



Northwest Indian Fisheries Commission

NWIFC News

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Inside:

- Tribes Elect Loomis NWIFC Chair
- Quinault Fights Oil Train Threats
- Forage Fish Return to Elwha
- Makah Investigates Olive Shell Die-Off
- Fences Minimize Elk Damage
- Steelhead Programs Boost Runs

Too Little, Too Late

By Russ Hepfer
NWIFC Commissioner

Being Frank is the monthly opinion column that was written for many years by the late Billy Frank Jr., NWIFC chairman. To honor him, the treaty Indian tribes in western Washington will continue to share their perspectives on natural resources management through this column. This issue features Russ Hepfer, vice chair of the Lower Elwha Klallam Tribe and an NWIFC commissioner.

More delay is about the only thing that any of us who live here in Washington can count on when it comes to a badly needed update of state water quality standards to protect our health.



After decades of foot-dragging by previous governors, Gov. Jay Inslee recently unveiled his plan to revise our state's ridiculously outdated water quality standards. While the plan offers a small increase in protection from 70 percent of the toxic chemicals regulated by the federal Clean Water Act, it maintains the inadequate status quo for the other 30 percent.

At best, Inslee's plan offers minimal progress in reducing contamination; at worst it provides a tenfold increase in our cancer risk rate.

Two numbers drive our water quality standards: our fish consumption rate and our cancer risk rate from pollution in our waters.

Inslee's plan rightly increases our fish consumption rate from the current 6.5 grams per day (about one serving of fish or shellfish per month) to 175 grams per day (at least one meal of fish or shellfish per day).

Support for that amount is a huge concession by tribes. Most tribal members, as well as Asian Americans and Pacific Islanders, eat far more than 175 grams of fish and shellfish per day. Studies show daily consumption rates of 236 to 800 grams. Even those numbers represent suppressed rates.

While giving a little with one hand, Inslee takes away a lot with the other, increasing our "acceptable" cancer risk rate tenfold, from one in a million to one in 100,000. Do you think anyone who gets cancer from the pollution in our fish and shellfish would find that risk rate acceptable? Would you?

By increasing the cancer risk rate, Inslee effectively cancels out most of the health benefits and improved water quality provided by the increased fish consumption rate.

To make up for the loss of protection under the cancer risk rate, Inslee proposes a statewide toxics reduction effort that would require legislative approval and funding. While the idea of a large toxics reduction program is a good one, it is not a substitute for an updated state water quality standards rule that carries the force of law.

No doubt there will be more delay and more opposition to Inslee's proposal. Boeing and other opponents to improved water quality rules will likely engage in full-strength lobbying during the legislative session to block any meaningful change, claiming that it will increase their cost of doing business.

The state has a clear duty to protect the environment to ensure that our treaty foods such as fish and shellfish are safe to eat. If not, those rights are meaningless. We will not put our hard-won treaty rights or the health of our children in the hands of the governor or state Legislature.

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6730 Martin Way E.
Olympia, WA 98516
(360) 438-1180

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Tribal contact information is available under Member Tribes at nwifc.org.

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On the cover: John Mahan, hatchery manager for the Quileute Tribe, sorts hatchery and wild chinook on the Sol Duc River after fisheries technicians Dustin Larkin, Greg Urata and Dean Penn collected them for a broodstocking program. For more about collecting broodstock, see page 16. Photo: D. Preston



Loomis Elected NWIFC Chair

Lorraine Loomis of the Swinomish Tribe, left, was elected chair of the Northwest Indian Fisheries Commission at the commission's September meeting. Loomis was acting chair following the death of long-time leader Billy Frank Jr. She will fill the remainder of Frank's term through May 2016.

Loomis has been Swinomish tribal fisheries manager since 1975. She has extensive experience in fisheries management throughout the region. She currently serves on the Fraser River Panel of the Pacific Salmon Commission that manages sockeye and pink salmon under the U.S./Canada Pacific Salmon Treaty. Loomis also coordinates tribal participation in the annual North of Falcon salmon season planning process with the state of Washington.

Shawn Yanity, chairman of the Stillaguamish Tribe, center, was elected vice-chair, replacing Loomis in that position. Ed Johnstone, Quinault Indian Nation, remains treasurer.



T. Royal

Quinault Fights Oil Train Threats

More than one million gallons of crude oil spilled in U.S. rail incidents in 2013, which is more than was spilled in the previous four decades combined, according to a Washington Department of Ecology report on emerging energy transportation risks.

For the Quinault Indian Nation (QIN), this fact illustrates why it opposes three proposals that would increase oil transport by rail to Grays Harbor terminals. Up to three 1-mile-long trains a day on aging rail infrastructure would pass through sensitive wetlands and an area adjacent to a major wildlife refuge critical to annual bird migration.

QIN has joined forces to oppose oil trains with Friends of Grays Harbor, Citizens for a Clean Harbor and Grays Harbor Audubon Society.

"Treaty-protected fishing rights and oil just do not mix," said QIN President Fawn Sharp. "We have to support sustainability in Grays Harbor, and that means protecting our environment. The fishing industry, tourism and all of the supportive businesses are far too important to let them wither away at the whim of Big Oil."

The point was brought home when two trains carrying grain derailed in Aberdeen earlier this summer.

"We all thank God it wasn't oil but it very well could have been oil," Sharp said.

Imperium, Westway and U.S. Development all have proposals for increased ground tank storage and oil-by-rail traffic into Grays Harbor. The Imperium and Westway proposals are under review by the state Department of Ecology. Public comments have been received regarding the draft Environmental Impact Study.

The U.S. Development proposal, titled Grays Harbor Rail Terminal Project, is still in the early stages of permit application.

As oil extraction from the Bakken Oil fields of North Dakota has increased, the amount of oil shipped by rail has risen by more than 400 percent since 2012, according to rail company reports. Disastrous spills and explosions frequently associated with an aging rail infrastructure and an inadequate type of train car also have increased.

The cars, known as DOT-111 tank cars, have been known to



D. Preston

Kathy Rosenmeyer, Quinault Indian Nation tribal member, waves to oncoming traffic with her "No Oil Terminals" signs in Aberdeen.

puncture far too easily, even in derailments at speeds less than 30 miles per hour. Some derailments have resulted in explosions, such as in Lac-Mégantic, Quebec, in July 2013, where 47 people died as the result of a runaway oil train that derailed and exploded in the middle of town.

