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Northwest Treaty Tribes

Protecting Natural Resources for Everyone

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COVID Impacts Tribal Traditions, Natural Resources Management



by Lorraine Loomis
NWIFC Chair

Like communities across Washington, treaty Indian tribes are coping with what we all hope are the worst days of the COVID-19 pandemic that has disrupted every part of our daily lives, economies and traditions.

High rates of certain illnesses, combined with limited access to medical care, put tribal members at increased health risks due to COVID-19 and led tribes to take quick preventive action to close our reservation boundaries.

That came with a huge financial cost as we closed our casinos, resorts and other businesses that are the economic engines of our own and nearby communities. Tribes are among the top 10 employers in the state and most employees are non-Indian.

Like any sovereign government, the health and well-being of our members is the top priority of tribes, especially the most vulnerable – our elders.

Our economic problems were compounded with the collapse of the seafood market due to both COVID-19 and trade policy issues with China over new tariffs on shellfish such as geoduck. The giant clams harvested in western Washington are much loved in China and other Asian countries and fetch as much as \$50 per pound.

Tribes quickly shut down most of their fisheries and delayed or canceled others. As restaurants closed, markets dried up for salmon, crab, shrimp and other species. Fish buyers were scarce and our fishermen were paid about half of normal prices.

In times like these we have come to rely more on ceremonial and subsistence harvests of fish and shellfish to feed our families and cultures. Even these limited fisheries have been difficult to conduct due to social distancing requirements. These fisheries provide important nutrition when many tribal members have limited options for groceries or are furloughed or unemployed. Many tribes are distributing fish, elk and other foods to members unable to go shopping.

We've also had to modify some aspects of our ceremonies to deal with the impacts of COVID-19.

My tribe, the Swinomish Indian Tribal Community, holds a First Salmon Ceremony and Blessing of the Fleet in May each year. It is our largest community celebration. We welcome the salmon with drums, songs and prayers. We invite our neighbors to share this food that has always sustained us and we pray for the safety of our fishermen and their boats.

Like many tribes, we had to make some changes this year, but were able to prepare salmon meals and deliver them to tribal members in their homes.

In South Sound, the Puyallup Tribe held a socially distanced First Salmon Ceremony on the Puyallup River waterfront on Memorial Day weekend.

Most of those who attended watched the ceremony from their cars as the first salmon was brought to shore in a tribal canoe. Those outside wore masks and practiced social distancing. Salmon was cooked on site and passed out drive-through style along with camas bulbs and other traditional foods. The ceremony was livestreamed on Facebook for those who couldn't attend.

These changes we have had to make to our ceremonies because of the pandemic in no way lessen their importance. In fact, they remind us just how important they are. From smallpox to tuberculosis, tribes have dealt with many diseases over the years and we will survive COVID-19 as well. One way is with the ceremonies that preserve our culture, honor our natural resources and enable us to survive as a people.



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On the cover:

Quinault Indian Nation tribal member and fisheries technician Angel Ellis uses a pump to flush razor clams to the surface so they can be sized, counted and then returned to the sand during annual razor clam surveys.

D. Preston



Brett Shattuck, Tulalip Tribes



American Rivers

Left: An excavator removes the Pilchuck dam piece by piece. Right: Controlled explosions reduced the Middle Fork Nooksack Dam to rubble.

Salmon Now Free to Swim Upstream

Two fish-blocking dams were torn down in the North Sound region over the summer, opening up pristine habitat for threatened salmon populations.

The Tulalip Tribes worked with the city of Snohomish to remove a dam on the Pilchuck River, while the Nooksack Tribe and Lummi Nation finally saw the demolition of the Middle Fork Nooksack River dam that should have come down years ago.

Both dams were built to provide water to nearby cities.

The original Pilchuck dam was built in 1912 southeast of Granite Falls. The 60-foot-wide, 10-foot-tall dam became obsolete after the city of Snohomish found it more affordable to get its water from the city of Everett. The city approached the Tulalip Tribes to partner in the dam removal, because of the tribes' experience with permitting, funding and construction of salmon enhancement projects.

Removing the Pilchuck dam opened up salmon access to more than 37 miles upstream, which is one-third of the length of the mainstem.

"Upstream of the dam, the river is in a much more wild state," said Brett Shattuck, Tulalip restoration ecologist. "There's a lot better stream-adjacent conditions with trees, so it's in a really good state."

Stream-adjacent trees are an essential feature of healthy riparian habitat because they keep water temperatures cool and

create pools where salmon can rest. Unfortunately, the Pilchuck dam prevented some fish from reaching that habitat.

The river is used by chinook salmon and steelhead, both listed species under the federal Endangered Species Act, as well as coho, chum and pink salmon, cutthroat and bull trout.

"For over 100 years, the waters of the Pilchuck were restricted by this dam, allowing only some fish to pass," said Tulalip Tribes Chairwoman Teri Gobin. "The removal of the dam is a great step toward the ultimate goal of recovering salmon and sustaining tribal fishing culture for future generations."

Meanwhile on the Nooksack River, the Nooksack Tribe and Lummi Nation have long advocated for the removal of the Middle Fork dam.

"Work began many years ago with Nooksack tribal members Peter Joseph, George Swanaset Sr., Paul Costello and the Nooksack Cultural Committee, and is still ongoing," said George Swanaset Jr., Nooksack natural and cultural resources director.

