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Northwest Treaty Tribes

Protecting Natural Resources for Everyone

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More Fishing Restrictions Expected



by Lorraine Loomis
NWIFC Chair

As the tribal and state co-managers begin the annual salmon season-setting process, the effects of drought and poor ocean conditions over the past few years – combined with ongoing loss of habitat – are leading to another year of low returns and restrictive fisheries.

The drought in 2015 left our rivers and streams running low, slow and hot. Many returning salmon died before they reached the spawning grounds or a hatchery, and thousands more out-migrating young salmon died before they could reach the ocean.

Poor ocean conditions in 2016 that included warmer-than-normal water and less nutritious food supplies led to coho returns that were below half of expectations. Those salmon that made it back were about 25 percent smaller than normal and females carried about half as many eggs.

We continued to feel the effects of those conditions in last year's low returns, and we can expect more of the same for the next few years.

The good news is that ocean temperatures are cooling. We also have seen a wet winter with a larger snowpack that will help our rivers and streams run higher and colder this summer.

But while weather and ocean conditions may improve, the trend of habitat loss and damage continues its downward trend, making it increasingly difficult for tribal and state co-managers to craft conservative fishing seasons that provide limited harvest while protecting weak stocks.

Stillaguamish and Snohomish river chinook are near record low levels because of lost habitat. Coho returns to the Queets and Snohomish rivers and Strait of Juan de Fuca also are expected to be low this year. Reduced harvest by both Indian and non-Indian fishermen will be needed to protect those stocks.

The ongoing decline of Puget Sound chinook is another challenge facing the

co-managers. Since 1999, they have been listed as threatened under the federal Endangered Species Act (ESA) and show no signs of improvement.

Co-managers have developed a new 10-year Puget Sound chinook management plan, but it already has been declared insufficient by the National Oceanic and Atmospheric Administration, the federal agency in charge of implementing the ESA. That means even more restrictive fisheries are likely, perhaps as early as this summer.

The agency also may require additional fishery restrictions to help recover southern resident killer whale populations, which have been declining along with their preferred food: chinook salmon. At the same time, harbor seal and California sea lion populations have exploded in western Washington to the point that they now take more salmon within Puget Sound than fishermen.

We can't do anything about the weather and ocean conditions, but we can do something about the largest cause of the salmon's decline: lost and damaged habitat.

The clock has been ticking for nearly 20 years on the listing of Puget Sound chinook as threatened under the ESA. A threatened species is "any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

With no progress on Puget Sound chinook recovery, how much time do we have before NOAA Fisheries decides to re-classify them as endangered? If we think fishing restrictions are tough now, we haven't seen anything yet.



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On the cover: Nisqually tribal staff Rene Bracero (top) and Walker Duval survey Yelm Creek for chum salmon. See story on page 12.
E. O'Connell

Port of Olympia Dedicates Billy Frank Jr. Park



E. O'Connell (3)



Top left: Arnold Cooper, Squaxin Island Tribe chairman, talks during the March 9 honoring ceremony at the new waterfront park and trail named for Billy Frank Jr. Top right: The Squaxin Island Tribe and Nisqually Tribe canoe families perform together during the honoring ceremony. Above: Willie Frank III, son of Billy Frank Jr., walks along the renamed trail.

The Port of Olympia recently honored Billy Frank Jr. by renaming a park and trail in Washington's state capital after the late treaty rights activist and tribal leader.

Last year, residents urged the port to rename its main public road after Frank. After consulting with the Squaxin Island Tribe and the Frank family, the port agreed to instead rename a public trail and park.

"We thought a park and trail was a respectful way to pay tribute to his legacy," said Ray Peters, the tribe's intergovernmental liaison. "A lot of tourists will walk that trail and visit that park, and it was close to the water, which was so important to Billy."

The park will be the most recent public honor for Frank.

The Nisqually Tribe, the Squaxin Island Tribe and the city of Bellingham already have named streets after him. The Nisqually Tribe also renamed its former administration building, and a low-income housing project in Olympia carries his name as well. In 2015, the federal government renamed the Nisqually National Wildlife Refuge to honor Frank.

The half-acre park is adjacent to the site that both the Squaxin Island and Nisqually tribes used for their final landings during canoe journeys they hosted in recent years.

The port also has committed to adding educational signs to the park and enhancing the area with native plants.

The Frank family and the Squaxin Island Tribe will approve the eventual design.

"We thought it was important that the port not just rename the park and trail and walk away," said Willie Frank III, Frank's youngest son and a Nisqually tribal council member. "We wanted them to leave the park a better place than it was before."

"My dad spent his life fighting for treaty rights and also educating people about our struggle. He talked a lot about why protecting and restoring salmon habitat is vital for everyone," Frank said. "This will be an important place for people to come learn about his life and legacy." – E. O'Connell

Mill Cleanup Focuses on Shellfish Health in Bay

Shellfish recovery is on track following the collaborative efforts to clean up an old lumber mill in Port Gamble Bay.