Environmental groups Sierra Club and Forest Ethics have sued the federal Department of Transportation for not taking immediate action to remove the cars from rail networks. — D. Preston



K. Neumeyer

Swinomish fisherman Landy James helps bring in Fraser sockeye during the tribes' ceremonial and subsistence fishery.

Fewer Sockeye for Tribes

Tribal fishermen had high hopes for this year's Fraser River sockeye fishery, forecast to be more than 20 million fish.

The returning fish are the offspring of the record 2010 Fraser run of about 30 million fish.

Unfortunately, between 95 and 99 percent of the sockeye were diverted into Canadian waters, out of reach for the nine tribes with treaty-reserved rights to harvest Fraser sockeye. The tribes are Jamestown S'Klallam, Lower Elwha Klallam, Lummi, Nooksack, Makah, Port Gamble S'Klallam, Suquamish, Swinomish and Tulalip.

By the end of August, Canadian fishermen had caught about five million Fraser sockeye, while in the States, tribal and non-tribal fishermen had caught about 275,000 fish.

Usually, about half the

sockeye swim around Vancouver Island through the Strait of Juan de Fuca, where tribal fishermen can harvest them when they enter U.S. waters.

Before the commercial fishery opened in August, the Swinomish Tribe held a one-day ceremonial and subsistence fishery intended to harvest sockeye for both Swinomish and Tulalip tribal members to put away for the winter.

"The tribes take some of their quota to save for ceremonies, and to give to tribal members to cook or can," said Lorraine Loomis, Swinomish's fisheries manager. "We don't have enough fish to get through the winter."

The tribes were targeting 35,000 sockeye to be caught for the nine tribes' ceremonial and subsistence use, but only 3,100 were caught. — K. Neumeyer

SALISH SEA MARINE SURVIVAL PROJECT

Tribes Study Salmon Disease, Food Sources

The treaty tribes are part of the region-wide Salish Sea Marine Survival Project, which addresses a key uncertainty in salmon recovery: What happens to salmon in the marine environment? Among the factors that affect marine survival are diseases and the availability of food.

Salmon Poisoning Disease

Steelhead out-migrating from North Sound rivers appear to have better marine survival than steelhead smolts from South Sound, and researchers are studying salmon poisoning disease as a potential cause.

Salmon poisoning disease, or *Nanophyetus salmincola*, is best known as the parasite that can make dogs sick when they eat raw salmon. It also has been found to affect the swimming performance of infected salmonids, potentially reducing their marine survival.

Northwest Indian Fisheries Commission fish pathologist Martin Chen is studying steelhead smolts from the Tahuya, Skagit, Snohomish, Green and Nisqually rivers. The fish from Skagit and Snohomish tested negative for the parasite, but there were lots of heavily infected fish in the Green and Nisqually rivers.

NWIFC pathologist Martin Chen samples hatchery steelhead at the Marblemount Hatchery on the Skagit River.



Karen Peabody

Both of those results were expected, but Chen was surprised not to find the parasite in any of the 24 steelhead sampled from the Tahuya River in Hood Canal. The Tahuya is across the canal from the Skokomish River, which has *Nanophyetus* in at least three tributaries.

Chen also is testing two drugs that could eliminate the parasite from infected fish.

Zooplankton

The Nisqually Indian Tribe is trying to predict future salmon runs by measuring the zooplankton that juvenile salmon eat on their way out to the ocean. The tribal researchers want to determine if there's less food in Puget Sound when salmon are migrating out, meaning fewer may be coming back.

The tribe will sample juvenile fish from the Nisqually estuary and adjacent marine areas. At the same time, the tribe will sample the water for zooplankton and other small animals.

"If we find that in years when a lot of food is available and salmon survive to return at higher rates, we could more easily predict future salmon runs," said David Troutt, the tribe's natural resources director.

— K. Neumeyer & E. O'Connell

Sediment Improving Habitat for Forage Fish

The Lower Elwha Klallam Tribe, U.S. Geological Survey (USGS) and Washington Sea Grant are observing an increase in forage fish and Dungeness crab near the mouth of the Elwha River since the river's two dams have been demolished.

Divers have noted continuous sand deposits in the Elwha nearshore, covering formerly cobble-dominated areas in subtidal areas. This has resulted in a shift from a rocky bottom and kelp-dominated habitat to a soft-bottomed habitat suitable for clams, crabs and other species.

"We first documented sand lance near the mouth of the river in 2012 after the dams started to come down in 2011," said Matt Beirne, the tribe's environmental quality manager and diver.

Juvenile crab were first seen in the new sand habitat just off the river mouth in 2013 during a dive survey.

Sand lance form schools in open water when feeding but also spend time buried in sand. Divers observed sand lance zipping in and out of the new sand near the river mouth, confirming the value of this habitat.



Ian Miller, Washington Sea Grant

A sand lance is caught at the mouth of the Elwha River, found using the new habitat following dam removal.

"Sand lance and other forage fish are such a critical part of the diet of adult salmon and other marine species," Beirne said.

Researchers from the National Oceanic and Atmospheric Administration have observed larger numbers of bull trout in the Elwha nearshore as well, possibly feeding on sand lance, smelt and other forage fish, Beirne added.

"We expected organisms to move in and take advantage of this new habitat, but it's actually observing it happen and having the opportunity to investigate the details that makes it interesting," said Ian Miller, a coastal scientist with Washington Sea Grant.

In areas where the bottom is still rocky, divers noted a decline in kelp, possibly because the amount of light reaching the seafloor has been reduced by fine sediments that washed out of the river, said Steve Rubin, a USGS fishery biologist.

Even so, Rubin said, divers have noticed young kelp in late summer for the past two years and growing conditions may improve as sediments finish clearing from the former Aldwell and Mills reservoirs. — T. Royal

Watershed Monitoring Covers Estuaries, Insects and Wildlife

As deconstruction of the Elwha River's two fish-blocking dams winds down, monitoring the river's response is ramping up.

In the estuaries, tribal environmental quality manager Matt Beirne and his staff are in their sixth year of seining the ponds to examine fish populations and study the stomach contents of juvenile salmon.

The huge volume of fine sediment released downstream has extended the beaches seaward, isolating the former estuary ponds from saltwater influence, Beirne said.