The 24-foot-tall dam was built southeast of Deming in 1961 to supplement the city of Bellingham's water supply, which mainly comes from Lake Whatcom. The state law at the time required that fish passage be built, but dam construction was permitted without it, according to the conservation group American Rivers.

In 2002, the Nooksack Tribe and Lum-

mi Nation, along with state co-managers, signed a memorandum of understanding with the city of Bellingham to restore fish passage in the Middle Fork. However, design efforts and feasibility studies stalled until 2017 when American Rivers became a formal partner, with funding provided by the Paul G. Allen Family Foundation. (The foundation also helped fund the Pilchuck dam removal.)

Thanks to those partners, along with Long Live the Kings, NOAA Fisheries and the city of Bellingham, the dam finally came down over the summer. A couple of dramatic explosions in July broke it into small enough pieces to be removed from the site.

"The habitat in the Nooksack basin will take decades to recover because there are many limiting factors that impact Endangered Species Act-listed early chinook," said Merle Jefferson, director of Lummi Natural Resources. "The habitat above the Middle Fork has potential and we hope that this project will provide more spawning habitat for the salmon, which are integral to our heritage and cultural identity."

A free-flowing river allows chinook salmon, steelhead and bull trout to access 16 miles of cold, pristine spawning and rearing habitat in the upper Middle Fork Nooksack River. The city of Bellingham moved its water intake upstream and installed a screen to keep fish from being drawn into it. — K. Neumeyer

Lummi Fishes Whatcom Creek for First Time in a Century

Lummi tribal fishermen harvested salmon from Whatcom Creek in August, for the first time in at least 100 years.

The chinook salmon were released as juveniles in 2017 from the Bellingham Technical College's Fisheries and Aquaculture Science program's hatchery, which works in partnership with tribal and state fisheries managers. When the chinook returned as adults this summer, they congregated below the waterfalls in the creek beside the hatchery.

Whatcom Creek travels from Lake Whatcom through the city of Bellingham to Bellingham Bay, where a pulp and paper mill operated on the waterfront from 1926 to 2007.

"When they decided we could catch these fish for ceremonial and subsistence, my name came up and they asked if I'd go fishing," said Lummi fisherman Troy Olsen. "I said I'd love to do that."

Olsen remembers being on the Lummi Fish Commission years ago and wondering why they didn't fish in Whatcom Creek.

"A lot of our ancestors gathered there at that creek when Whatcom County was in its early stages of industry," Olsen said. "I thought, the colonizers really impacted Whatcom Creek in a bad way. The toxic waste from the Georgia-Pacific mill really degraded the salmon habitat."

Lost and degraded habitat is the main cause of declining



Shirley Williams

Lummi fishermen harvest hatchery chinook from Whatcom Creek in August.

salmon runs. To supplement populations until habitat can be restored, the Lummi Nation and state co-managers operate hatchery enhancement programs on the North and South Forks of the Nooksack River, Lummi Bay and the Samish River, as well as the new program at the Whatcom Creek Hatchery.

In 2017, some of the chinook spawned at the Lummi Nation hatchery on Skookum Creek were not suitable for release in the South Fork Nooksack River. Those fish were brought to the college's hatchery on Whatcom Creek where they were released.

"There wasn't any intention of having these fish spawn in the wild," said Ben Starkhouse,

Lummi harvest manager. "It was intended that these would be caught."

A group of about 20 tribal members gathered by the creek in August, holding a small ceremony to pray for the safety of all fishermen, before setting a net in the creek.

"You may see a thriving community in this place you call Bellingham," said Steven Solomon, chairman of the Lummi Natural Resources Commission. "For us, it's Whatcom. Home of the Noisy Water. It wasn't just noisy over that fall, that water coming down. This creek was full of fish."

"Our great-grandfathers said there used to be upwards of 300,000 fish in this creek,"

Solomon said. "They would make a set right here to feed the whole village. One set. Only took what they could use. That's our way today. We only take what we could use and not drive it to extinction."

After the Lummi fishermen harvested about 100 fish, an emergency rule change by the Washington Department of Fish and Wildlife provided a recreational fishing harvest opportunity until Sept. 13.

"People forget Whatcom is a Lummi word," Olsen said. "We need to remind them we're still here. We have children; they have a future. They need to have a relationship with that place as much as anybody else." – K. Neumeyer

"Our great-grandfathers said there used to be upwards of 300,000 fish in this creek. They would make a set right here to feed the whole village. One set. Only took what they could use. That's our way today."

Steven Solomon
Lummi Natural Resources Commission
Chairman

Sockeye Fishery Delayed to Maximize Return



D. Preston

Upper Skagit tribal members Jalen, left, and Lee Washington load Baker River sockeye into a tote that the family, including tribal Chair Jennifer Washington, caught during a four-hour fishery.

The Upper Skagit Tribe delayed its annual Skagit River sockeye fishery in July to increase available early numbers of sockeye to meet hatchery broodstock needs.

In the four-hour fishery on July 6, the tribe caught 700 harvestable fish from the estimated 13,000 total sockeye fish returning to Baker Lake. All of the salmon harvested were distributed to tribal elders.

The fishery is held near the ancestral Upper Skagit fishing village *Sbalikwh*, where the fishing culture was passed from generation to generation for thousands of years.

