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Northwest Treaty Tribes

Protecting Natural Resources for Everyone

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Inside:

We Must Move Forward on Water Quality Standards

by Lorraine Loomis, NWIFC Chair

In an unfortunate reversal, the U.S. Environmental Protection Agency (EPA) has decided to reconsider our state's new water quality standards – the most protective in the nation – based on an industry trade group petition that argues the rules will increase their cost of doing business.

Treaty Indian tribes in western Washington believe a pollution-based economy is not sustainable and that no price can be placed on the value of human health or the resources that sustain us.

It's been less than two years since the EPA stepped into the rule-making process to ensure that our water quality standards are based on the best available science. The federal Clean Water Act requires states to develop rules that ensure our waters are clean enough to provide healthy fish and shellfish that are safe to eat.

Water quality standards include human health criteria based on how much fish and shellfish we eat. The more we eat, the cleaner the water must be. Two numbers drive the standards: our fish consumption rate and our cancer risk rate from eating local seafood.

For more than 25 years, the state used a fish consumption rate of only 6.5 grams per day – or about one big bite – to determine water quality standards. The cancer risk rate from consuming toxics in seafood was set at one in 1 million.

After EPA got involved, Washington's water quality standards were revised about 18 months ago to include a more realistic fish consumption rate of 175 grams (about 6 ounces) per day. The cancer risk rate remained unchanged.

The updated water quality standards were the result of years of extensive public processes at the state and federal levels, involving tribal governments as well as industry representatives, environmental groups and other stakeholders. The standards are based on science that accurately reflects what happens when we are exposed to pollution in our waters. They also include a wide range of implementation tools and generous timelines for implementation.

Now our hard-fought gains to protect human health are threatened.

There is no new science or law that justifies EPA's reconsideration or that would lead to a different result. EPA's response to industry's petition is simply an agreement to participate in rehashing issues and concerns that were discussed, debated and resolved through a lengthy rule-making and public process that spanned decades.

What has changed is the current anti-regulation approach to a strong economy. We believe that human health and environmental quality are the keys to economic health.

We agree with Maia Bellon, director of the state Department of Ecology, who told the EPA that she opposes any reconsideration of the current water quality rules.

"What Washington state's communities and businesses need the most right now is predictability, certainty and flexibility to meet clean water requirements," she said. "We are well on the path of providing just that."

We also agree with Gov. Jay Inslee who said in 2015: "We will not fall victim to the fear mongers who have attempted to block every clean-air and clean-water law since Earth Day 1970 by arguing we cannot have a healthy environment and a healthy economy. They have been wrong every time."

For 17 days, we all watched with great sadness recently as a grieving mother orca carried her dead calf around the Salish Sea. Pollution in our water and fish are part of that story. Those orcas are us, the late tribal leader Billy Frank Jr. would say. What happens to them will one day happen to us.

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On the cover: Skokomish tribal member Nichole Green pulls in a beach seine during a chinook fishery near Hoodsport in August. *Photo: T. Royal*

Katy Foster, NOAA permit 18786

Tribes Support Killer Whale Task Force

With southern resident orcas at their lowest numbers in decades, the world's attention is focused on the decline of Puget Sound chinook salmon.

The treaty tribes in western Washington have been calling for years for bold actions to recover chinook salmon, including increased hatchery production, habitat restoration and protection, and determining predation impacts from seals and sea lions.

Treaty tribes are participating in a statewide Southern Resident Killer Whale Recovery Task Force, which aims to provide Gov. Jay Inslee with specific, effective and immediate suggestions to help the southern resident orcas.

The southern residents of the Salish Sea – known as the J, K and L pods – were down to 75 orcas from a high of 98 in 1995. Unlike transient orcas that eat other marine mammals, these orcas eat only fish – specifically, chinook salmon – and whale researchers believe that they're starving to death.

Worldwide media caught on to the story of the threatened population this summer when a mother orca named Tahlequah, or J35, carried the body of her dead newborn calf around the Salish Sea for 17 days. At about the same time, an unprecedented rescue effort began to save a 4-year-old orca known as J50, or Scarlet.

J50 was emaciated with the shape of her cranium visible through her blubber, a condition known as "peanut head," and she was lagging behind her pod.

Members of the Lummi Nation collaborated with the National Oceanic and Atmospheric Administration, Washington Department of Fish and Wildlife, and whale researchers to get medicine and nourishment to the young orca.

"Lummi Nation is just stepping up to do the right thing and do what we can to help," said Lummi Chairman Jay Julius. "We are answering the call of *Xa Xalh Xechnging*, our sacred obligation."

An antibiotic was delivered to J50 via dart, and Lummi's fisheries enforcement boat was used to deliver live hatchery chinook salmon to her.