The now largely freshwater system has encouraged changes in aquatic plants and insects, and as a result, the diets of juvenile salmon.

The tribe has found that when the river is clouded with fine sediment, juvenile fish have difficulty finding prey. But fish are also being more opportunistic in seeking prey, such as ants, spiders, beetles, leeches, snails and earthworms that were rarely seen in previous diet studies.

The tribe's wildlife staff also has wrapped up a four-year study on river otters and American dippers.

"Overall, we found most of the otters moving throughout the Elwha watershed and Strait of Juan de Fuca, from as far south as the Glines Canyon dam when it was still fully intact, to as far north and east as Port Angeles Harbor," said tribal wildlife biologist Kim Sager-Fradkin.

Analyses of the animals' diets showed that both otters and dippers are eating more marine-derived nutrients now than before the dams started to come down.

In the former lake beds of Aldwell and Mills, crews continue to plant native vegetation and kill invasive plants.

"Aldwell just needs maintenance and some supplemental planting now," said tribal habitat manager Mike McHenry. "The natural and planted vegetation have responded well."

Mills is not as easy to revegetate, he said, since it has a larger surface area to cover and the planting substrate is dominated by cobble, gravel and sand, making it difficult for plants to take root.

As for the dams, the final 30 feet of the Glines Canyon dam was demolished at the end of August. — T. Royal



T. Royal

Bugs are collected from juvenile salmon stomachs from the Elwha estuaries.

Olive Shell Die-Off Mystery to Makah Tribe



D. Preston (2)

Makah tribal member Jody Ray Johnson wears olive shells in her regalia during a canoe journey potlatch in Neah Bay. Tribal members have used the shell for millennia for trade and decoration but a mysterious die-off has the tribe concerned about the long-term health of the gastropod population.



A massive die-off of olive shells used in Makah tribal regalia has biologists and tribal members wondering what caused the event and whether there are links to climate change.

The olive shell is part of a snail, or gastropod, that feeds on worms, bivalves and crab. There are many color varieties and species throughout the world, but the purple olive shell is found in Neah Bay.

Tribal members have been harvesting olive shells for millennia for use in their regalia and to trade. In the months leading up to Makah Days in August, tribal members often harvest

the live snails during low tides. The snail is removed before the shells are washed and strung together for use on clothing or to create necklaces, bracelets and other regalia.

This year, however, tribal members saw thousands of dead snails on the beach in June and July. Thanks to the Makah Tribe's youth program and an annual olive shell survey created by the tribe's marine mammal biologist, Jonathan Scordino, the tribe knows that there were 37 times fewer live olive shells on Hobuck Beach.

"Anecdotally, we estimated about 60 gallons of dead shells came off the beach as a result of the die-off," Scordino said. "There are about 2,000 olive shells per gallon, giving a total estimate of 120,000 that died during the mortality event."

The dive in population was so steep, the tribe halted ceremonial digs for live olive shells. Scordino is seeking a gastropod specialist to help him decipher the mystery.

— D. Preston

Jamestown S’Klallam Opens New Shellfish Hatchery

The Jamestown S’Klallam Tribe is developing its own shellfish hatchery to benefit both tribal and non-tribal shellfish operations in Puget Sound.

The tribe plans to raise shellfish and grow shellfish seed to sell, said Kurt Grinnell, Jamestown S’Klallam Tribe vice-chair.

The tribe leased the former Washington Department of Fish and Wildlife shellfish hatchery in Quilcene in late 2013 and started rearing 800 Pacific oysters in March.

The tribe is working in partnership with Troutlodge, a private salmon and shellfish aquaculture company, and Jones Farm, a shellfish farm on Lopez Island. The tribe and its part-

ners are working together because water chemistry has been a problem when sourcing seed from one location.

The primary focus will be growing manila clams, geoduck and oysters from seed to adult, plus the algae needed to feed everything, as well as selling seed to others.

"We want to create our own larvae and broodstock here and provide seed to others," Grinnell said. "We've had a need for something like this for a long time and have it accessible to all tribes. We're going to make this work, we just have a long ways to go." — T. Royal



T. Royal

Hatchery technician Nicolas Rosales rinses oysters before placing them in a floating upwelling system.

Chico Creek Loses One Fish-Blocking Culvert

After 50 years of partially blocking a significant salmon stream in central Kitsap County, two large box culverts and nearly 400 feet of roadway have been removed from the Chico Creek estuary.

Demolishing the 8-foot by 8-foot cement structures under Kittyhawk Drive will improve fish passage and restore parts of the estuarine marsh, which is known to the Suquamish Tribe as the “Place of Chum Salmon.”

Removing the culverts will allow native chum salmon, the watershed’s predominant salmon species, to take advantage of a widened estuary. Chico is one of the largest native salmon-producing creeks in Puget Sound with an average of 30,000 fish spawning in the watershed each year.

The culverts were installed in the 1960s, during the construction of nearby State Route 3, said Tom Ostrom, the tribe’s salmon recovery coordinator.

With the culverts in place, at low tide, salmon had a hard time reaching the culvert to continue their spawning journey upstream. In the fall, when the creek was running high and fast, the volume and speed of the creek water made it difficult for salmon to access the culvert. — *T. Royal*



Construction crews demolish the culvert at the mouth of Chico Creek, beneath Kittyhawk Drive. The culvert will not be replaced, opening the creek mouth and estuaries to more natural tidal flows. *T. Royal*

Tribe, Corps, Veterans Clean Quilcene, Sequim Bays



T. Royal

Washington Conservation Corps crew supervisor Junior Fuimaono, left, and crew member Alison Flury dig tires out from the Sequim tide-lands.

The Jamestown S’Klallam Tribe is re-using old cinder blocks to clean up popular shellfish beds and delineate harvest areas.

With crews from the Department of Ecology’s Washington Conservation Corps/Veterans Conservation Corps and NW Straits Commission (NWSC), tribal shellfish staff moved concrete blocks and removed debris from Quilcene and Sequim bays this summer.

In Quilcene Bay, hundreds of cinder blocks were left on the tidelands from an old oyster farm operation. Instead of removing them, the tribe reorganized them to create obvious harvest area boundaries.