As a result of collective efforts of the Skagit River co-managers, Baker River sockeye have recovered from a historical low return of around 90 adult fish in 1985 to a high of more than 51,000 in 2015. Much of that success came through the efforts of the tribes and Washington Department of Fish and Wildlife in the Puget Sound Energy hydroelectric relicensing process, leading to increased fisheries enhancement and fish passage improvements.

Successful Skokomish Sockeye Summer

Skokomish tribal member and Saltwater Park Sockeye Hatchery employee Charlie Henry shows off the first returning adult sockeye to the hatchery in July.

As of mid-September, 123 adult sockeye salmon had returned to the hatchery, which is operated by Tacoma Power.

These are the first sockeye to return to the hatchery since the start of the sockeye recovery program in 2016 to bring back these salmon to the North Fork Skokomish River and Hood Canal.

A 2009 hydroelectric dam relicensing agreement between the tribe and utility has led to river restoration, increased water flow, fish passage improvements, fish and wildlife habitat restoration, and salmon hatchery programs on the North Fork.



Tacoma Power

Razor Clams Sustain QIN

Razor clams were the hero Quinault Indian Nation (QIN) tribal members needed following three seasons of blueback (sockeye) salmon fishery closures.

Not only was this the third year without a blueback fishery, the pandemic also stifled the market for most other fisheries. In their absence, razor clams provided sustenance to tribal members.

“This is the best razor clam population we’ve seen in two decades,” said Joe Schumacker, marine resources scientist for QIN.

With more than 9 million clams available for state and tribal harvest on two co-managed beaches (Copalis and Mocrocks), this year has the potential to be one of the best harvest seasons ever, even better than last year.

While COVID-19 may prevent nontribal digs with thousands of participants at a time, for QIN, it’s easy to physically distance a few

hundred people on several miles of beach.

It’s hoped that warmer waters don’t lead to a bloom of *Pseudo-nitzschia*, the plankton that produces domoic acid that can accumulate in the clams. In high levels, domoic acid can sicken or kill humans, though it does not harm the clam. QIN digs started in September.

QIN is one of the few places on the West Coast with a facility to can razor clams, making it possible for tribal members to harvest razor clams commercially. The clams are popular for crab bait and also for steaks purchased by consumers.

“Every QIN tribal member who can get out there with a minimal investment in a shovel and small mesh basket can make a couple hundred dollars in one night if they are really pushing it,” said Scott Mazzone, QIN shellfish and marine fish biologist. – D. Preston



D. Preston

Quinault Indian Nation tribal member Will Pink harvests razor clams in February.

Streamflow Data Aids Fisheries Management

The roar of winter flows in the North Olympic Peninsula’s Bear Creek has been replaced with summer’s gurgling brook as Nicole Rasmussen steps into the stream to measure its flow.

Rasmussen, water quality biologist for the Quileute Tribe, has been measuring eight streams like it for 10 years and

two others for eight years. Rasmussen takes two readings, with seven to 10 days between them, hoping for no rain, to measure the rate of the stream’s discharge.

“It can be a little tricky out here in the rainforest to get that many days without rain, but during late July and September, I can usually get a couple of readings in,”

Rasmussen said.

For the tribe, the data is already assisting with managing fisheries, because summer low flows often impede fish passage.

“When the rivers get to a level that becomes problematic for fish passage, we engage in conversations with our state co-managers to decide if it’s necessary to close the rivers to fishing until sufficient flows return for fish to migrate,” Rasmussen said.

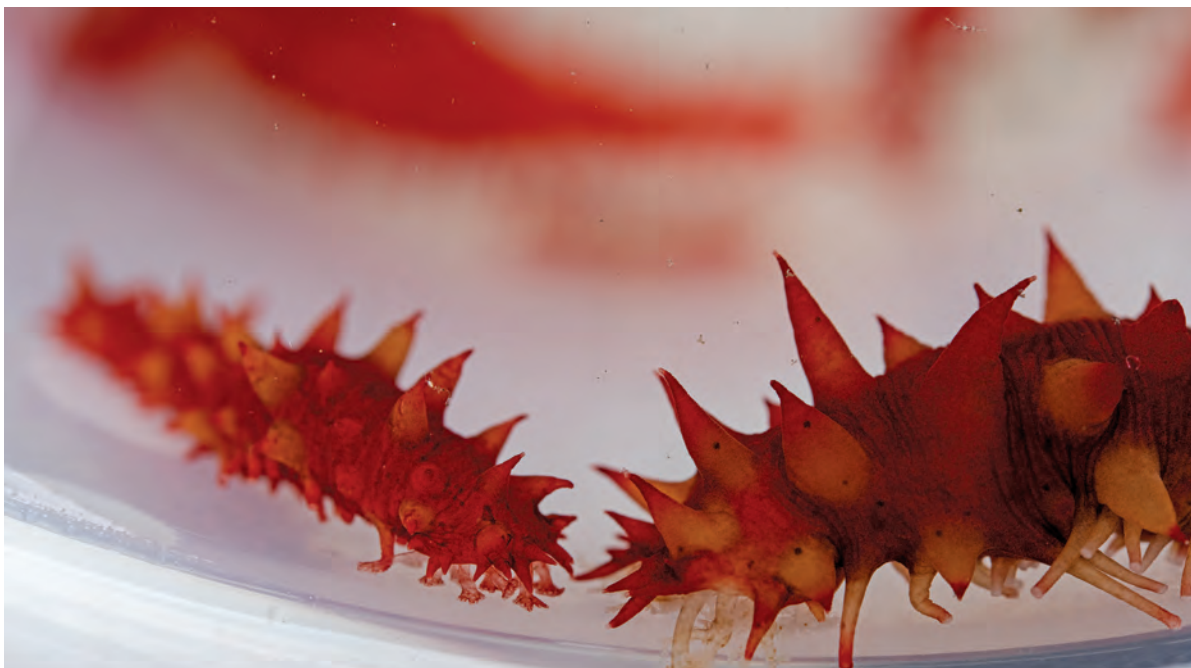
The data collection is part of a voluntary effort of all 20 treaty Indian tribes in western Washington. The project began in 2007 in partnership with the U.S. Geological Survey (USGS) to help create a model for estimating summer base flow in small streams without a water flow gauge. Tribes already pay for many of the USGS gauges on rivers used to inform sportsmen, weather professionals and the tribes.