After the first feeding attempt on Aug. 12, it was not clear whether the orca ate the fish, but researchers continued to monitor her. The team administered a second dose of antibiotics Sept. 4, but lost sight of the whale for several days. On Sept. 13, the Center for Whale Research declared J50 presumed dead. Her death would bring the total number of southern resident orcas down to 74. – *K. Neumeyer*

K. Neumeyer

Candace Emmons, NOAA permit 18786

Top: J50, a four-year-old orca also known as Scarlet, surfaces near Point Roberts. Middle: Lummi Chairman Jay Julius, left, transfers a hatchery chinook salmon to a tote before attempting to feed it to J50. Right: J50 swims near a Lummi Nation boat, which released live chinook to feed the ailing young orca.

T. Royal (2)

Above: Port Gamble S'Klallam tribal member Stormy Purser digs for clams at Point Julia. Right: Port Gamble S'Klallam tribal member Matt Ives sets up salmon and horse clams to be cooked over a fire.

Teaching Harvesting, Cooking Techniques

When Port Gamble S'Klallam tribal member Shallee Baker grew up on the reservation, she didn't have many mentors to teach her the tribe's traditional practices.

"I started thinking about other kids on the reservation who are in the same situation – either in foster care or maybe they just don't have parents or resources to teach them their culture," she said.

In 2017, Baker, the tribe's natural resources department education and outreach coordinator, started "Sustainable Little Boston – Traditional Sustainable Practices," a series of classes where tribal members learn the practices of their culture from elders and traditional knowledge keepers, while protecting the environment like their ancestors.

"It is vital that we keep our S'Klallam traditions alive by teaching our youth and community as a whole about how to harvest without damaging the environment, and in ways that will sustain our resources and culture over time," Baker said.

There have been 10 classes since 2017, covering topics including how to harvest cedar bark for traditional clothing and basketry, prepare and smoke salmon in a smokehouse, use nettles in cooking, and prepare a traditional seafood bake.

"We noticed there's people who don't know how to do the things we automatically assume, such as harvesting shellfish properly," Baker said.

For the seafood bake, tribal elder Gene Jones spent three days teaching students how to pick rocks for the fire (dark-colored ones so they don't crack while hot); how to prepare ironwood branches for cooking fish and clams (make them 4 feet long and 1 inch thick); and how to dig for horse clams without damaging the meat (be a really, really fast digger).

The classes are open to youth and adults of all ages.

"To me, the variety of ages is special because with this kind of work, it not only protects our environment and our natural resources but it's a rite of passage," Baker said. – *T. Royal*

A Whale for Makah Days

The Makah Nation was able to celebrate its whaling culture during the 2018 Makah Days, when a whale was gifted to the tribe after it had been struck and killed by a ship near Sekiu.

Justin Parker, Makah Nation

Keeping Cedar Bark Gathering Skills Alive

Suquamish Tribe members Peg Deam and Martha Mabe walk down a logging road near Bremerton, looking for cedar trees to harvest.

After about 10 minutes, the women find a grove of cedars. Deam sizes one up from top to bottom.

"Think I could get a good strip out of this?" she asked.

"Not if I don't get one bigger," Mabe said.

Deam places a hand on her cedar and closes her eyes, silently asking it for permission to harvest. Part of harvesting is having respect for the trees, she said.

Using a small axe, Deam makes shallow cuts into the bark just above the trunk. She creates a 6- to 8-inch-wide tab that she'll use to strip off a long piece that runs up the tree, leaving behind the wet and smooth surface of the tree's wood core.

"You have to be skillful with the axe and not harm the wood and the tree," she said.

Deam pulls apart the rough gray outer bark from the golden inner bark. She holds the fresh strip to her nose and inhales.

"It smells like fresh water almost," she said. "It's an aroma that is unique to the tree."

Deam wraps the remains of the outer bark around the bottom of the tree, so as it decomposes, the nutrients go back into the tree, she said.

The inner bark can be used to make traditional clothing such as vests, skirts and capes.

Basket weavers can use the material immediately, but the bark must be dried for at least three years before it can be used to make clothing.

After drying, the strips are pounded to loosen the fibers to make them softer and easier to weave.

"Our ancestral fishermen used to make twine and rope out of it for whaling," Deam said.

Tribal members also work with the tribe's forest practices coordinator and ecologist to harvest sustainably from selected forests in Kitsap and Jefferson counties.

Deam learned the basics decades ago from tribal elders Martha George (Suquamish) and Bruce Miller (Skokomish).

Deam has developed her own techniques and teaches others who want to learn the practice, such as Mabe.

"It's in me," Mabe said. "It just is what I feel and when I was watching and listening to her talk about harvesting, I decided to try it out and it felt comfortable, like home. It's just what I think I was meant to do."

– T. Royal

T. Royal

Suquamish tribal member Peg Deam separates the inner bark of a cedar tree strip from the outer bark.

E. O'Connell

Tribal Canoe Journey

Members of the Quileute Tribe's canoe family participate in the Tribal Canoe Journey protocol hosted by the Puyallup Tribe of Indians in August. More than 100 canoes pulled from as far as British Columbia and the Pacific Coast to convene at the South Sound tribe's reservation for the annual event that celebrates Coast Salish and First Nation canoe culture.