“Boundaries need to be better defined on the beach for both tribal and non-tribal harvesters, especially at night, when it’s hard to see the boundary flags,” said Ralph Riccio, the tribe’s shellfish biologist. “The blocks are a great way to do that.”

Debris removal included taking out old boundary posts and oyster seed bags from Quilcene Bay, and tires from the banks of Sequim Bay.

“We wound up removing 45 tires from Sequim Bay, weighing more than 1,800 pounds, plus 240 pounds of Styrofoam and plastic debris from Quilcene Bay,” said Paul Argites, NWSC marine debris removal assistant. “It’s a significant haul, but only a minor dent in the accumulation of marine debris in the Puget Sound.”

— *T. Royal*

WILDLIFE MANAGEMENT

Moving Day for Beavers

A group of six beavers nestled together in a furry cluster in a manmade lodge at the Tulalip Tribes' Bernie Kai-Kai Gobin hatchery, confirming wildlife biologists' suspicions that this was a family unit. Tribal staff, along with biologists from the University of Washington (UW), had captured the beaver colony in Duvall, where they were flooding a blueberry farm.

The beavers were housed temporarily at the hatchery as part of the Skykomish Beaver Project, a partnership among Tulalip, UW, U.S. Forest Service and other agencies. The project is relocating certain beavers from the Snohomish lowlands, in places where they are considered a nuisance, to public land in the Skykomish River system.

"Beaver flooding can be very costly," said Ben Dittbrenner, Ph.D. candidate in forest ecology at UW.

"We can often reduce human-beaver conflicts non-lethally by installing devices that stop them from plugging up culverts. However, sometimes it's not possible to manage them, and relocation is the best option."

In 2014 and 2015, the biologists plan to move about 30 beavers to 15 tributary locations selected for habitat potential. Because beavers are social animals, they are being relocated as family units.

"The beaver families will restore watershed processes like sediment capture, fish rearing, and aquatic insect reproduction," said Jason Schilling, the tribes' wildlife biologist. "Our goal is to release them into headwater streams to restore ecological integrity and improve water quality, which benefits salmon and other fishes. Coho salmon do especially well in beaver ponds."

— K. Neumeyer



K. Neumeyer

A beaver swims in a raceway at the Tulalip Tribes' hatchery, where it is being temporarily housed before being relocated near the Skykomish River.

Co-Managers Support Elk Habitat and Homeowners

Point Elliott Treaty tribes and the Washington Department of Fish and Wildlife (WDFW) are finding ways for North Cascades elk to thrive in their traditional ranges without causing loss to private landowners.

Last year, the Stillaguamish and Tulalip tribes helped an Acme dairy farm install a three-strand electric fence to keep elk out of the pasture. When the elk jumped through the top two strands, the tribes improved the Coldstream Farm fence by making it a five-strand fence, which successfully deterred the elk. In June, tribal natural resources staff returned to help fence an additional 100 acres.

In the Day Creek neighborhood east of Sedro-Woolley, Stillaguamish and Tulalip wildlife staff met with landowners to discuss options for preventing elk from damaging crops and property.

"We're experimenting with some non-fencing projects that may offer some good alternatives," said Jennifer Sevigny, wildlife biologist for Stillaguamish.

For the first trial, the Stillaguamish Tribe purchased and donated 20 tons of lime to two different landowners in an effort to improve haying capacity. The increased quality and quantity will offset what the elk eat, and farmers may be able to harvest sooner, giving elk less opportunity to forage.

After trying other control measures, some landowners concluded an elk exclusion fence was the only solution.

"We tried hazing them and working with the (WDFW) master hunter program," said Jim Carstens, who owns a cattle farm in Birdview. "It keeps the elk away for a short period of time, and then they come back."



K. Neumeyer

Stillaguamish assistant fisheries manager Jeff Tatro ties flags to a temporary two-strand electrical fence around a potato farm.

Carstens didn't have the means to install a fence, even after WDFW supplied the materials. Digging holes for fence posts is labor-intensive, so the Tulalip Tribes bought a hydraulic post driver that landowners can share.

Tulalip, Stillaguamish and Sauk-Suiattle natural resources, and WDFW staff helped build the 6.5-foot-tall, seven-strand high-tensile electric fence for Carstens, encompassing approximately 146 acres. — K. Neumeyer

Makah Sheds Light on Bobcat Populations



D. Preston

Rob McCoy, wildlife division manager for the Makah Tribe, applies eyedrops to a bobcat prior to fitting it with a radio collar.

Olympic Peninsula tribes are tracking bobcats and cougars to find out whether they are the primary predators of deer and elk on the peninsula. Until now, there hasn't been much scientific evidence supporting or disproving that theory.

Several tribes are putting radio-signal transmitting collars on cougars to better understand their home ranges, diet and other behavior. The Makah Tribe is the only entity collecting similar data on bobcats.

"There really has been no research done on bobcats in Washington," said Rob McCoy, Makah wildlife division manager. The tribe has been conducting research on cougars since December 2010 and started radio-collaring bobcats in January 2012.

"We have really good data on cougars and male bobcats and we're working to get more females into the study to better understand reproduction and size of litters and survival," McCoy said.

The tribe now has four male and four female bobcats with collars.

When a collared cat makes a kill, the ra-

dio signals show that it has stopped moving around while it feeds. Biologists walk in and note the kill species.

"We're still gathering data, but right now, we just aren't seeing elk in the bobcat diet at all," McCoy said. "It's early in the study, but we aren't seeing a significant number of deer being killed by bobcats either. There is evidence they scavenge on deer opportunistically after a cougar kill or natural cause of death."

McCoy said that bobcats may actually survive on smaller prey such as mountain beavers, birds, rabbits, moles and mice.

Adult male bobcats have little overlap of home ranges as they are quite territorial.

"One of the things we want to know about female cats is whether their home ranges are larger or smaller and how territorial they are, comparatively," McCoy said.

Coupled with extensive research of elk and deer within their traditional hunting area, the tribe will use the research on cats to manage them in the future. — D. Preston

Elwha Looks at Deer Mortality, Hair Loss Syndrome

Standing in the sunroof of a truck, Kim Sager-Fradkin points her spotlight into a dark clearcut, searching for pairs of reflective deer eyes.

Spotlighting is just one method the Lower Elwha Klallam Tribe's wildlife biologist is using to count black-tailed deer on the North Olympic Peninsula for a three-year study.