Some tribes are collecting low flow data on an annual basis; other tribes are collecting low flow data occasionally. The purpose of the tribal low flow network is to provide a managed data system to store low flow data provided by tribes over the long term. – D. Preston



D. Preston

Nicole Rasmussen, water quality biologist for the Quileute Tribe, takes a flow reading in Bear Creek east of Forks.



Juvenile sea cucumbers waiting to be put into the Suquamish Tribe's FLUPSY at the Brownsville Marina.



Jeremy Johnson (2)

Puget Sound Institute research technician Erin Horkan unloads about a dozen juvenile sea cucumbers into the Suquamish Tribe's FLUPSY at the Brownsville Marina.

Juvenile Sea Cucumbers at Home in FLUPSY

The Suquamish Tribe and the Pacific Shellfish Institute (PSI) partnered this summer to learn more about what sea cucumbers like to eat.

The institute approached the tribe about hanging mesh containers full of juvenile sea cucumbers off the tribe's floating upweller system (FLUPSY) for shellfish in the Brownsville Marina, after discovering that sea cucumbers grow quickly after eating shellfish waste.

The tribe has two FLUPSYS used year-round for growing juvenile shellfish, which are distributed to local beaches as part of the tribe's shellfish population restoration efforts.

Nearly 100 young red sea cucumbers, speckled with yellow and brown spots, ranging from 1 to 2 inches long and as thick as a thumb, were placed in mesh-lined baskets so they couldn't escape and predators couldn't enter, but algae and shellfish waste could flow through. Some baskets were placed within the FLUPSY, others

were hung off the outside of the floating structure.

"We are seeing a lot of shellfish poop accumulate in the sea cucumber cages, and some sea cucumbers with full guts, so they are settling in and eating, which is definitely what we want to see," said Erin Horkan, a PSI research technician.

The work is part of PSI's grow-out trials with the sea cucumber offspring that came from broodstock established by the tribe and Puget Sound Restoration Fund in 2016 and 2017. Sea cucumbers are of cultural and economic importance to the tribe, and the population has been dwindling for years.

The PSI grow-out trials are to determine if sea cucumbers can grow well in an aquaculture setting alongside bivalve shellfish, Horkan said. The PSI scientists learned that sea cucumbers grow well being fed dark red seaweed but grow faster with mussel waste.

– T. Royal

Aggressive Milfoil Spoils Elwha Estuary

While monitoring the Elwha River estuary the past few years following dam removal, the Lower Elwha Klallam Tribe has been keeping an eye out for invasive plant species, including the aggressive Eurasian water milfoil.

Milfoil is a dense plant that provides poor habitat for fish, birds and wildlife, grows quickly, displaces native plants, and decreases water quality for fish, said Kim Williams, the tribe's revegetation program supervisor.

"There is a known population of milfoil in Lake Sutherland, which is connected to the Elwha River via Indian Creek," Williams said. "Now we have found it in the freshwater pools in the Elwha estuary."

"It's such a special estuary, we want to treat it right, especially for milfoil," she said. "It's a horrible invasive plant that needs eradicating. It's one of the worst weeds out there and a major destroyer of fish habitat."

The tribe is implementing a rapid response "search and destroy" sweep of milfoil in the estuary, nearby Bosco Creek



Washington Conservation Corps (WCC) crew member Calvin Stokes, left, Kim Williams, Lower Elwha Klallam Tribe revegetation program supervisor, and WCC crew member Mike Hatha-way survey for milfoil in the Elwha River estuary.

and the Elwha River mainstem. Removal treatments include the use of an EPA-approved herbicide and removal by hand.

The tribe also will conduct outreach efforts to educate tribal members and the community about the dangers of spreading milfoil while working in the estuary, including making sure to clean their boots and waders after field work.

During dam removal from 2011-2014, 24 million cubic meters of sediment flowed downriver, resulting in 88 new acres of land at the river mouth, changing

the estuary conditions from a saltwater/freshwater mix to a mostly freshwater system, Williams said. Milfoil proliferated during this change.

The effort to survey and eradicate milfoil will benefit the species that rely on the estuary, including chinook, chum, coho, sockeye and pink salmon, plus steelhead, bull trout and Pacific lamprey. The estuary is important habitat for these species to rest, feed and hide from predators as they migrate to and from the ocean as adults and juveniles. – T. Royal

Eelgrass Shows Explosive Growth in Port Angeles Harbor



A diver inspects eelgrass in test plots in Port Angeles Harbor.