The Port Gamble S’Klallam Tribe and Pope Resources made sure the removal of nearly 8,600 pilings and 110,000 cubic yards of wood waste and sediment from the former Port Gamble Mill site had minimal effects on the bay’s shellfish.

“It was important to us that this work be done in a good way, not only for the tribe but for everyone who uses these beaches,” said Jeromy Sullivan, the Port Gamble S’Klallam Tribe chairman.

The tribe worked with the state departments of Ecology, Health, and Fish and Wildlife, environmental engineering firm Anchor QEA, as well as Pope Resources, which owns the mill site, to develop a shellfish monitoring program that ensured the cleanup work protected local shellfish resources.

The removal of the mill materials was expected to release chemicals into the water but the contamination was not as bad as projected, said Clay Patmont, project manager for Anchor QEA.

“So the shellfish recovery is on track,” he said. “We didn’t think that’d happen for another five or 10 years.”

The tribe, Pope Resources and Anchor QEA monitored biotoxin and chemical concentrations using caged mussel and water samples before, during and after the project. Baseline monitoring took place from 2008-2015; in-water cleanup began in fall 2015 and concluded in early 2017.

Mussels are filter feeders that are used around the world as indicators of water quality and as an early indicator of shellfish quality. Mussels were brought in from Penn Cove near Whidbey Island, considered to be some of the healthiest mussels in Puget Sound.

Biotoxin testing included collecting mussel and phytoplankton samples to test for paralytic shellfish poisoning. Samples were sent to the state lab and tested for warning signs of increased biotoxins.

For chemical concentrations, cages of mussels were deployed north and south of the mill site, as well as on three tribal beaches popular for harvesting, left for 60 days, then sent to the state lab for testing.

“The great news is that we didn’t see a significant increase in biotoxin or chemical levels in mussels, and we never had to close shellfish beds for harvesting,” Patmont said.

The tribe, Pope Resources and Anchor QEA looked at four chemicals of concern – cadmium, PCBs, dioxins/furans and PAHs.

Overall, levels of these chemicals decreased over time as creosote pilings were removed, and wood waste was removed and capped. In addition, the chemical levels didn’t spike as expected during the cleanup. Patmont attributes that to few creosote pilings breaking while being removed.

After the project ended in January 2017, shellfish were sampled from the bay in April 2017, with results showing that chemical concentrations in the bay have continued to decline well below advisory levels. – T. Royal



T. Royal (2)

Top: Christine Raczka, Port Gamble S’Klallam Tribe environmental scientist, samples mussels from Port Gamble Bay. Above: Mussels were sent to a state lab to test for toxin levels before, during and after the cleanup of the old lumber mill on the bay.

“The great news is that we didn’t see a significant increase in biotoxin or chemical levels in mussels, and we never had to close shellfish beds for harvesting.”

Clay Patmont,
Anchor QEA, Project Manager



E. O'Connell (2)

Nisqually DNA Study Looks at Adult Chinook Population

The Nisqually Tribe is looking at DNA from out-migrating juvenile chinook to find out how many adult chinook have spawned in recent years in the Nisqually watershed.

From 2012 to 2014, the tribe operated an adult salmon trap to sample chinook returning to the Nisqually River. In addition, the tribe has been working with the state Department of Fish and Wildlife since 2013 to take genetic samples from out-migrating juveniles at a smolt trap.

A smolt trap is a safe and effective device to catch and count a portion of out-migrating salmon.

“We have a good idea of the genetic makeup of the adult run and we have a random sample of the out-migrating smolts they produced,” said David Troutt, the tribe’s natural resources director. “We’ll know if an adult successfully spawned if we find its genetics in outgoing juveniles the next spring. We can expand that to get a good idea of how many chinook successfully spawned.”

Each spawning pair can produce thousands of offspring, so at least one of the offspring would be caught in the smolt trap.

The tribal and state salmon co-managers are managing fisheries based on the understanding that too few chinook spawn in the river.

For almost 20 years, the tribe has led a grassroots effort to restore chinook habitat in the Nisqually watershed. In addition to recovering more than 700 acres of estuary, the tribe and its partners have restored two important chinook spawning tributaries.

“What we’re seeing is that there is more space for chinook to spawn than there are chinook getting up there,” Troutt said.

The Nisqually chinook run is part of a Puget Sound-wide population that is listed as threatened under the federal Endangered Species Act.

Instead of finding their way to the spawning grounds, the vast majority of returning chinook migrate back to the tribe’s hatcheries. The tribe trucks excess adults from one of their hatcheries to the upper watershed in the hopes of boosting the number of chinook spawning in the watershed. The tribe will use similar genetic techniques to evaluate the trucking effort. – E. O’Connell



Top: Nisqually tribal staff Walker Duval, left, and Betsy Hall take a DNA sample from a chinook that returned to the tribe’s adult trap in 2013. Above: An adult chinook that returned to the trap.