"Very little is known about the population size, habitat and home range, and the mortality factors affecting deer," Sager-Fradkin said.

While potential causes of mortality include habitat loss, predation and harvest, the tribe is concerned about hair loss syndrome, which has been found widespread in deer on the peninsula.

Hair loss syndrome is caused by a non-native chewing louse, which causes deer to incessantly lick and scratch. As a result, deer develop poor body conditions, some dying

from hypothermia and malnutrition. The constant scratching and licking also distracts the animals from being alert to predators.

"The fawn mortality work recently conducted by the Makah Tribe led us to believe that hair loss syndrome and its effects could be impacting populations outside of the Makah's study area, so Lower Elwha is focusing on areas east of Makah," Sager-Fradkin said.

The tribe captured and radio-collared 25 fawns and collected information such as weight, length, sex and health condition of each. The collars, which expand as the fawn grows, track the migration and mortality patterns of the young deer. The tribe plans to collar and monitor mortality patterns of 10 bucks this year as well. The tribe will tag additional fawns and bucks in 2015. — T. Royal



T. Royal

Lower Elwha Klallam wildlife technician Karsten Turrey prepares a collared fawn for release.



K. Neumeyer (2)

Left, Lummi tribal fishermen prepare to set a reef net, or *sxwole*, between two canoes as their ancestors did. The tribe has begun the long process of returning to the traditional fishing method. Right, Lummi fisherman Troy Olsen prepares the *sxwole*, which mimics the appearance of a reef so salmon will swim into it.

Lummi Nation Returns to Reef Net Fishery

Lummi Nation tribal fishermen are teaching young tribal members the traditional method of harvesting salmon in a reef net.

The tribe had four new wooden canoes made for reef netting. Traditionally, fishermen suspended the reef net between two canoes.

“It’s an imitation of the seafloor, like a reef, that’s why it’s called a reef net,” said Lummi fisherman Richard Solomon. “*Sxwole* is what our people called it. It was a gift earned by

one of our people, I don’t know exactly how many years ago, (maybe) 200 years ago.”

Tribal fishermen watch from the canoes for the salmon to swim into the simulated reef and then lift the net.

“One of the things that is our challenge with reef nets is that we need to be in water that’s clear,” said Lummi fisherman Troy Olsen. “We need to be able to see the old hereditary salmon path. We have to relive the path. Our journey back to the *sxwole*, our reef net, is in

its infancy and we’re just now starting. We’ll go through several years of trials before we can really get back to the salmon path.”

In August, to practice with the reef net, tribal youth paddled one of the canoes about four miles to Cherry Point, known in the tribal language as *Xwe’chi’eXen*, from the Stomish grounds on the Lummi reservation.

“Our main goal today is to get set out and then if we’re on the right tide, the kids can kind

of get an idea of what it feels like, what the ancestors did,” Olsen said. “We have a long ways to go in our sites. This is just one site of probably many hundreds of sites that kids can explore over time.”

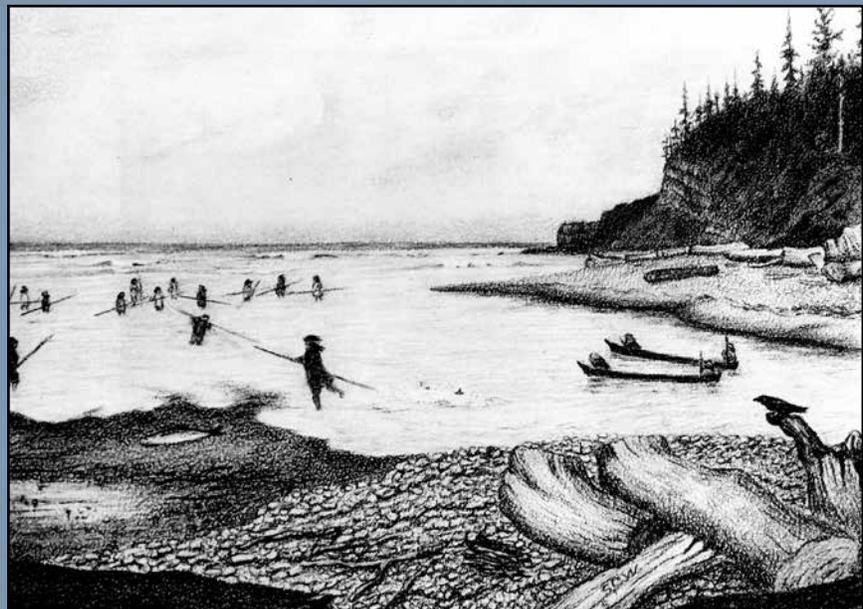
– K. Neumeyer

Watch a video about the return to reef netting at go.nwifc.org/lkc

Generations

This drawing of Quinault spearfishermen was done by Sarah Willoughby, the wife of an Indian agent in the 1880s. Most of her collection is in the University of Washington Special Collections Division.

This drawing appears in the Quinault Indian Nation’s book, *Land of the Quinault*. It is called “High Tide at Grandville,” which was the name for Taholah before it became Taholah.



Courtesy of QIN. UW reference number: NN: NA-4045

HABITAT RESTORATION

Former Golf Course to be Estuary Again

The Capital Land Trust and the Squaxin Island Tribe are working to bring back salmon habitat and protect an important shellfish growing area by restoring a former golf course on Oakland Bay.

The land trust recently purchased the 74-acre Bayshore Golf Course, which includes the mouth of Johns Creek and more than a thousand feet of shoreline.

The tribe and the land trust will remove a 1,400-foot dike, restoring the Johns Creek estuary and important marine shoreline.

“Taking the dike out will provide salmon with additional acres of saltwater marsh to use as they migrate out to the ocean,” said Jeff Dickison, assistant natural resources director for the tribe.

Eventually, the golf course fairways will be replanted with native vegetation, restoring a streamside forest that helps provide habitat to salmon. Preventing development around

the bay also protects the most productive shellfish growing area in the state.

The former golf course sits on a peninsula jutting into Oakland Bay that is made up of mostly gravelly glacial outwash.

“If the golf course had been sold to developers, the porous nature of the gravel underneath the golf course couldn’t have protected shellfish beds from being polluted by septic tanks,” Dickison said.

The mouth of Johns Creek was the site of one of the largest longhouses and Squaxin villages.