A multi-year eelgrass restoration effort in Port Angeles Harbor has proven successful for the Lower Elwha Klallam Tribe.

In 2017, the tribe, Pacific Northwest Laboratory (PNNL) and other partners gathered nearly 4,000 eelgrass shoots from inside Ediz Hook at the site of a proposed U.S. Navy pier. The shoots were divided and replanted on test plots within Ediz Hook and in PNNL outdoor tank nurseries at the Sequim laboratory. To the surprise of PNNL researchers, the eelgrass grew well in both locations.

"The eelgrass exploded in the tanks," said Matt Beirne, the tribe's natural resources director. "There is typically dieback after the initial planting, but that didn't happen, in both the tanks and test plots. The eelgrass actually expanded."

To build upon the successful growth, 7,000 eelgrass shoots were taken from the tank nurseries this summer and replanted along the inte-

rior of Ediz Hook.

When divers explored the original 2017 planting sites in Ediz Hook, they were surprised to find a half-dozen new, naturally established eelgrass meadows along a 150-foot segment of shoreline, Beirne said.

These particular spots had the appropriate depth and substrate for eelgrass, Beirne said, likely leading to the successful growth.

Eelgrass meadows buffer the effects of ocean acidification, stabilize the nearshore, and are used by juvenile salmon, other fish and invertebrate species for foraging, spawning and rearing.

The tribe and the lab will allow the remaining eelgrass to expand in the outdoor tanks with intentions to plant more next year, Beirne said. The tribe also collected GPS locations for all new eelgrass meadows in Ediz Hook and will monitor them for growth and health over time. – T. Royal



K. Neumeyer

Swinomish tribal member Lenora Cook finds some ripe salmonberries along with mountain huckleberries.

Huckleberry Harvest Tradition Revived

After a hiatus of five decades, the Swinomish Indian Tribal Community has revived a tradition of several families collectively harvesting mountain huckleberries in the North Cascades.

According to tribal archives, last year was the first Huckleberry Camp in 50 years, said Michal Heidt, the tribe's community environmental coordinator. Heidt coordinated the second annual event in August with the tribe's hunting and gathering program manager, Valentino Villaluz.

"All our first foods are in this area," said Villaluz, a tribal member, noting that in the past families kept huckleberry gathering practices private.

"I could do this all day," said Swinomish tribal member Anna Cook, who works as a community environmental health associate for the tribe.

Anna picked berries

with her mother, Lenora Cook, and her sister Sarah Cook in a huckleberry patch a safe distance from the other families. Last year was the first time they harvested huckleberries.

Sarah paused in her gathering to share a Lushootseed blessing. The women wondered among themselves whether their ancestors had a more efficient method of collecting berries, rather than pulling them off the bushes one by one.

Anna recently graduated from The Evergreen State College, where she earned a degree in Native American studies. "I've been learning a lot about our native foods. I just gravitated to it."

Last year they baked their huckleberry haul into cakes.

This year, Lenora said, "We're going to freeze a little bit of it to use for ceremonies." – K. Neumeyer

Cedar Harvesting



T. Royal

Suquamish tribal members Denita and Joey Holmes inspect strips of bark they harvested earlier this summer, cleaning and preparing them to take home.

Tribal members harvest cedar bark for use in traditional clothing, baskets, masks and other items. The bark is carefully removed without damaging the tree, then cleaned on site and taken home to dry and prepare for use.

Motion-Sensor Cameras Spot Wildlife

Standing 30 feet from a tree equipped with a motion-sensor camera in the Olympic National Forest, Dylan Bergman makes abrupt movements, bobbing back and forth and squatting, to trigger the camera.

"I'm getting my workout for the day," joked the Point No Point Treaty Council wildlife biologist, making a note on his clipboard about how far the camera could "see" him.

This is one of 80 cameras that Bergman and Charin Roberts, Port Gamble S'Klallam Tribe wildlife biologist, set out on the northeastern corner of the Olympic Peninsula this summer to photograph bears, bobcats, coyotes, cougars, deer and elk.

The goal is to develop population estimates for the Jamestown S'Klallam and Port Gamble S'Klallam tribes' wildlife management programs. A secondary goal is to collect data as part of a partnership with the other peninsula tribes and Panthera, a global wild cat conservation group, to get a better idea of animal populations in the region.

Bergman assigns a camera to a location by overlaying a grid of evenly spaced GPS locations

on a map of the peninsula. The photos are taken in a wide array of habitats, accounting for the variable wildlife within each habitat.

"We expect some sites to yield lots of pictures of animals, and others to produce almost none at all," he said. "The number of animals we photograph at each site will be representative of how many animals live in that area and habitat."

The cameras are motion-triggered, and a handful of them take time-lapse photos every six hours. The cameras will be in the field for four months before Bergman gathers them again.

As a result, millions of photos will be taken. To help review them, Bergman is working with Panthera to train a software program to identify animals in the photos.

"The camera grid system is a relatively new method for capturing animal behavior and population estimates, so we're in the early adoption phase," Bergman said. "It's less expensive, less dangerous and should prove to be more accurate than putting biologists in helicopters or planes to do surveys."