Tribal Camps Connect Resources to Culture

E. O'Connell

Kalvin Valdillez, Tulalip News

Top: A student at the Steh-Chass Youth Camp prepares a water quality sample. Above: Kydalynn Hoelzle, left, and Marianna Richwine learn about marine life during Tulalip's fish camp.

Youth Learn Cultural Uses for Plants

Tribal youth attending a two-day camp on the shores of Budd Inlet learned how ecology and traditional tribal knowledge are intertwined.

Instructors described the life history and environmental needs of native trees, as well as ways tribes traditionally used trees and their cultural meaning.

"It isn't enough for us to communicate to the kids where an oak will grow or what species depend on a Douglas fir," said Peggen Frank, executive director of the environmental nonprofit Salmon Defense. "We wanted to make sure they knew that the big leaf maple was the 'community tree' because it brings together families with all its uses."

The middle- and high-school students also dissected salmon, tested water quality and made fir needle lip balm.

The camp was part of the Festival of the Steh-Chass, hosted by Salmon Defense, the Squaxin Island Tribe, and the Deschutes Estuary Restoration Team. Additional funding came from the Nisqually, Puyallup and Tulalip tribes.

Steh-Chass is the Lushootseed name for Budd Inlet and for the band of Squaxin people that lived there.

Campers Travel from Mountains to the Sea

The Tulalip Tribes have taken youth cultural education from the mountains to the sea.

"From whitecap to whitecap, this is our ancestral land," said Patti Gobin, Tulalip natural resources department special projects manager.

For three summers, tribal youth between 11 and 14 have attended a Mountain Camp in the Mount Baker-Snoqualmie Forest in the upper Skykomish watershed. This year, a group also went to Fish Camp on Lopez Island, one of the San Juan islands where Tulalip tribal members fished traditionally.

"We started Mountain Camp three years ago, and we wanted to extend that experience out to their other traditional lands here in the islands," said Kelly Finley, the tribe's outreach and education coordinator.

At Fish Camp, the youth dug clams and learned how to steam shellfish using hot stones on the beach. They also made Indian ice cream for the first time. Bearing little resemblance to modern ice cream, the traditional food is made by smashing soap berries until they get frothy.

"Tulalip youth explored areas throughout Lopez Island, seeing signs of the deep history of Coast Salish peoples in ancient shell middens, deep trenches, relic camas gardens and traditional reef net sights," said Libby Halpin Nelson, senior environmental policy analyst. Other camp activities included storytelling, snorkeling and learning about marine life.

"I like (camp) because it brings me more towards my culture, and I've been thinking about getting a lot closer to my culture," said camper Kane Hots.

– E. O'Connell and K. Neumeyer

Kukutali Preserve Restored for Both Fish and Visitors

The Kukutali Preserve continued its transformation this summer from a private island to a system of public trails surrounded by intact shoreline habitat.

Formerly known as Kiket Island, the preserve on the Swinomish Reservation was purchased jointly in 2010 by the Swinomish Tribe and the Washington State Department of Parks and Recreation.

On a blustery morning in June, tribal and state co-managers dedicated a new visitor shelter overlooking Similk and Kiket bays, with a view of the Deception Pass Bridge. New signage also was installed, designed by artist Cecelia LaPointe, telling the land's story from the point of view of both the tribe and the state.

A timeline reads, "Before the arrival of Euro-American settlers in the Pacific Northwest, Kukutali had been part of the territory of the Swinomish people. Here, women gathered cattails, men hunted and fished, and shellfish were harvested from fertile tidelands."

Text alongside a painting of canoes landing reads, "Kukutali's tidelands, and the waters that surround them, fed the Swinomish people well for countless generations. . . . Our ancestors wove weir nets from willow and cedar bark and laid them in the water. When the fish came into these nets, we would pull them up and bring the salmon to shore."

Since those times, a road was constructed to provide vehicular access, and the narrow sandbar, or tombolo, that connects the island to the mainland was armored with riprap. In August, crews removed that road to restore tidal flow between Similk and Kiket bays.

"The shoreline armoring has isolated the beach from natural processes and this project will allow more natural gravel and driftwood movement to restart and maintain the tombolo and lagoon," said Swinomish environmental director Todd Mitchell.

"Kiket Lagoon provides important rearing and refuge habitat for juvenile salmon migrating from the Skagit River to the marine environment," said Steve Hinton, restoration director for Skagit River System Cooperative, the natural resources extension for the Swinomish and Sauk-Suiattle tribes.

– K. Neumeyer

K. Neumeyer

Guests attend a blessing for a new shelter at Kukutali Preserve.