The state Department of Ecology helped the land trust buy the surface water rights associated with the golf course.

“Johns Creek doesn’t have enough water to support a weak run of summer chum,” said Scott Steltzner, salmon biologist for the tribe. “By securing this water right, we can balance against increased water appropriations throughout the Johns Creek watershed.”

— E. O’Connell

An aerial photo shows Johns Creek running through the Bayshore Golf Course, which the Squaxin Island Tribe has purchased with plans to restore important estuarine habitat.



Department of Ecology



Joelene Boyd, The Nature Conservancy

SRSC staff Rich Henderson, left, Jason Boome and Ric Haase beach seine for juvenile fish in Fisher Slough following a restoration.

Setback Plus Floodgate Benefits Skagit Salmon

A five-year monitoring effort has shown that the Fisher Slough restoration project benefited juvenile chinook even more than predicted in the Skagit River Salmon Recovery Plan.

The Nature Conservancy led the project to restore tidal marsh habitat in the Skagit watershed. Once the project was completed, the Skagit River System Cooperative (SRSC), the natural resources extension of the Sauk-Suiattle and Swinomish tribes, monitored the site between 2009 and 2013.

The Fisher Slough project is one of seven estuary restoration projects completed in the Skagit, totaling more than 750 acres of restored habitat. These projects mainly used four different designs: dike setback, dike breach, intertidal fill removal and self-regulating tide gates (floodgates) to restore habitat.

“Our monitoring has generally found that dike setback and fill removal works the best for fish,” said Eric Beamer, SRSC research director. “What is interesting at Fisher Slough is the use of both dike setback and a self-regulat-

ing floodgate.”

The restoration created about 46 acres of juvenile rearing habitat, and the combined effects of the dike setback and floodgate significantly changed the seasonal dynamics of dissolved oxygen and water temperature, benefiting resident chinook.

SRSC sampled fish with beach seines and fyke traps, and found an increase in juvenile chinook upstream of the floodgate. Compared with an estimate of fewer than 17,000 smolts in 2009, the high estimate for 2013 was nearly 39,000 – an increase of about 22,000 fish.

“This increase in smolt carrying capacity is 1.3 times a greater benefit to Skagit chinook salmon than predicted by the Skagit Chinook Recovery Plan,” Beamer said. “The dike setback clearly increased the amount of rearing habitat upstream of the floodgate, but juvenile chinook salmon are able to access the new habitat only because the floodgate was operated in sync with at least part of the natural tidal cycle.”

— K. Neumeyer



E. O'Connell

Eatonville High School student Hanna Bridgham, from right, Cassidy Forler and Tessa Rurup help Eatonville retain its unofficial title of the country's "Rain Garden Capital."

Rain Gardens Counteract Eatonville's Development

The Nisqually Indian Tribe and the Nisqually River Council are working with local high-school students to build six rain gardens in Eatonville, continuing several years of stormwater mitigation work.

"If we don't do something, growth in Eatonville will have a massive detrimental impact on salmon and water quality," said David Troutt, the tribe's natural resources director. "But if we can handle the growth the right way, we can have salmon and a healthy community."

Dozens of rain gardens have already been built throughout Eatonville, giving the city the distinction of the highest density of rain gardens of any community in the country.

Rain gardens capture and absorb polluted runoff from impervious surfaces, like roofs or parking lots. They reduce runoff

by allowing stormwater to soak into the ground instead of flowing into storm drains causing pollution, flooding, and diminished groundwater.

As a part of the project, the council's Nisqually River Education Project is engaging local high-school students in building and caring for the city's growing collection of rain gardens. The project is working with four students from Eatonville High School to design each new rain garden. Each student also participated in the tribe's Stream Stewards training course this summer.

"This kind of effort is what we'd like to see across the watershed and across the region," Troutt said. "When we end up saving salmon and Puget Sound, it will be because we've found ways to handle the population growth that is going to come."

— E. O'Connell

Channel Restoration Expands, Sees Results

This summer, the Nisqually Tribe, the Nisqually Land Trust and the South Puget Sound Salmon Enhancement Group tacked on another 1.5 miles of restored habitat to Ohop Creek.

More than a century ago, farmers turned the creek into a straight-flowing ditch in an attempt to dry out the valley floor and create cattle pasture. However, deep clay deposits in the soil continued to hold water year round, and despite the failed effort to completely dry the valley, the stream remained channelized.

The Ohop Creek restoration will include digging a new channel as well as adding other features, such as logjams and deep pools, that will provide habitat for salmon.

Salmon habitat restoration on the creek began in 2009 with a repaired 1-mile channel just upstream of the new site. That channel was constructed to restore a sinuous stream that connected to its floodplain. The floodplain, now replanted with native vegetation, re-creates 80 acres of healthy riparian habitat that controls water temperatures and stabilizes the stream banks.

The project partners have already documented the progress of the upstream restoration.

"We've seen a lot of changes, down to the types of birds that visit the site," said David Troutt, the tribe's natural resources director. Early results include increased use by salmon and the return of wildlife species, such as elk, that had not been seen in the valley for decades.

Ohop Creek is one of two major tributaries to the Nisqually River that can support chinook salmon and steelhead, both of which are listed as threatened under the federal Endangered Species Act. Ohop Creek also supports coho and pink salmon and cutthroat trout.

"Throughout Puget Sound, we're seeing available salmon habitat continue to disappear, despite millions of dollars spent to restore and protect it," Troutt said. "There is no larger threat to treaty rights than lost salmon habitat. Projects like this are a small step toward reversing that trend." — E. O'Connell

Allie Feidt of South Puget Sound Salmon Enhancement Group helps remove fish from Ohop Creek before the channel is filled in.

E. O'Connell





E. O'Connell

Muckleshoot tribal member Gerland Moses prepares salmon for the tribe's community forest day. The tribe is concerned about the use of genetically modified salmon as a "food additive."

Genetically Modified Fish Threatens Tribal Way of Life

The Muckleshoot Indian Tribe, the Affiliated Tribes of Northwest Indians and the National Congress of American Indians are taking a stand against genetically engineered salmon.

Each has passed a resolution asking the federal government to reject a proposal to mix genetic material from chinook salmon and eel-like fish with Atlantic salmon. The genetically engineered fish would grow to full size in three months compared to three years for a natural salmon.