— T. Royal



T. Royal

Point No Point Treaty Council biologist Dylan Bergman checks one of his wildlife game cameras on the Olympic Peninsula. Motion sensor and time-lapse cameras are being used to gather data about population estimates for bear, bobcat, cougar, coyote, deer and elk.

Designated Use Discussed

The Nisqually Parks Department recently hosted an in-person, socially distanced meeting at the Nisqually Tribe's Designated Use Area at Mount Rainier. The goal was to discuss improving the area based on input from tribal members and in conjunction with Mount Rainier staff.

Ideas included creating several campsites, including one for tribal members with mobility issues. Currently, the area typically is used only by one large group at a time. Another issue is establishing water access closer to the site.

The site was designated in 2014, and has been used for tribal ceremonies and cultural awareness training for Mount Rainier staff.



D. Preston

Surveys Help Track Changes in Tide Pools

In late 2014 and into 2015, when sea stars on the coast began to die off with a little-understood sea star wasting disease, the Quinault Indian Nation (QIN) tracked the devastating drop in populations with regular tide pool surveys.

While the nation has always kept track of marine life in their traditional areas, fisheries staff have been keeping records in coordination with many other agencies since 2011. The common data-gathering method was established by the Multi-Agency Rocky Intertidal Network (MARINE), a partnership of agencies, universities and private groups committed to determining the health of rocky intertidal habitat and making this information public.

QIN visits several areas once a year to inventory a variety of species including sea stars, mussels, barnacles and other sea life. Fisheries technicians and biologists track the numbers of intertidal species and determine changes over time based on weather and ocean conditions.

“It’s a poor man’s way of monitoring for climate change,” said Scott Mazzone, QIN shellfish and marine fish biologist. “We also keep contact with tribal elders and collect their observations and compare it to what we’re seeing.”

For QIN, the surveys allow both tracking of population changes caused by a warming world and, in a worst-case scenario, provide an inventory in case of a catastrophic event such as an oil spill.

With rising seas due to climate change, for instance, it would be expected that mussels will move higher in the intertidal areas and other species from farther south will move into the survey areas. – D. Preston



D. Preston

Angel Ellis and Michael McCoy, fisheries technicians for Quinault Indian Nation, scrape a plot clean of sea life. Pictures are taken before and after, documenting what grows back and how fast.

SEVEN GENERATIONS

This photo was taken Sept. 9, 1970 by Daniel Fear on the banks of the Puyallup River during the raid of the Puyallup Fish Camp.

The bridge was an area of constant protest and law enforcement presence as tribal members used the central location to draw attention to the treaty rights battle with fish-ins.



Courtesy of the Puyallup Tribe, Historic Preservation, Daniel Fear Collection

Kilisut Harbor, Oak Bay Finally Reconnected

Juvenile salmon can move freely from Oak Bay to Kilisut Harbor for the first time in 75 years, following the recent removal of an earthen causeway that supported a road and undersized culverts.

The man-made structures were replaced with a 450-foot-long bridge between Indian and Marrowstone islands this year, improving tidal flow, fish passage and water quality, plus giving salmon access to 2,300 acres of nearshore habitat.

Data from the Port Gamble S'Klallam Tribe's 2014 intensive salmon habitat study helped the project jump the final hurdle to make the restoration happen.

The study showed where and how juvenile salmon were using nearshore environments in Hood Canal and Admiralty Inlet. The tribe found salmon using small bays such as Kilisut Harbor instead of larger estuaries at the mouths of the Duckabush and Dungeness rivers.

"The tribe is really excited to see the historic connection reestablished between Oak Bay and Kilisut Harbor because of the value it will have to out-migrating

juvenile salmon," said Hans Daubenberger, the tribe's senior research scientist. "It's created an additional corridor for these fish to travel during their out-migration to the ocean."

The tribe also expects the restoration to benefit the water quality conditions in Kilisut Harbor. Prior to the removal of the road, the water registered higher temperatures lethal to fish.

"When the tidal flow was disconnected, it created a dead end in Kilisut Harbor," Daubenberger said. "During the summer, the water stopped exchanging and would heat up to temperatures in excess of 70 degrees – like bathtub water – which is not good for fish that inhabit Puget Sound. So we're pretty confident that this restoration will alleviate that issue."

The S'Klallam people have deep cultural and historic ties to Kilisut Harbor and the surrounding landscape, said Josh Wisniewski, a cultural anthropologist who does research for the Port Gamble S'Klallam and Jamestown S'Klallam tribes.

"Archeological evidence from lands adjacent to Kilisut Harbor provide evidence of thousands of years of continuous occupation by the S'Klallam and Chemakum ancestors of S'Klallam tribal members," he said. "Today S'Klallam people continue to carry out traditional cultural harvesting activities in Kilisut Harbor that were protected by treaty rights and reaffirmed by the Boldt decision. By doing so, Kilisut Harbor remains an essential part of the S'Klallam cultural landscape."

"Mother Nature has definitely started her work," said Rebecca Benjamin, executive director for the North Olympic Salmon Coalition, which oversaw the project. "The tide is scouring deep pools and it's looking more like a tidal channel. We're seeing tons of forage fish such as surf smelt, as well as crab."