Kukutali Fast Facts:

- Kukutali is Lushootseed for "Place of the Cattail Mat."
- Vehicle access is prohibited on Kukutali Preserve. There is a small parking lot, bike rack and restroom at the entrance, on Snee-Oosh Road on the west side of the Swinomish Reservation. A Discover Pass is required for the parking lot.
- To protect the environment and habitat, no pets or horses are allowed. Shellfish harvesting, fires or overnight use is prohibited. Kayaks are not allowed from July to September to protect spawning grounds for forage fish.
- Daily high tides block pedestrian access to and from the island for 15 minutes to three hours a day. During the summer, most of those high tides happen overnight, when the preserve is closed. Daytime high tides mostly happen during the winter.
- More information: *wta.org/go-hiking/hikes/kukutali-preserve*

Squaxin First Salmon

E. O'Connell

Jim Peters, Squaxin Island Tribe, positions salmon fillets over a fire in preparation for his tribe's First Salmon Ceremony in August.

Tribe, Partners Count Olympic Mountain Cougars

Chasing cougars on the Olympic Peninsula is not for the faint of heart.

It involves scrambling in and out of steep mountain drainages, bushwhacking through dense forests, and trying to determine what a cat has eaten based on the bone and fur remains found at its kill sites.

For the next three years, the Lower Elwha Klallam Tribe and the University of Idaho will find out the size of the cougar population in the area, and use GPS collars to observe migration and population patterns, eating habits and socialization with other animals.

The tribe also has contracted with Conservation Canines from the University of Washington to use dogs to survey cougar and bobcat scat for genetic studies. Tribal member and University of Idaho research assistant Cameron Macias will analyze the scat to identify individual cats, and conduct a population estimate for both cougars and bobcats in the tribe's historic use area.

The cougar work is part of a bigger effort to develop a comprehensive wildlife management plan that includes all of the tribe's wildlife studies from the past decade, said Kim Sager-Fradkin, the tribe's wildlife manager.

Joining the tribe is Mark Elbroch, a cougar researcher from Panthera, a nonprofit dedicated to studying all 40 wild cat species around the world. Elbroch, who lives in Sequim and is a certified animal tracker, helps the tribe look for cat behavior clues in the field.

"What the tribe is doing is cutting-edge connectivity research," he said. "Combining genetics and GPS movement data has shown to have the best results for insights that are so much richer than if the two components were looked at separately."

Last winter, the tribe collared one male cougar with a GPS collar. During the spring and summer, tribal staff have been tracking the cat's movements. The eventual goal is to collar at least a dozen cougars locally, and more across the peninsula.

When the cougar is seen hanging out in one spot for several hours, indicating the cat may have made a kill or bedded down, the tribe will go in as soon as possible to make observations. They often find remains of elk, deer, and mountain and North American beaver.

Based on the first year of scat detection work, opportunistically placed trail cameras, and snow tracking surveys, the initial consensus is that the population is smaller than expected.

T. Royal

Cougar researcher Mark Elbroch shows University of Idaho research assistant Cameron Macias, middle, and wildlife program manager Kim Sager-Fradkin, right, the remains of an animal left behind by a cougar.

Elbroch also will help the tribe set up a camera grid system to monitor all the wildlife in the tribe's hunting area. There will be 64 motion-triggered game trail cameras set up in the field that will capture images from July through September.

– *T. Royal*

Hair Snares, GPS Used to Track Bears around Enumclaw

The Muckleshoot Tribe is tracking dozens of black bears as part of a multi-year study in the White River watershed north of Mount Rainier.

The tribe received a U.S. Fish and Wildlife Service Tribal Wildlife Grant in 2017 and began snagging hair and collaring bears to collect genetic data and track their movements. So far, tribal researchers have identified more than 70 individual bears in the hills east of Enumclaw.

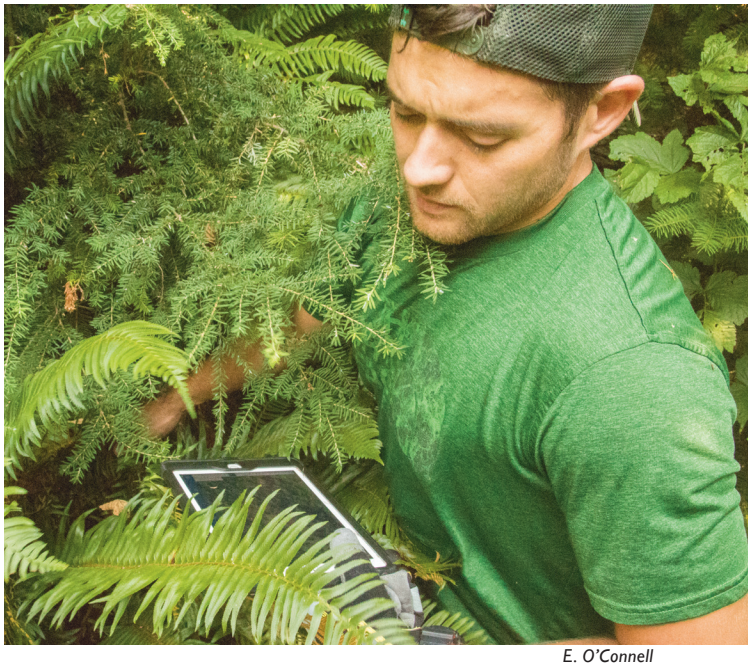
In addition to the federal grant money, the tribe contributed more than $200,000 with in-kind contributions and staff time to the research project. The tribe will collect GPS data until the spring of 2019, when the bears' collars are expected to fall off.