How Net Pens Support Sustainable Fisheries

Using net pens to release native species of salmon has provided sustainable fisheries in western Washington for decades. An example is the Peale Passage facility in deep South Sound, operated jointly by the Squaxin Island Tribe and the state Department of Fish and Wildlife.

Every winter, as many as 1.8 million coho are trucked from state hatcheries around the region and transported by barge to the floating net pens in Peale Passage. The tribe manages the day-to-day operations of the net pens between Harstine and Squaxin islands.

In addition to providing fisheries, the special nature of net pen facilities allows the tribe to protect wild spawning coho populations.

“Those fish that we release from the net pens tend to concentrate near Squaxin Island and the surrounding islands when they return, so that’s where we fish,” said Joe Peters, the tribe’s fisheries harvest manager.

Most salmon return to the stream where they were born, but because net pen fish are released directly into Puget Sound, their homing instincts bring them back to the pens.

The tribe fishes for fall coho in deep South Sound, avoiding bays and inlets where wild coho congregate. More than 95 per-



E. O’Connell

A juvenile salmon is released into a net pen facility managed by the Squaxin Island Tribe in deep South Sound.

cent of the tribe’s commercial fishery are hatchery fish, according to catch samples.

“The reason we manage our fishery the way we do, avoiding terminal areas, is to protect wild runs of coho while harvesting hatchery fish,” Peters said.

Net pen coho also contribute to sport fisheries in Puget Sound, as thousands of these fish are caught by sports fishermen each year, Peters said. – *E. O’Connell*

More Wood, More Pools to Benefit Salmon Habitat

A lack of holding pools in the South Fork Nooksack River continues to limit the recovery of spring chinook salmon populations.

The Lummi Nation will soon begin the second phase of a restoration project near Skookum Creek to improve habitat complexity, connectivity and climate change resilience for threatened salmon species.

Twelve engineered logjams will create shaded pools for migrating adult and over-wintering juvenile chinook salmon

and bull trout.

Several of the logjams will be placed downstream from a known cooler water stream, Edfro Creek, to provide temperature refugia in cool deep pools with woody cover.

“Temperature is a limiting factor for salmonid production in the South Fork during the hot, low-flow summer and early fall months, primarily July through October,” said Alex Levell, deputy restoration program manager for Lummi.

“During this time, adult chinook are migrating upriver and spawning, and eggs are incubating.”

In the first phase of the project, Lummi Natural Resources constructed four logjams and removed 600 feet of riprap to open up additional woody cover.

“The logjams have been designed to be as close to the active river channel as possible to induce the most habitat response,” Levell said. – *K. Neumeyer*

A crew builds a logjam during the first phase of the Skookum Creek project in August 2017.

Alex Levell, Lummi Natural Resources



FISH HEALTH

Fish Vaccine to Help Salmon, Humans

A little home cooking is helping tribal hatcheries keep chinook and coho disease-free and eliminating the need for antibiotics that could lead to drug resistance in people.

For the past three decades, staff from the Northwest Indian Fisheries Commission's tribal fish health program have been producing vaccines to treat vibriosis and enteric redmouth disease that can be lethal to young salmon in hatcheries. Treaty tribes in western Washington produce about 40 million salmon annually.

Both of the vaccines produced in NWIFC's lab eliminate or sharply reduce the need for antibiotics to treat infected fish in hatcheries. It is thought that the overuse of antibiotics in animals used for food reduces the effectiveness of antibiotics in humans.

"The vaccines we produce are highly effective and can be made at a fraction of the cost that companies charge," said Bruce Stewart, the lab's director. "We made 750 gallons of vaccine for use this year that we can use to inoculate about five million fish, saving the tribes tens of thousands of dollars a year, and protecting salmon that are harvested by Indian and non-Indian fishermen."

Enteric redmouth disease is a bacterial infection of freshwater and marine fish that mainly affects steelhead and chinook early in their life cycle, sometimes before their immune system is developed.

The *vibrio* virus occurs naturally and is widespread in western Washington marine waters. Outbreaks are influenced largely



T. Meyer

Betsy Hall, NWIFC microbiologist, checks the status of vaccines being produced in the NWIFC fish health lab in Olympia.

by water temperatures that exceed 55 degrees. If unchecked, the disease can lead to huge losses of young salmon in hatcheries.

Coho and chinook are especially susceptible to vibriosis, but their treatment varies because of the difference in size and how much the young fish are handled before release.

To further gauge the effectiveness of inoculating young chinook in fresh water, tribal and fish health lab staff will use a coded-wire program to track survival rates of the treated fish over the next three years. – T. Meyer

Longfin Smelt Harvested by Tribes for Generations



Bill Stagnario, University of California-Berkeley

A longfin smelt, also known as a hooligan.