Because the genetic modifications would be classified as a "food additive," they would be protected under a patent as intellectual property.

"It isn't a stretch that these fish could eventually escape into the wild and spawn with naturally spawning fish or salmon in our hatcheries," said Valerie Segrest, a traditional foods educator with the Muckleshoot Tribe. "At that point, a private

corporation would have ownership of salmon in our streams and in our hatcheries. No one should own the genetic code of our salmon or our culture."

One of the most worrisome aspects is that because these fish grow so fast, they also take in more pollution than a naturally evolved salmon.

"Pollution is already a problem for tribal people who depend on fish and shellfish as part of their diet," Segrest said.

Genetically engineered salmon would drive a wedge into the relationship between Indian tribes and salmon, which has shaped their culture for thousands of years.

"Our way of life has evolved alongside salmon," Segrest said. "Allowing genetically engineered fish into the food system, or accidentally allowing them into our streams, would cause irreversible DNA damage and negatively change how we depend on the salmon."

— E. O'Connell

Probing Cause and Effect of Changing Lake Temperatures

The Squaxin Island Tribe is getting to the bottom of Lake Isabella to find out whether water temperatures are affecting salmon populations downstream.

"Warm water can really hurt juvenile salmon before they migrate out to the ocean," said Sarah Zaniewski, the tribe's habitat biologist. Warm water can spawn diseases and carries little of the dissolved oxygen that salmon need to breathe. Because salmon are cold-blooded, warm water increases their metabolic rate, forcing them to use energy needed for survival.

"We're taking a closer look at what exactly causes warming and cooling of Lake Isabella, Mill Creek, and all its tributaries, and how that would impact salmon," said Erica Marbet, the tribe's hydrologist.

Throughout the summer, tribal researchers took the temperature of the lake, and

throughout Mill Creek, the lake's downstream tributary.

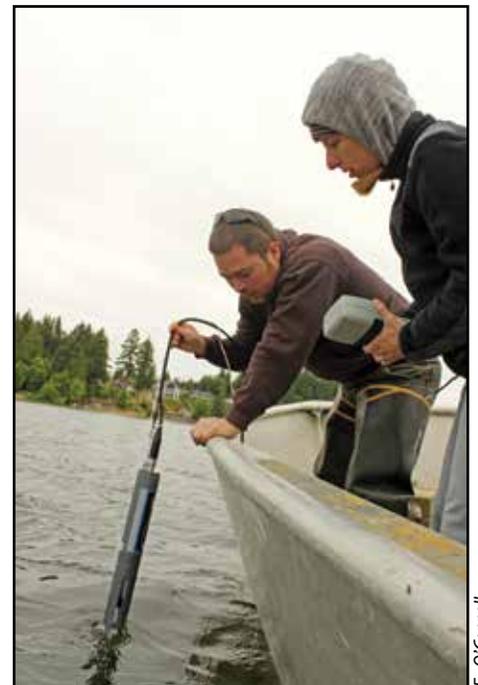
"One of the important things to find out is how the lake's temperature changes as you get deeper," Marbet said. "That way, we can figure out how important the lake is to the temperature in the creek."

The researchers also walked portions of the creek to find out why it warms and cools at different places.

"Because coho salmon spend their first year of life in fresh water, they are especially vulnerable to changes in freshwater habitat," Zaniewski said.

This year's temperature study follows an intense habitat survey that the tribe conducted last year on Mill Creek. Like most South Sound streams, Mill Creek coho production dropped off about 20 years ago.

— E. O'Connell



E. O'Connell

Joe Puhn, Squaxin Island natural resources technician, and hydrologist Erica Marbet sample water in Lake Isabella.

Quileute Tribe Maps Nearly 300-Acre ONP Acquisition

Mapping the wetlands of the Quileute Tribe's 278-acre acquisition from Olympic National Park was a critical task before proceeding with development plans to move tribal members and the tribal school out of the tsunami zone.

The tribe's natural resources personnel and the U.S. Army Corps of Engineers completed mapping surveys in the late summer in a cooperative effort that provided important training for both.

The land is part of the 800-plus acres that was transferred to the tribe more than a year ago by an act of Congress.

The 278 acres will be used for development of housing and other facilities.

"For the guys at the Corps, it's an opportunity for hands-on training they wouldn't normally get in terrain they don't see much," said Frank Geyer, the tribe's deputy natural resources director. "For us, we got a week of training that helped us learn the process of mapping wetlands through identification of wet-

land vegetation, soils and hydrology, and tribal council gets the maps and information they need to start planning."

For a week, groups of tribal personnel, Army Corps engineers and biologists walked the wooded acreage marking wetland areas based on the vegetation and soil samples. A preliminary map has been given to tribal council and additional maps will assist in plans that will be submitted to the federal department of Housing and Urban Development.

"We mapped where the wetlands are and how big they are and that gives the tribe a blueprint for how they can look at it in terms of development," Geyer said.

"The tribe has a good ongoing relationship with the Army Corps of Engineers with disaster preparedness, as well as the work on dredging the river channel and the jetty maintenance that protects the marina," he added. "They had some funding available and they were willing to put it to use for a worthwhile project for them and us." — D. Preston



D. Preston

Quileute deputy natural resources director Frank Geyer, left, and Melissa Leslie, biologist for the U.S. Army Corps of Engineers, consult a soil book while mapping a recently acquired piece of Olympic National Park.

Hoh's New Circular Steelhead Tanks Boost Efficiency

The Hoh Tribe has acquired circular fish-rearing tanks to augment its pond and raceways, and improve efficiency at the Chalaat Creek Hatchery.

Four of the 16-foot-diameter tanks for rearing steelhead are up and running, helping to improve water efficiency.

"We have low flow issues most summers and these tanks allow us to re-use up to 75 percent of the water," said Joe Gilbertson, the tribe's fisheries manager. Additionally, the tanks are self-cleaning, less costly and more efficient for treating fish health problems during the summer's low flows, compared to the previously used large pond.

A \$100,000 federal Hatchery Reform grant paid for the tanks and an aerator to boost oxygen in the water. The tribe will still use the pond in the fall when there is more water, easing concerns about water temperature and crowding that can increase the risk of fish diseases.

The tribe aims to release 100,000 steelhead each year.