"Based on our genetic work, we're estimating that there could be as many as 90 adult bears in our study area," said Mike McDaniel, wildlife biologist for the tribe. "That number is pretty good if we're aiming for a sustainable population."

The tribe's study is the first intensive effort to understand black bears in the White River watershed. Earlier data came from harvest records from hunters.

"Getting a better handle on the kind of habitat that bears require and how they move around means that we can preserve the self-sustaining bear population here for tribal and nontribal hunters," McDaniel said.

– *E. O'Connell*



E. O'Connell

Sam Hoffer, a Muckleshoot Tribe wildlife technician, tracks tree damage by bears in the White River watershed.

E. O'Connell

A Squaxin Island summer youth intern collects western toads to measure during a survey on the Satsop River.

Western Toads Signal Healthy Habitats

Youth interns and staff from the Quinault Indian Nation and the Squaxin Island Tribe surveyed western toads on the Satsop River this summer.

"These toads can tell us a lot about the health of a forest and a river," said Erica Marbet, a hydrologist with the Squaxin Island Tribe. "If we see toads in the right places, it is safe to assume that the river is healthy."

Part education, part science, the surveys were a way for the interns to learn from biologists how to conduct basic species surveys. The data collected will help managers understand local western toad populations.

Toads are upland creatures, living in the forest and open land, but they breed in wetlands and along large rivers.

"We let the students do the work while we ask them questions to unpack the process," said Candace Penn, climate change specialist for the Squaxin Island Tribe. "It is much more important to understand why we're collecting certain data than just that we're collecting certain data."

The survey crew parked at the end of a logging road and hiked several miles before scaling down a steep hillside to the river.

They looked for evidence of breeding and found large groups of tadpoles at various stages of development.

"It was my first time seeing tadpoles schooled together like that, deep in the woods in the river," said Keenon Vigil-Snook, a Squaxin Island tribal intern. "Looking at the toads in their natural environment truly helps us understand what we're studying." – *E. O'Connell*

Cameras Show Results of Salmon Carcass Program

Nisqually River Education Project

A bald eagle, seen on a game camera, is just one of many animals that depend on salmon carcasses.

The Nisqually Tribe's salmon carcass tossing program attracts hundreds of volunteers – as well as eagles, bears, stream bugs and a host of other creatures – to tributaries around the Nisqually watershed every winter. The carcasses return nutrients to the watershed that support future salmon runs and the entire ecosystem.

"We show up with about a ton of frozen salmon, and folks get a big kick out of tossing the fish into streams," said David Troutt, the tribe's natural resources director.

For the past two winters, the tribe has worked with the Nisqually River Education Project, which installed time-lapse cameras at four of the 10 carcass sites.

Studies show that salmon bring back ocean nutrients that feed 137 vertebrate species. Small animals, such as stream insects, feed on the carcasses, which in turn are food for young salmon.

"Salmon nutrients have always been a key part of watershed health," Troutt said. "Every living thing is connected to the salmon run."

The time-lapse cameras look at how species other than salmon benefit from the carcasses. The most common animals seen were eagles and other raptors.

"Seeing so many large birds concentrate near the distribution sites indicate that the carcasses are an important food source," Troutt said. Countless coyotes, deer and other animals also passed in front of the cameras.

During the last 20 years, the tribe has frozen and distributed 160 tons of salmon carcasses after spawning at their two hatcheries. – *E. O'Connell*

Updated Trap to Move More Salmon Faster

A new fish passage facility at the Buckley diversion dam on the White River will be able to transfer three times as many fish per day as the old trap.

The Buckley diversion dam is five miles down river from the Mud Mountain Dam, a fish-blocking flood control facility. The Army Corps of Engineers collects and trucks salmon around the dam, but the old trap lacks the capacity to move them fast enough, so returning fish have been dying in crowded conditions.

The intended capacity of the old facility was 20,000 fish annually, but even when the Corps moved up to 20,000 a day during pink salmon runs, they couldn't keep up with all the returning fish. The new facility will have the capacity to move 60,000 fish a day and up to 1.2 million annually.

"We expect that the new passage facility will finally allow our salmon and steelhead to get upstream safely," said Jeremy James, chair of the Muckleshoot Tribe's fish commission.

Since the diversion dam was built in 1910, fish have struggled to access the Corps' trap.

"Instead they have been jumping at the increasingly crumbling dam and either dying on the apron or being hauled upstream with head wounds, only to die before spawning," James said.

"The new facility will be a huge leap in our ability to move fish and minimize delay," said Russ Ladley, the Puyallup Tribe of Indians' natural resources director.