Lummi Natural Resources and Northwest Indian College (NWIC) have partnered to learn more about the longfin smelt, known as hooligans, that have been harvested by tribal members for generations.

NWIC native environmental science faculty member Dr. Rachel Arnold and Lummi fisheries technician Jeffrey Solomon have spent two seasons gathering DNA samples, scales and otoliths (mineral structures often referred to as "ear bones") from hooligans harvested along the Nooksack River each fall.

"We've also had conversations with tribal elders, as well as non-native elder fish-

ers, who have been harvesting hooligans since they were children," Solomon said.

Longfin smelt migrate to salt water and back again to spawn, like salmon. In 2015, Lummi Natural Resources' stock assessment division reported that longfin smelt have been caught in shrimp trawls down to about 450 feet during the winter.

"The science and the traditional knowledge, it's all relative to each other," Solomon said. "It has even been suggested by one of our tribal elders that protection might be warranted for this particular population because of a suspected decline in the run this past season."

– K. Neumeyer

Fast Facts:

- The "hooligan" that returns to the lower Nooksack to spawn is the longfin smelt, *Spirinchus thaleichthys*.
- A food source for adult salmon and other predators, hooligans provided rich fat content historically for tribes. The nutritious "fish butter" was used on foods such as salmon, halibut, herring roe, berries and vegetables.
- According to local fishers, the run starts around Veterans Day and ends about Thanksgiving weekend. Most fishers catch these smelt with a pole net as the fish move upstream to spawn.
- Hooligans live 2 to 5 years in salt water before returning to fresh water to spawn, spending 95 to 98 percent of their lives at sea.

Steelhead Swimming Past Former Dam Sites

Spawning surveys in the Elwha River show that steelhead are taking advantage of the river's newly opened habitat.

For the past six years, the Lower Elwha Klallam Tribe, with federal and local partners, has been surveying the river and its tributaries for steelhead nests (redds) and spawning adults. The surveys have been conducted annually between February and July, following the removal of the fish-blocking Elwha Dam in 2012 and Glines Canyon Dam in 2014.

"The purpose is to document where the steelhead are spawning in the Elwha River as they access newly opened areas of historic habitat," said Mike McHenry, the tribe's habitat program manager. The tribe is working with fisheries biologists from the National Oceanic and Atmospheric Administration/Northwest Fisheries Science Center, Olympic National Park, U.S. Geological Survey and Trout Unlimited.

The 2017 surveys brought to light several important milestones for the recovering river:

- Steelhead voluntarily made their way upriver to spawn in tributaries;
- Steelhead redds were discovered farther upstream than before in Little River, a major tributary to the Elwha River; and
- More steelhead spawned above the former Glines Canyon dam site than in any previous year.

"It appears that steelhead are passing the former boulder blockage at Glines Canyon and moving farther upstream in the watershed," McHenry said. "These observations suggest that the distribution of spawning winter steelhead is likely to expand as the river's habitat conditions improve and steelhead populations increase."

The annual surveys, conducted by foot, start near the mouth of the river and end at river mile 18, within Olympic National Park at Long Creek. Survey data is correlated with data from the tribe's sonar program, which counts the number of fish returning to the river between June and September.

The steelhead are likely a mix of natural-origin fish, and fish from the tribe's captive broodstock program that was put in place to keep the population viable during dam removal, McHenry said.

- T. Royal



John McMillan, Trout Unlimited

Steelhead swim up river while scientists survey 18 miles of the Elwha River by foot.

"These observations suggest that the distribution of spawning winter steelhead is likely to expand as the river's habitat conditions improve and steelhead populations increase."

Mike McHenry,
Lower Elwha Klallam Tribe, Habitat Program Manager



T. Royal

Lower Elwha Klallam Tribe hatchery technician Keith Lauderback and Western Washington University intern Melanie Roed examine a steelhead for blood and scale samples in 2009, for the tribe's steelhead captive broodstock program.

PROTECTING HABITAT

Tribes Improve Salmon Habitat on Pysht River

The Lower Elwha Klallam and Makah tribes are restoring habitat that has been lost for decades on the Pysht River.

Partnering with private property owners and logging company Merrill and Ring, the tribes installed nearly 40 large log structures within a 2-mile stretch of the Pysht mainstem in 2017, between the South Fork and Needham Creek.

“The health of the Pysht River watershed is extremely important for both tribes,” said Stephanie Martin, the Makah Tribe’s habitat division manager. “This stretch of river is extremely impaired, and also complex with risk to infrastructure. That is why it has taken nearly a decade to get to this point.”

The river’s movement threatens Highway 112 and buildings on private land along the river. Instead of protecting them with riprap, wood structures are tied to the banks and partially buried, which slows water velocity and creates pools salmon need for eating, resting and feeding.