"It's creating a lot of spawning habitat for forage fish, which we didn't realize at the beginning of the project," she said. "The edge of the tidal channel is now forage fish habitat." – T. Royal



T. Royal

Top: North Olympic Salmon Coalition Executive Director Rebecca Benjamin, left, and Kevin Long, project manager, paddle into Oak Bay from under the new bridge that allows Oak Bay to flow into Kilisut Harbor, between Indian and Marrowstone islands. An earthen causeway was in place of the bridge for 75 years, preventing juvenile salmon from migrating between the two bays.

Right: Port Gamble S'Klallam Tribe marine biologist Julianna Sullivan takes measurements in Oak Bay before the culverts were removed.



Hans Daubenberger, Port Gamble S'Klallam Tribe



Golf Club Hill Culvert Removed

After two decades of patient planning and coordination with Kitsap County and others, the Suquamish Tribe is happy to finally see the removal of one of county's biggest fish-blocking culverts this summer, improving habitat for its most productive salmon stream.

At Chico Salmon Park, a 36-foot triple-box culvert, originally built by the U.S. Navy in the 1940s for a railroad spur, was removed from Golf Club Hill Road and replaced with a 140-foot-long single-span bridge, opening up 16 miles of upstream spawning and rearing habitat to salmon.

The Golf Club Hill Road culvert was identified by the state and tribe as a barrier to fish passage in the early 2000s and had been a top priority for Kitsap County streams for removal.

This project is significant because of its location, being close to the mouth of the creek and cutting off salmon from taking advantage of relatively undeveloped upstream habitat.

Chico Creek is home to the county's biggest chum salmon population, some years exceeding 100,000 fish, while also supporting coho salmon, steelhead and cutthroat trout.

"The large amount of marine nutrients returning to Chico Creek each fall provides essential nutrients to the watershed, contributing to the productivity of salmonids, other wildlife and riparian forests in the watershed," said Alison O'Sullivan, the tribe's senior environmental biologist.

Salmon are central to the tribe's economy, sustenance and way of life, she said. Restoration projects like this also provide opportunities for the community to learn about the importance of salmon to the area and to the tribe.

This culvert removal is the fourth major salmon habitat restoration project in the Chico Creek watershed in the past 14 years. Another priority project is removing a Navy-owned railroad trestle on Dickerson Creek, plus the replacement of the culverts under Highway 3, starting in 2022. – T. Royal



T. Royal (2)

Top: Excavators remove the triple-box culvert from Chico Creek under the new bridge for Golf Club Hill Road. Above: Alison O'Sullivan, senior environmental biologist for the Suquamish Tribe, catches aquatic life in Chico Creek to be moved downstream, out of the construction site.

CLIMATE CHANGE

Fishing Area Protected with Restoration Work

It took the Quileute Tribe decades to have the traditional fishing area known as Thunder Field returned in a land swap with the National Park Service in 2012.

Now the tribe and its partners are investing millions of dollars in a restoration effort to restore parts of the Quillayute River to protect Thunder Field, the village in La Push and other tribal lands.

Climate change has increased the number of flooding events in La Push. An emergency flood berm was installed in 2006 by the U.S. Army Corps of Engineers to protect the lower village and nearby U.S. Coast Guard station. However, flooding events have gotten worse, overwhelming the berm in some areas and washing away where Quileute fishermen land their catch on Thunder Field.

The road leading to the

area encompasses important hunting grounds for elk and deer as well.

“It’s really important to protect the lower village to the extent possible by improving the berm and restoring river function that will protect Thunder Field too,” said Nicole Rasmussen, water quality biologist for the Quileute Tribe and temporary project manager.

The name Thunder likely comes from the last name of the owner of the original 40-acre homestead.

Following several assessments by the Natural Resources Conservation Service, Oregon Climate Change Research Institute, and Washington Coast Restoration and Resiliency Initiative, the tribe received funding from the state legislature to conduct a geomorphic assessment and design improvements to the



D. Preston

Nicole Rasmussen, Quileute Tribe water quality biologist and temporary project manager, measures the remaining bank at Thunder Field.

flood berm and restoration work within the river area around Thunder Field. An additional grant from the National Fish and Wildlife Foundation funds the completion of the full design for the river reach work.

The Quillayute River system is vast, including the Sol Duc, Bogachiel, Calawah and Dicky rivers that support six species of salmon including a unique run of summer coho. These

tribes feed into the Quillayute River that flows nearly six miles to the Pacific Ocean.

Work is slated to begin in the spring of 2022 with Tetra Tech, Inc. now completing the geomorphic assessment, flood protection berm and river structure designs around Thunder Field. Planting more trees and other native plants along the river’s edge will help with future stability of the river’s flow. – D. Preston

Tool Predicts Changes to Shorelines, Water Temperatures

A new model developed by the Skagit River System Cooperative (SRSC) predicts a bleak future for juvenile crab and chinook based on predicted effects of climate change.

SRSC partnered with the Swinomish Tribe’s Fisheries Department to create a Climate Change Vulnerability Model, which makes evidence-based predictions about how shorelines will be altered by increased sea surface temperature, wave energy and sea level rise. Those predictions provide a pathway to see how different species will be affected by these changes.

“In combination with other climate change vulnerability resources, these maps reflect areas to target for protection and restoration efforts,” said Eric Beamer, research director for SRSC, the natural resources extension of the Swinomish and

Sauk-Suiattle tribes.