Construction of the $112 million facility will likely take two and a half years.

White River chinook have been the focus of restoration efforts for decades.

Last year, more than 8,000 adult spring chinook returned, exceeding the maximum of just under 6,000 seen in 2007, 2013 and 2016.

"Our success here has come despite the conditions at the Buckley trap," Ladley said.

– E. O'Connell

E. O'Connell

Blake Smith, enhancement manager for the Puyallup Tribe of Indians, transfers a spring chinook into a holding tank at a fish trap on the White River.

New Bridges Unshackle Skagit Tributary

Illabot Creek has room to roam now that a major restoration and bridge construction is complete in the upper Skagit River watershed.

While the floodplain restoration work began years ago – phase one was finished in 2013 – the two new 100-foot-bridges are the most conspicuous elements.

Illabot Creek provides spawning and rearing grounds for chinook, chum, coho and pink salmon, steelhead and native char. However, about a half mile of the creek was constricted in the 1970s when road construction forced it under the Rockport-Cascade Road bridge.

"Back in 1998, our biologists documented how the river was shackled by just this one bridge," said Steve Hinton, restoration director of the Skagit River System Cooperative (SRSC), the natural resources extension of the Swinomish and Sauk-Suiattle tribes, which spearheaded the project.

Removing dikes and constructing the new bridges gives the creek more space to meander during high water events, said Devin Smith, SRSC restoration ecologist.

The excavation work eventually will reconnect historic channels and increase habitat, while large engineered logjams built in both phases of the project add complexity to the habitat and create pools and cover for fish.

SRSC completed the project in partnership with Skagit County; landowners Seattle City Light, Sierra Pacific Industries and Pauline Ryan; and grant funding from the Puget Sound Acquisition and Restoration Fund, NOAA Fisheries, state Salmon Recovery Funding Board and other sources.

All together, both phases of the project cost $5.3 million.

"You can't put a price on something that's going to benefit our children and grandchildren and the next seven generations," said Swinomish Chairman Brian Cladoosby. *– K. Neumeyer*

A crew installs girders for a new bridge over Illabot Creek.

K. Neumeyer

Partners Use LIDAR to Track Restoration

Brian Zierdt, SPSSEG

This LIDAR image shows how engineered logjams add complexity to the Greenwater River.

The Puyallup and Muckleshoot tribes and the South Puget Sound Enhancement Group are using Light Detection and Ranging (LIDAR) maps to track the effectiveness of a salmon habitat restoration project completed between 2010 and 2014 on the Greenwater River.

"These maps are much more precise than traditional topographic maps," said Russ Ladley, natural resources director for the Puyallup Tribe. "They can track landscape changes within less than a foot."

LIDAR creates topographic maps by shooting a laser at the ground from an airplane or drone. Maps show small variations in the landscape because of differences in return times and wavelengths of the laser.

The project entailed constructing 17 logjams and removing nearly a mile of road, allowing the river to use more of its historic floodplain.

"One of the most important things we expected to see was a combination of a wider floodplain paired with reduced velocities in the river's flow," said Lance Winecka, executive director of the enhancement group.

"Those first harsh fall floods come when spring chinook eggs are the most vulnerable," said Martin Fox, Muckleshoot habitat biologist. "Slowing the river by giving it more room to move as well as adding wood to add channel complexity means those eggs have a better chance to survive."

Before restoration, there was a 7-foot elevation difference between the river and a historic channel on its north side. According to the new LIDAR maps, the river already is reoccupying the old channel at moderate flood levels. – *E. O'Connell*

Pulling in the Catch

Skokomish tribal members beach seine for fall chinook near the Hoodsport Hatchery in late August. The hatchery salmon run contributes to the tribal treaty harvest each year.

T. Royal

Stillaguamish ceremonial and subsistence fishermen (left to right) Jesse Pecor, Daemon Yanity, Gary Tatro and Laurie Lucas pull in a set net during the tribe's chinook fishery in July.

Conservative Harvest Management Pays Off

The Stillaguamish River coho that survived to spawn during 2015's drought proved resilient as substantial numbers are expected to return this fall.

In September, the Stillaguamish Tribe opened a commercial coho fishery targeting 1,600 fish.

Even without the low flows and high temperatures that accompanied the drought, the coho run was challenged three years ago by low returns of smaller-than-usual adult fish.

"We just shut our fishery down completely that year, before the fish even hit the river," said Stillaguamish Chairman Shawn Yanity, who is also the tribe's fisheries manager.

The tribe has a long history of voluntarily reducing fisheries to help ensure that adult salmon will be able to spawn. The tribe ceased chinook fishing for decades beginning in 1980 for that same reason.

Thanks to conservative harvest management and the tribe's hatchery operations, Stillaguamish resumed small ceremonial and subsistence chinook fisheries a couple of years ago. In July, the tribe served Stillaguamish River chinook at its First Salmon Ceremony for the first time since the celebration was revived 10 years ago.