Sedimentation in the Pysht also has been a problem after decades of logging in the upper watershed sent sediment downstream, filling gravel beds that salmon need for laying eggs.

“In the 1950s, the state had a division dedicated to clearing streams of wood, under the premise that simplifying stream channels for fish would be beneficial,” said Mike McHenry, the Lower Elwha Klallam Tribe’s habitat program manager. “This was exacerbated by forest practice rules at the time, which didn’t include leaving buffers of trees along salmon streams, or leaving behind the wood debris after logging.

“When you lose that wood, you cause channel incision or downcutting, which results in a loss of pools, off-channel habitat and floodplain habitat – all that stuff that salmon need to survive,” he said.



T. Royal

Lower Elwha Klallam Tribe natural resources technician Gabe Youngman ties together logs for a logjam in the Pysht River.

By the 1990s, surveys showed there were few functional wood pieces in the Pysht, he said, but now wood pieces are beginning to fall into the river naturally, primarily because of riparian buffering in addition to the restoration work of the tribes.

“So we’re in still in the early signs of recovery,” he said.

– T. Royal

Puyallup Tribe of Indians Protests Natural Gas Plant



Washington Department of Ecology

The proposed site for Puget Sound Energy’s LNG plant in Tacoma.

The Puyallup Tribe of Indians is urging state and federal authorities to stop construction on a new liquefied natural gas (LNG) plant in the tribe’s treaty-protected area.

“Local authorities rushed this plant through and did not consult with the Puyallup Tribe,” said Bill Sterud, the Puyallup Tribe’s chairman. “Neither the city nor the

Port of Tacoma took enough time with their permitting processes to consider the treaty-protected resources at stake here.”

Once completed, Puget Sound Energy’s LNG plant will include an 8-million-gallon tank that is able to process 250,000 gallons of natural gas daily. LNG is held in the tank at about -260 degrees Fahrenheit, making it dense and easier to store.

The plant will be located on the Tacoma tide flats, across from a marina and beach owned by the Puyallup Tribe. Even though the estuary has been industrialized, the LNG plant poses a substantial and serious environmental threat.

A leak and explosion at an LNG plant in Eastern Washington three years ago injured 14 people and resulted in 14.3 million cubic feet of natural gas escaping.

The plant is slated to be built next to the Occidental Chemical cleanup site, the most polluted site on Puget Sound. An ever-expanding underground plume of chemicals reaches from the Occidental site to under the Hylebos Waterway.

“The estuary is where all of the salmon that come out of the Puyallup acclimate to salt water before they leave for the ocean,” said Russ Ladley, natural resources director for the tribe. “This is the sort of place where we’d hope conditions would be getting better, not worse.” – E. O’Connell



T. Royal

Jen McIntyre, aquatic ecotoxicologist for Washington State University, observes the behavior of a coho that has been exposed to water polluted with ground-up tires.

How Much Tire Residue Does it Take to Kill a Fish?

After six years of learning how coho and chum salmon are affected by runoff from urban streets, scientists are narrowing down which pollutant is killing fish.

The annual pre-spawning mortality study at Suquamish Tribe's Grovers Creek Hatchery this winter has been focused on how tire residue affects juvenile and adult coho and chum salmon.

"We want to figure out which concentration of the tire residue in the water will kill fish and how long after exposure do the fish become sick and die," said Jen McIntyre, aquatic ecotoxicologist for Washington State University, who has overseen the last few years of the project. Other partners include U.S. Fish and Wildlife Service, University of Washington, and National Oceanic and Atmospheric Administration (NOAA).

Fish are exposed to the polluted water for 24 hours or less, and then pulled from the tank and observed for normal or abnormal behavior. Fish that appear to be dying have their blood and organ tissues sampled.

Scientists also are observing how the polluted water affects chum and

coho differently. In the past, chum haven't been fazed by polluted water, but coho have died within hours.

"Chemicals that leach from tire particles are part of the complex chemical mixture of urban runoff," McIntyre said.

The yearly work at Grovers Creek is part of a larger effort to understand the causes and consequences of coho pre-spawn mortality in urban watersheds.

Other regionwide studies have included a land-use analysis of stormwater runoff using data from stream surveys collected from 2000-2011 by the Suquamish and Stillaguamish tribes, and other private groups and federal agencies, including Wild Fish Conservancy.

"A major take-home of the work is that it looks like the chemicals causing the most problems are coming from motor vehicles," said Nat Scholz, lead for the ecotoxicology program at NOAA's Northwest Fisheries Science Center. "The greater the traffic density within a given geographic area, the stronger the association with the mortality syndrome." – *T. Royal*

GENERATIONS

Emmanuel Alfred and Justin Alfred seine on the beach near Agate Pass in Suquamish.



Courtesy of The Suquamish Museum and Cultural Center, Photograph 1352

Tribe Partners with Navy to Replace Culvert

An undersized culvert under West Kingston Road is being replaced with a fish-friendly bridge.

