleeve and carrier pipe, allowing the panels to pivot from the bottom across a sill (concreted footing). The individual panels are connected to a large steel beam or "strong back" affixed with lifting eyes on either side.

Migrating fish are directed through a side channel on one side of the structure and funneled between diagonal rows of pickets (fyke) into a big concrete fish box. The trapped fish can then be counted and studied by Tribal biologists before being released to continue their upward migration. The weir also allows biologists to assess the health, migration timing and sex ratio of returning fish.

The weir gate is operated by two large hydraulic cylinders controlled by a computer. The hydraulic system was designed and manufactured by Applied Industrial Technologies in close coordination the Natural Resources staff and the Tribal engineer to meet the requirements of the project.

The hydraulic pressures are continuously monitored by the computer. The programmable logic allows for adjustable set points which trigger operation of the hydraulic cylinders. If the weir gets loaded up with leaves and debris, the pressures will rise. Once the pressures rise above the set points, the hydraulic cylinders will release and the panel will lower, allowing the debris to clear.

After a preset down time, the hydraulic cylinders will automatically retract, the panels will rise and the system will reset itself. The computer will recalibrate the pressures with each operation to account for rising or lowering water levels.

Similarly, if the panel is affected by large debris like a tree stump or big log, the panels will immediately

lower to prevent the weir from sustaining damage.

The fish weir was designed by Tribal Engineer Eric Scott in collaboration with Kelly Dirksen, Tribal Fish and Wildlife coordinator. The concrete foundations were constructed by Round Valley and Gelco Construction last fall. The weir panels and hydraulic cylinders were installed by Sumco Excavating with help from Natural Resources staff. The metal fabrication was done by Welliver Metal Products.

While the fish weir itself is an impressive machine, it almost pales in comparison to the spectacular results it has generated so far this season. Fish that travel to Agency Creek must cross Willamette Falls. The Oregon Department of Fish and Wildlife operate a fish ladder at the falls and count salmon and steelhead as they travel through. As of Nov. 22, 1,166 coho had crossed the falls. To date the fish weir has captured more than 250 coho. This is an astounding 20 percent of all coho in the entire Willamette Basin in a stream that makes up far less than 1 percent of the basin.

This is an incredible proportion of fish for the basin and reflects well on the Tribe's management of the land. Over the last 10 years, 13 culverts were replaced that posed an obstacle to fish passage, this resulted in more than 20 miles of stream opened for fish use.

More than 160 logs and root wads were placed in Agency Creek to improve spawning and rearing habitat for fish. Additionally, Natural Resources staff annually place approximately 4,000 pounds of surplus salmon carcasses in the stream that provide a valuable food source for developing salmon and steelhead.

The current fish count at the weir is a validation of the tremendous effort the Tribe has made over the



Bernards holds a net as Bernard pulls a coho out to be measured and tagged. Below is a look at most of the fish weir now straddling Agency Creek.

years to manage and improve its natural resources.

The coho run is probably about finished for this year. This fish is generally considered non-native to the system. The coho are naturally reproducing in Agency Creek but they are thought to have originated from stocking programs discontinued in the 1980s.

Steelhead should start arriving at about the first of the year. Steelhead

are historically native to the stream. Although many Tribal Elders have told of successfully fishing for steelhead in the past, the fish is now extremely rare and listed as threatened by the federal government.

The long-term goal is to see steelhead in equal or greater numbers than the coho. The fish weir is one part of a two-part system to monitor salmon and steelhead in Agency Creek.

The weir is in operation from mid-October through April and is intended to get a count of adult salmon and steelhead. In February, a rotary screw trap will be deployed to capture and get a count of juveniles migrating out of the system. This way staff biologists can get a count of adults and juveniles and from there they can calculate juvenile to adult survivorship, a critical bit of information that is key to developing a reliable management plan and hopefully someday a fishable steelhead population on the Grand Ronde Reservation. ■

Written by Tribal Fish and Wildlife coordinator Kelly Dirksen and Tribal Engineer Eric Scott.