The tool already has been used to create species-specific maps for larval and juvenile crab, juvenile chinook salmon and cockle larvae. The cockles were in a slightly less dangerous predicament than the others.

Within the project’s study area of nearshore areas in northern Puget Sound, large river estuaries are shown to be at high risk of erosion from increased wave energy and sea level rise as well as increased water temperature.

The model also can connect climate change vulnerabilities between species. For example, variability in Dungeness crab larvae survival also may influence the survival of juvenile chinook because research has shown crab larvae are an important prey resource to the juvenile salmon.

Dungeness crab larvae live throughout the water column, and adults inhabit beaches, estuaries and bays.

“Dungeness crab face many potential human-caused threats including ocean acidification and warming sea surface temperatures,” said Courtney Greiner, Swinomish marine ecologist. “As these threats intensify, scientists and managers will need to develop adaptive responses to sustain this species.” – K. Neumeyer

Courtesy of Washington State Department of Ecology



Lone Tree Lagoon on Fidalgo Island is an example of estuary habitat at risk from the impacts of climate change.

Salmon Habitat Restoration Completed in Nooksack River



Lindsie Fratus-Thomas

Nooksack tribal staff rescue fish from an in-water construction area of the Farmhouse reach. Fish exclusion minimizes construction impacts by isolating and temporarily diverting the channel before the fish are removed, identified, counted and safely released downstream.

The last of 127 engineered logjams were placed in the Farmhouse reach of the North Fork Nooksack River this summer, completing an extensive multi-year salmon habitat restoration project.

The Nooksack Tribe installed large woody structures in the North and South forks of the Nooksack River nearly every year since 2008. This summer, the final 56 logjams were placed in the 3-mile-long reach of the North Fork located near Maple Falls, completing restoration that began in 2014.

Restoring river habitat is essential to recovering threatened salmon populations in the Nooksack watershed. Habitat in the North Fork Nooksack was degraded and made unstable by years of instream wood removal, clearing of riparian forests and more frequent large floods.

“The Farmhouse reach is one of the most unstable and volatile reaches within the North Fork Nooksack with high channel turnover rates. It’s kind of like a firehose,” said project manager Lindsie Fratus-Thomas who has managed the project for the tribe through all five construction seasons. “This project is a process-based restoration project in which one of the goals is to stabilize the main channel and protect those nice side channels, which are the

preferred habitat for salmon in this system.”

Engineered logjams stabilize side channels for salmon to spawn and rear in, and form pools for them to rest in. Projects like these restore natural habitat processes. For example, logjams slow currents and create areas where gravel accumulates to form islands.

“As trees colonize those islands and grow to maturity, the islands stabilize and grow, helping to form the side channels that are so productive for salmon,” said Treva Coe, Nooksack watershed restoration program manager.

Ambitious projects like these are only possible with the hard work and support of staff from many agencies and partners, including the expertise from several Nooksack Natural Resources tribal staff, engineering consultants, log supply and construction contractors, and funding and permitting agencies, Fratus-Thomas said. This year, for the first time, BNSF Railway partnered with the tribe to donate trees they had removed because they posed a hazard to railroad operations. The U.S. Forest Service provided a similar wood donation to the project in one of the previous phases in 2016. – K. Neumeyer



K. Neumeyer

An engineered logjam is installed in the Farmhouse reach of the Nooksack River during the last phase of the massive project.

WALKING ON



Georgiana (Porgie) Kautz walked on Aug. 7 at age 78 surrounded by family at home near the Nisqually River.

She was born August 15, 1941 in Tulalip, to Rose McCloud (deceased) and George McCloud Sr. (deceased). She had six brothers:

Georgiana "Porgie" Kautz

Pernie, Earl, George, Orville, Orvide and Jack (all deceased) and four sisters: Norma, Regina, Marilyn (deceased) and Ramona (survived).

She grew up in Nisqually, where she had four children: Kim (survived), Timothy (deceased), Frances (deceased) and Slim (deceased) with her husband, Nugie Kautz. They were married Nov. 1, 1958, celebrating 62 years together in 2019.

She attended Yelm High School and went on to a vocational school in Olympia. She gradu-

ated from The Evergreen State College and went on to receive her doctorate of Science from the University of Puget Sound in 2018.

She fought for fishing rights all her life and was a fish warrior in the 1960s and 1970s fish-ins to push for Nisqually treaty rights, which led to the Boldt decision in 1974. She worked for Nisqually Natural Resources for more than 25 years and served as a commissioner for years on the Northwest Indian Fisheries Commission.

Retired NWIFC Scientist Receives Top Honor

Bruce Stewart, recently retired NWIFC fish health program manager, was honored in July by the American Fisheries Society (AFS) with the S.F. Snieszko Distinguished Service Award. The career service award honors an individual's outstanding accomplishments in fish health.

Stewart was honored alongside Gael Kurath, an instrumental researcher in the intricacies of IHN, during the organization's online annual meeting.

Stewart worked for NWIFC for 32 years, devoting a lifetime to helping make the NWIFC Fish Health Lab one of the most respected facilities of its kind in the Northwest and beyond.

Stewart noted not only was he retiring during a pandemic, he was wearing a mask just as he did following the Mount St. Helens eruption during his first year on the job in Idaho.

"It is an incredible honor and I thank all the people who worked with me who really made this possible," Stewart said.