Those chinook were harvested in a set net fishery that Yanity invited summer youth interns to witness. He is concerned that diminished opportunities to fish have deprived tribal youth of a key part of their identity.

"They may hear the stories, but the salmon doesn't become an important part of their life if they're not fishing," he said. "If it isn't important to them, then they won't fight for it."

– K. Neumeyer

K. Neumeyer (2)

Fisherman Jesse Pecor prepares to return the remains of the first salmon to the Stillaguamish River, with guidance from Rosie Cayou, cultural outreach manager for the Samish Indian Nation, during the tribe's First Salmon Ceremony in July.

Learn more in a new video series, *Tribal Fishing 201*, at *nwtt.co/Fishing201*.

- **Part 1: Why Nets?** ***(nwtt.co/nets)***
- **Part 2: How Are Fisheries Managed?** ***(nwtt.co/manage)***
- **Part 3: How Do We Preserve Traditions?** ***(nwtt.co/future)***

K. Neumeyer

Preserving Salmon Run for 30 Years

Stillaguamish summer youth intern Connor Goodridge, left, helps water resources biologist Jody Brown, center, and natural resources technician Robbie Lamb, collect an adult chinook during broodstocking in early August.

The Stillaguamish Tribe's natural resources department collects broodstock from the North Fork of the Stillaguamish River every summer for a hatchery program that has supplemented the threatened salmon run for 30 years.

K. Neumeyer (2)

Fishing Near Ancestral Village

Above: Upper Skagit tribal fishermen harvest sockeye along the Baker River in late June. Left: Upper Skagit tribal fisherman Sophia Fox loads Baker sockeye into a tote filled with ice.

"Our ancestors fished here for thousands of years," said tribal fisherman Scott Schuyler, pictured above. "There's a lot to that for me personally, to be out here knowing that my ancestors were here, maybe even in this exact same spot."

For more of Schuyler's story, watch Part 1 of the video series *Tribal Fishing 201* at *nwtt.co/nets*.

Above: Ryan Crim, hatchery manager for the Puget Sound Restoration Fund, inspects a selection of cockles to spawn at the hatchery in Manchester. Right: Suquamish shellfish biologist Elizabeth Unsell collects cockles for the tribe's research project to develop a hatchery program.

T. Royal (2)

Cockle Study Could Lead to Hatchery Program

The Suquamish Tribe is researching possible development of a hatchery program for cockles.

"While they are not harvested commercially by the tribe, they have cultural value," said Elizabeth Unsell, a shellfish biologist for the tribe.

Tribal members have seen populations decline significantly on beaches where they harvest regularly, she said.

"Tribal members love them so we thought, 'How can we help?'" she said. "We do not have data on the local cockle populations, but observed declines on popular cockle beaches have prompted a desire to help those populations rebound."

Working with the Puget Sound Restoration Fund (PSRF), the tribe sampled cockles in June from Sandy Hook, near Agate Pass, for spawning at the federal Kenneth K. Chew Center for Shellfish Research and Restoration in Manchester.

At the Chew Center, spawning is induced by heating the water, said Ryan Crim, PSRF hatchery manager. Like many other marine invertebrates, cockles are broadcast spawners. Individuals release their gametes directly into the water column where fertilization and embryo development take place.

"Interestingly, cockles also are simultaneous hermaphrodites, meaning each individual is capable of spawning both as male and female," Crim said. "Spawning individuals typically first release sperm and after some time, they switch and begin releasing eggs."

In the hatchery, Crim collects eggs and sperm in small buckets and cross-fertilizes the gametes to maximize the number of parental crosses.

If all goes well in the hatchery, the juveniles, once big enough, will be transferred to the tribe's shellfish nursery in Brownsville before being used in shellfish seeding projects.

"Monitoring out-planting success may be challenging with this bivalve because of its capacity to move around easily," said Viviane Barry, the tribe's shellfish program manager. "Once released on beaches, a tagging experiment may be an interesting avenue to better understand the extent of cockle movement."

Manilas, littlenecks and butter clams tend to stay in place on the tideland, while the cockle, with its strong foot, will move to other areas of a beach. The foot gives them mobility to escape from predators such as birds and sea stars and find refuge under a dock to shade themselves from the sun.

Traditionally, tribal members harvested cockles by walking barefoot on the beach. When their feet struck a hard object, it was likely a cockle, Unsell said. In sandy substrate, cockles burrow about two inches below the surface of the tideland, compared to littlenecks and manila clams, which bury themselves deeper in their preferred habitat of gravel and sand.

– T. Royal

NWIFC Lab Earning National Accreditation

The Tribal Fish Health Laboratory of the Northwest Indian Fisheries Commission (NWIFC) is completing an accreditation process that will ensure it meets standards for similar laboratories nationwide.

While the lab is well known throughout the Northwest for its high-quality work testing for pathogens in fish at tribal hatcheries, there aren't many affordable options for labs like NWIFC's to get accredited, said lab manager Bruce Stewart.