As part of a mitigation agreement between the Suquamish Tribe and the U.S. Navy, a 5-foot-wide culvert is being replaced with a 150-foot-long bridge. The span crosses the Carpenter Creek estuary where it meets Apple Tree Cove in Kingston, and is used by both marine life and wildlife.

“When we had to decide on a mitigation project, this was an action that the tribe and Navy could agree on after several other options were given consideration,” said Steve Todd, the tribe’s ecologist. “This project builds on the progress made downstream in 2012 when a small culvert

was replaced with a bridge on South Kingston Road.”

The new bridge will open tidal flow to 6,000 square feet of estuary while improving migration routes for fish, such as chum, coho and chinook salmon.

“It provides a contiguous corridor that is free from barriers for fish and other wildlife to access more habitat, as well as enhances more natural movement of water, sediment and wood coming from the upstream watershed and through the estuary,” Todd said.

Staff and volunteers at the nearby Stillwaters Environmental Center have wanted this culvert replaced since 2000, said Naomi Maasberg, the center’s administrative director.

“Our first hurdle was getting funding for the South Kingston bridge at the mouth of the estuary, and that took 11 years of advocacy to get built,” she said.

The organization will be monitoring how the estuary improves and changes after the project.

“West Coast marshes are little studied,” said Joleen Palmer, the center’s monitoring and program director. “With interns from the University of Washington and Western Washington University, the Stillwaters staff and citizen volunteers monitor and conduct research relevant to the unique character of the estuarine and salt marsh ecosystems.

“Plant communities located throughout the salt marsh

will likely change as the saline marine waters increase. It will likely take 10 to 15 years to see the whole system restabilize.”

The work is partial mitigation for ecological damage caused by a renovated pier at Naval Base Kitsap-Bremerton in 2012.

“The Navy is proud of our contribution to this significant salmon habitat restoration project,” said Greg Leicht, environmental director for Naval Base Kitsap. “Successful consultation and collaboration between the Navy, the Suquamish Tribe, federal and state agencies, and Kitsap County allowed us all to complete one of the higher priority projects in the Puget Sound Action Agenda.” – *T. Royal*



Left: An undersized culvert blocks fish passage in the Carpenter Creek estuary. Below: The Suquamish Tribe and U.S. Navy have partnered to build a bridge to replace the culvert and restore tidal flow to 6,000 feet of estuary.



T. Royal (2)

“It provides a contiguous corridor that is free from barriers for fish and other wildlife to access more habitat.”

Steve Todd,
Suquamish Tribe, Ecologist

Tribal Surveys Lead to Fishing for All



E. O'Connell

Nisqually tribal staff Walker Duval, left, and Rene Bracero survey Yelm Creek for chum salmon.

Tribal and sport fishermen were able to fish for Nisqually winter chum this year thanks to a new in-season management tool developed by the Nisqually Indian Tribe and the Northwest Indian Fisheries Commission.

The tribe built a new predictive model that uses in-season data to update escapement expectations. Pre-season estimates of this year's winter chum run had been too low to allow for harvest.

"Now we can determine the entire run size much earlier than usual," said David Troutt, natural resources director for the tribe. "We're able to adjust our fishing plans to reflect what the run looks like in real time."

In-season changes to fishing plans usually include a watershed-wide count of salmon on the spawning grounds. On the Nisqually, this escapement number had not been available until weeks after the fishing season closed.

The new model uses data gathered during tribal spawning surveys on Yelm Creek. Tribal scientists established a connection between early chum spawning on the creek and

watershed-wide chum escapement.

"If we see a lot of chum in Yelm Creek, we'll also see them later throughout the watershed," Troutt said.

Tribal managers have been testing the model for the last few years.

"We're excited by how accurate the model is," Troutt said. "Despite a low run of chum last year, the number produced by the model was within a few percentage points of the eventual watershed escapement."

To protect weak runs, the tribe has fished an entire chum season only once in the past eight years. The tribal fishery typically runs from late November to mid-January. Last year, for the first time, the tribe did not open a winter chum fishery at all.

"Winter chum has always been the most important stock to the Nisqually Tribe," said Farron McCloud, chair of the Nisqually Tribe. "They were always our largest run and we depended on them to sustain us through the winter. We want to make sure enough salmon make it up the river to spawn."

– E. O'Connell



T. Royal

Eliminating Invasive Species

Lisa Belleveau, habitat biologist for the Skokomish Tribe, pulls Scotch broom from floodplain areas in the Skokomish Estuary.

After more than a decade of restoration, the tribe is monitoring the estuary as it restores itself after decades of being diked and blocked off from tidal flow. The tribe, Mason Conservation District and community volunteers pulled Scotch broom during the winter and will plant native vegetation in the spring.



Take a Panoramic Virtual Tour of the Stillaguamish

Western Washington rivers have entered the world of virtual reality.