Steelhead are especially important because they return over a longer period of time and in the winter when there are few seasonal jobs to supplement incomes. Most of the tribe's fishery is directed at the hatchery fish which return before the wild steelhead run.

— D. Preston



D. Preston

Hatchery technician Lester Fisher, left, and hatchery manager Bob Koons assemble the piping that will connect an aerator to the Hoh Tribe's new circular tanks.

GENETICS RESEARCH

Gathering DNA from Steelhead Scales and Tails

The Jamestown S’Klallam Tribe wants to know which age class of steelhead is surviving the best within the Dungeness River watershed.

While checking smolt traps and surveying spawning grounds this spring, the tribe took tail and scale samples from 500 juvenile steelhead in five creeks between Sequim and Port Angeles: Seibert, McDonald, Matriotti, Bell and Jimmycomelately.

“We’re already counting the adults and juveniles every spring and fall, so why not take DNA samples and develop an age database for steelhead?” said Jamestown S’Klallam natural resources technician Chris Burns.

Analyzing the scales will tell biologists how long a steelhead has been in fresh water before out-migrating and how long it spent at sea. The DNA also will show whether the steelhead migrated back to sea after spawning in fresh water.

Steelhead returns are harder to forecast



T. Royal

Jamestown S’Klallam natural resources technicians Chris Burns, left, and Casey Allen sample scales and tails from steelhead for a DNA study.

because of their complex life history. Juvenile steelhead leave fresh water between the first and fourth years of life, but return from salt water in one to five years. Steelhead also are repeat spawners, returning to salt water before coming back to fresh water to spawn again over their lifespan, which can be as long as seven to nine years.

The genetics information will be shared with the state to help develop a larger database.

“By zoning in on steelhead ages, it will help the tribe with fisheries management, resulting in more accurate return estimates and harvest management decisions,” Burns said. — T. Royal

Comparing Coho Stocks in Puyallup Watershed

The Puyallup Tribe of Indians is building a library of genetic material from coho salmon throughout the Puyallup River watershed.

Winter run coho migrate through the Puyallup as late as February or even March while the earliest fish are often seen as soon as July.

“There isn’t much time when coho aren’t moving into the fresh water to spawn,” said Russ Ladley, the tribe’s resource protection manager.

Tribal natural resources staff collect adult coho at the Buckley trap at a diversion dam on the White River, then take a sample from the pectoral fin.

“I would like to collect an adequate sample so we have a background from which to compare,” Ladley said. “I want to know, for example, if the late-timed coho we see in the

White River are different from early coho we see there.

“Thirty years ago the state Department of Fish and Wildlife sprinkle-planted coho fry throughout the watershed, so I would like to find out if the fish are all the same or are still diverse.”

Much of the Puyallup coho’s historic habitat has been degraded in the past century and is still disappearing. Coho salmon spend an extra year in fresh water as juveniles compared to other salmon species, making them more vulnerable to declines in freshwater habitat.

“Coho are their most vulnerable when we get to summer low flows,” Ladley said. “Despite a prohibition of new water withdrawals, we’ve seen a continual decline in summer flows because of unregulated wells



E. O’Connell

Puyallup natural resources staff sample DNA from adult coho collected at the Buckley trap on the White River.

being allowed to spread across the watershed.”

Low flows reduce the amount of habitat available for coho rearing and can cut fish off completely from valuable habitat.

“We see a fairly broad range of return timing, and coho uti-

lizing habitat from near sea level to 3,000 feet of elevation in Mount Rainier National Park,” Ladley said. “It will be interesting to learn if this is one homogeneous stock or whether clear genetic differences exist.”

— E. O’Connell

STEELHEAD BROODSTOCK



T. Royal

Skokomish biologist Matt Kowalski, left, WDFW volunteer Corey Sawin and NOAA biologist Rob Endicott collect steelhead eggs.

Skokomish Supplements Hood Canal Run

The steelhead population in the Skokomish River has doubled since the Skokomish Tribe started a supplementation project in 2006, part of a 16-year-long project to boost the steelhead population in Hood Canal.

“The increase in the number of egg nests has given us an early indication that the project is working, but the long-term monitoring will be the true test of its success,” said Matt Kowalski, the tribe’s steelhead biologist. “We expect numbers to continue to increase over the next four years because there will be active supplementation of steelhead in the river.”

The tribe has spent the past eight years collecting 30,000 eggs a year from the Skokomish River. The eggs, collected between May and June, were raised to smolts in a state hatchery, then released into the river, except for 400 of them. Those 400

have been raised to four-year-old adults in a federal hatchery and then released to increase chances of spawning in the river.

The eggs collected are considered naturally spawned steelhead, Kowalski said, but their adipose fin is clipped so they can be differentiated in the field.

The next eight years will be focused on monitoring and counting salmon egg nests and observing changes in spawning areas, life history and genetic diversity, Kowalski said.

The National Oceanic and Atmospheric Administration is conducting genetic testing to determine changes in diversity and parental lineage throughout the population.

“One of the main goals of the project is to increase the number of steelhead without decreasing genetic and life history diversity,” Kowalski said. – T. Royal

Puyallup Program Shows Positive Results

For the last four years, a hatchery broodstock program meant to preserve a shrinking run of steelhead in the Puyallup watershed has seen incredible results.

“When we launched this program, we just meant to preserve the genetic traits of these fish, to make sure they didn’t disappear,” said Blake Smith, enhancement manager for the Puyallup Tribe of Indians. “But now, in some years we’re seeing more broodstock fish than wild fish.”

For eight years, the Muckleshoot and Puyallup tribes have been spawning about 20 wild steelhead taken from an adult trap on the White River. Their offspring are raised in tribal hatcheries and eventually released into the White River, a tributary to

the Puyallup.

“Every year since 2010 we’ve seen hundreds of these broodstock fish come back,” Smith said. “We thought we were at least replacing the fish we were taking, but we’re seeing good returns, doubling the number of adult steelhead on the spawning grounds.”

Each returning adult broodstock steelhead carries a small tag that can be detected when it is processed at the adult trap.

“We need to keep track of how many fish from the project actually return,” Smith said. “It’s encouraging to see this many steelhead come back, given the low release numbers.” – E. O’Connell



E. O’Connell

Terry Sebastian, Puyallup biologist, uses warm saline to collect eggs from an adult steelhead.