"There is a growing need in our line of work to be able to demonstrate the quality and credibility of fish health procedures we routinely use in our lab," Stewart said. "In the future, it's going to be hard to find a lab that doesn't have some type of nationally recognized accreditation."

The lab is participating in the American Fisheries Society's (AFS) Fish Health Section accreditation process.

"We're also acquiring validation of the work we're doing so that if someone ever questions our results, we have more than just our word about the integrity and reproducibility of our results," Stewart said.

Historically, labs similar in size don't typically apply for national accreditation because the process is expensive and time-consuming, Stewart said, but AFS has put together an accreditation program that is appropriate for the NWIFC lab.

"We have protocols already but this puts them into a more formal structure," said Marcia House, an NWIFC fish pathologist. "As we reviewed our processes, there were a few things we saw where we decided to add an extra step here and there, so it's been really beneficial to just go through the process and tighten it up a bit and make sure protocols are up to date."

House and microbiologists Matt Stinson and Betsy Hall were responsible for the initial step in the program by reviewing all of the lab's procedures.

"The quality those guys bring to the program is incredible," Stewart said.

The first phase included providing information about lab procedures, equipment and lab safety. The second phase will likely include a third-party performance audit before accreditation is granted.

"By getting this accreditation, the tribes are raising the bar for fish health," Stewart said. "We're one of just a few labs in the country that has cleared it and I think the tribes can be proud that they are being represented well." – *T. Royal*

Microbiologist Betsy Hall, left, fish pathologist Marcia House and microbiologist Matt Stinson are working on getting a national accreditation for the NWIFC Fish Health Lab.

T. Royal

E. O'Connell

Nisqually Councilman Willie Frank III and Squaxin Island Tribe Chairman Arnold Cooper discuss ways tribes can work together.

Coming Together to Protect Mother Earth

Medicine Creek treaty tribes welcomed activists this summer to the Protect Mother Earth Conference, hosted by the Nisqually Indian Tribe and the Wa-He-Lut Indian School.

The conference was sponsored by the Indigenous Environmental Network and Indigenous Tribal Action. Sessions featured topics on the history of nonviolent action, the how-tos of rapid response media, and traditional plants.

Speakers focused on the battles being waged by Northwest treaty tribes. For the last two years, the Puyallup Tribe has been fighting a proposed liquefied natural gas (LNG) plant on Commencement Bay.

"It is just in the wrong place," said Annette Bryant, a member of the Puyallup Tribal Council. "There's only one ship in the Tacoma area that may need these 8 million gallons of LNG. That's the fight we're in."

Willie Frank III, a member of the Nisqually Tribal Council, described how the ongoing loss of salmon habitat in western Washington is having an enormous impact on the treaty tribes' way of life.

"Every year it has gotten harder for us to go fishing, to exercise our treaty rights," Frank said. "Fishing is our way of life, that is our culture. Once we lose that, we lose who we are as natives." – *E. O'Connell*

Jamestown S'Klallam Tribe

Restoration Reveals Archaeological Cooking Site

A creek restoration project turned into a history lesson this summer for the Jamestown S'Klallam Tribe.

After an area in front of the tribal center in Blyn was prepared for stream work, Jamestown's tribal preservation officer David Brownell noticed areas of black dirt and white shell fragments in the newly excavated area.

"These were clear indicators where tribal members used to dig cooking pits and eat shellfish," he said.

Brownell submitted an excavation plan to the Bureau of Indian Affairs' regional archaeologist in early July before methodically sifting the dirt to find samples of shells, charred pieces of wood and fire-modified rocks.

Additional findings included fish vertebrae, deer or elk bone, seal bone, cherry pits and the head of an adze, a sharp woodworking tool.

The animal bones were intact because the calcium carbonate in shell acts as a preservative, Brownell said. Charcoal from the cooking pits will be sent out for radiocarbon dating. Brownell also is going to compare the rocks to samples from other village sites on Sequim Bay.

A lot of the shells being excavated are butter and horse clams, and Olympia oysters, he said, species that can't be found in large numbers in the bay anymore.

"This kind of work can tell us how the environment has changed, based on the species we find in our excavating, and whether they are still in the area or not," he said.

The tribe has lived on the shores of Sequim Bay for thousands of years and this particular area was used by one family for its annual reunion cookout, so the site has long been connected to the preparation and cooking of traditional foods, Brownell said.

He will analyze the artifacts to determine their ages so he can tell if they were used before or after tribal contact with European settlers, and to create a more detailed timeline about the use of the area. – *T. Royal*

T. Royal

Jamestown S'Klallam Tribe employee Josh Carver, left, sifts through dirt looking for artifacts, while tribal preservation officer David Brownell scoops dirt from an archaeological pit.

Generations

Jamestown S'Klallam Tribe Library

Jamestown S'Klallam tribal member Harvey Adams Sr. stands with a catch of crab in Jamestown in 1955.