The Stillaguamish and Tulalip tribes have partnered with a company called FishViews to create an interactive 360-degree map of the Stillaguamish watershed.

The maps contribute to salmon recovery by allowing natural resources managers to identify habitat restoration opportunities.

“We can reach out to land-

owners where projects could be needed,” said Jason Griffith, Stillaguamish fisheries biologist. “If there’s invasive species that need controlling, for example, or a place cows could get into the creek.”

FishViews captured the major channels of the North Fork, South Fork and mainstem Stillaguamish River to the estuaries. Users can view the river from a rafter’s point of view, and also dip down below the water’s surface.

Public access points have been marked to guide fishermen and recreational users.

The website is a platform to share geospatial data with anyone with Internet access.

“FishViews’ broader goal is to create a virtual reality map of the entire Salish Sea rivers and Salish Sea shore so that salmon recovery data can be unified and understood on a more holistic and insightful level,” said Brian Footen, president of the company.

In addition to the Stillaguamish, FishViews mapped the Elwha River after the dams were removed, and is working in partnership with others to quantify fish habitat in the Snoqualmie River and integrate a bull trout distribution study in the South Fork Hoh River. – K. Neumeyer

Experience FishViews:
nwtt.co/fishview

Chinook Habitat Corridor to Give Floodwater a Place to Go

The Stillaguamish Tribe is connecting a corridor of chinook habitat from mountain tributaries to the Stillaguamish River’s mouth.

During the past 10 years, from Darrington to Stanwood, the tribe has acquired 1,000 acres toward its goal of 7,225 acres by 2055. This winter, the tribe received funding from the state Salmon Recovery Funding Board to buy about 90 acres more.

Building a corridor enables the tribe and its partners – which include the Tulalip Tribes, Snohomish County, The

Nature Conservancy, Forterra and the Snohomish Conservation District – to complete restoration work outlined in the 2005 Stillaguamish Chinook Recovery Plan.

“We’re all together trying to conserve the land,” said Jason Griffith, Stillaguamish fisheries biologist. “Then we can set back infrastructure, give the river some space and rewild the floodplain.”

Ultimately, the corridor will give the river somewhere to go during floods, providing an area for sediment to settle.

Sediment and large floods put salmon

eggs at risk of being scoured and smothered. Already, floods that used to occur every 20 years are happening every two years, Griffith said.

Climate change is expected to increase the frequency and intensity of floods, along with other negative effects on salmon from high temperatures, low summer flows and rising sea levels.

“A complex floodplain builds resilience into a watershed to deal with these challenges,” Griffith said. – K. Neumeyer



K. Neumeyer (2)

Restoration in Skagit Tributary Nearly Finished

Years of work to restore salmon habitat on a productive tributary to the Skagit River is expected to be completed this summer.

Most of Illabot Creek has been protected from habitat loss, but about a half-mile was degraded in the 1970s by construction of the Rockport-Cascade Road bridge. The channel was relocated and constrained. A steeper gradient reduced habitat complexity and limited connectivity with the floodplain.

“This work changed Illabot Creek from a sinuous, multi-thread channel throughout this reach to a straightened, single-thread channel,” said Devin Smith, restoration ecologist for the Skagit River System Cooperative (SRSC), the natural resources extension of the Swinomish and Sauk-Suiattle tribes.

The first phase of the Illabot restoration in 2013 removed 1,150 linear feet of dike, installed logjams and built pilot channels downstream from the road.

“If we don’t maintain the momentum of restoration activities, the restored habitat upstream of the Rockport-Cascade bridge will continue to be degraded by the

bank armoring, and Illabot will be isolated from 10 acres of floodplain,” Smith said.

Between now and August, an additional 850 linear feet of dike will be removed, two new 100-foot bridges will be built, and logjams will be installed to reconnect the creek with historical channels.

“The existing bridge will be left in place,” Smith said. “When the project is completed, any one of the three bridges could convey all or

a portion of the flow from Illabot Creek.”

Eventually, natural processes of erosion, deposition and channel development will take over, increasing spawning and rearing habitat for chinook, chum, coho and pink salmon, steelhead trout and native char.

“We expect the habitat restored by this project to be colonized quickly and used by multiple species,” Smith said. – K. Neumeyer

Above: Construction of the Rockport-Cascade Road bridge in the 1970s degraded habitat in Illabot Creek. Below: Excavators remove dikes and place large woody material in Illabot Creek during the first phase of the project.



Traditional Food Hard to Come By

More than half of Nisqually tribal members don't have access to tribally caught salmon, according to a food sovereignty assessment conducted by the tribe.

Salmon remains the most available traditional food even though only 44 percent of tribal members who responded to the assessment say they have access to it. In addition, more than half of Nisqually tribal members (57 percent) report they don't have access to wildlife harvested by tribal hunters, and 75 percent say they don't have access to tribally gathered plants.

Food sovereignty refers to the right to healthy, culturally appropriate and sustainable food. A primary reason for the lack of access to traditional foods is that they aren't as plentiful as they were historically.

"Salmon habitat has been on the decline for decades," said Georgiana Kautz, natural resources manager for the tribe. "Though we're making great strides here in the Nisqually watershed working with our neighbors to restore habitat, Puget Sound itself is sick. Salmon don't have much of a chance."

Even though the tribe operates two salmon hatcheries that boost runs, tribal fisheries have been shortened in recent years to protect weak natural-origin returns.

"We've taken the lead on restoring and protecting our salmon runs, but because of damage done in the past, our people cannot take advantage of our hard work," Kautz said.

Access to shellfish is more difficult due to pollution and loss of habitat. For example, a recent shellfish assessment by the tribe pointed out that most of the habitat in the tribe's treaty-protected harvest area has been lost to shoreline armoring.

While access to traditional food has diminished, the tribe has made a concerted effort to stem the loss.

The tribe runs a community shellfish farm on Henderson Inlet. It sells most of the shellfish commercially but reserves some for tribal members.

To improve access to fresh produce, the tribe launched a community garden program in 2011. Besides providing fresh produce to tribal members, the community garden allows access to culturally important plants such as berries, nettles and camas.

"Our ancestors reserved the right to fish, hunt and gather in our treaty because those rights are important to our economy and culture," said Farron McCloud, chair of the Nisqually Tribe. "We're working hard to expand access to traditional foods to the Nisqually people because it is a core part of who we are." – E. O'Connell

Nisqually tribal members prepare traditional foods for a fall harvest dinner in 2013. Herman "Bucky" Johns, top, cooks salmon, while Dulcie Frazier, right, prepares vegetables including potatoes and squash.



E. O'Connell (2)

WALKING ON

Larry George Kinley
Chexanexwh



Larry George Kinley, *Chexanexwh*, lost his battle with cancer Feb. 13 and has moved on to better fishing grounds.

Kinley was born in Bellingham to Francis Garland Kinley (Goog) and Mary Evelyn Kinley (James). He graduated from Ferndale High School and received a bachelor's degree from Chaminade University in 1970. He served in the U.S. Army with an honorable discharge in 1970. He then served on the Lummi Indian Business Council for 19 years between 1974 and 2001, and was the longest running chairman.

Kinley married his soul mate Eleanor Kinley (Solomon) on April 4, 1993.

He was instrumental in not only advancing Lummi's large fishing fleet, but also in expanding the Northwest Indian College, the Lummi School District, Fisherman's Cove, the Silver Reef Casino & Spa, several mini-marts and a processing plant.

Kinley was involved in developing the Centennial Accord that brought tribal leaders to the

table with the governor and leadership of the state of Washington.

First and foremost a commercial fisherman, Kinley formed the Lummi Fisherman's Marketing Association. In 2016, Kinley built an aluminum reef-net boat with All American Marine, using technology shared by the fishing cooperative Lummi Island Wild.

Kinley was preceded in death by his parents; his brothers Randy Sr., Googie and Kevin; and sister Karen.

He is survived by his wife; daughters April Finkbonner and Shawnee Kinley; sons Lucas and Kyle; brothers Steve Kinley (Maureen) and Rick Kinley (Kimberly Kurtz); and sisters Patricia Alvarez, Jean Cultee, Sandy Finkbonner, Connie Martin, Cheryl Sanders (Karl) and Cindy Kinley. He also is survived by grandchildren Sebastian Kinley, William Elzey and Faith Elzey; great grandchild Taidence Lane; and numerous nieces and nephews.

Karen Elizabeth Wolf



Karen Elizabeth Wolf, 60, of Skagit Valley, passed away Jan. 15.

Wolf worked as a GIS specialist for the Skagit River System Cooperative, the natural resources extension of the Swinomish and Sauk-Suiattle tribes, for nearly two decades.

She was born in Bellingham on Dec. 6, 1957 and attended Mount Baker High School where she participated in marching band and drama. She traveled abroad extensively in Europe before raising her two daughters in Bellingham. She studied geography at Western Washington University, graduating in 1991. After working in nursing homes, doing bookkeeping and massage therapy, she pursued her love of

mapmaking and became a GIS specialist for the Swinomish Tribe and Skagit River System Cooperative in 1999.

She became a member of the Buddhist organization Soka-Gakkai International in 1993, and her practice focused her energy toward seeking happiness and giving to others.

Wolf is survived by her siblings Sarah and Keith; daughters Jana and Sarah; stepdaughter Nicoco; adopted daughters Patty and Melissa; granddaughter Liviya; step-grandchildren Jimmy and Chevy; adopted grandchildren Deshawn, Treverre, Andrew and Stephanie; and boyfriend Sam.