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How Do We Stop Tire Debris from Killing Coho?

By Nisqually Chairman Willie Frank III and Nisqually Natural Resources Director David Troutt

Now that we know a chemical in our car tires is killing salmon, we have to act urgently to keep it out of the water.

Research published last year confirmed that the preservative 6PPD interacts with ozone to kill coho salmon even in low concentrations in a short amount of time. The study led by Jenifer McIntyre of Washington State University was conducted over a decade in partnership with the University of Washington at the Suquamish Tribe’s Grovers Creek Hatchery.

In the salmon recovery world, it’s rare that we’re able to pinpoint the exact chemical at fault. These findings are a smoking gun for the collapse of coho salmon throughout Puget Sound, especially in the urban and developing areas where roads and salmon intersect.

Coho populations are at an all-time low, having declined steadily since the 1980s. At the same time, we’ve seen the expansion of road systems into rural areas. While there are other factors that have led to declining salmon runs, science has shown that 6PPD is a piece of the puzzle.

Antiozonants like 6PPD make tires safer by preventing the rubber compounds from cracking and degrading. When 6PPD mixes with ozone, it becomes 6PPD-quinone, or 6PPD-Q. It is omnipresent on our roadways. With every rain event, the untreated chemical washes into our streams, rivers, bays and Puget Sound, killing juvenile coho as well as returning adults attempting to spawn.

Not only has this stormwater runoff been proven to kill coho salmon, it also has been shown to have sublethal effects on other fish – including reduced growth, heart defects and pulmonary edema – which affect their ability to avoid predators and can lead to poor survival.

Solving this problem demands immediate action and a long-term commitment. The first step is to remove 6PPD at the source by identifying a harmless replacement to make tires safe. This will take time, and unfortunately, it’s not practical to replace every tire on the road. Even if we could, we would still have legacy impacts to deal with for at least 15 to 20 years. In addition to leaving residual tire dust on roads, used tires are commonly recycled into products like crumb rubber fields and playgrounds.

We need to deal with these impacts immediately by filtering 6PPD-Q from stormwater before it enters the water. The Nisqually Tribe is working with McIntyre, Long Live the Kings and the state Department of Transportation to develop a compostable biofiltration system on Highway 7 where it crosses Ohop Creek.

If we are successful, similar systems could be retrofitted along all roadways to remove this lethal, toxic chemical.

The tire industry understandably is going to be concerned about the economic impact of removing 6PPD from their product, but they understand the need to prevent it from killing salmon. In July, a representative from the U.S. Tire Manufacturers Association joined us in testifying before the U.S. House Natural Resources Subcommittee on Oversight and Investigations, citing evidence that filtering roadway runoff through a rain garden reduces fatalities in coho salmon.

This is the DDT of our generation. In the 1960s, we learned that the insecticide was harming bald eagles and other raptors. It was removed from the ecosystem – not without struggle and industry resistance – and bald eagles made a comeback.

We are in a similar struggle. We’ve been putting 6PPD-Q into Puget Sound and it’s killing the salmon that are the lifeblood of tribal cultures here. We must do everything we can as fast as we can to keep it off our roads and out of our water.
Ed Johnstone of the Quinault Indian Nation was elected chair of the Northwest Indian Fisheries Commission. He succeeds Lorraine Loomis, who passed away in August. Johnstone will serve the remainder of Loomis’ term through May 2022.

As the fisheries policy spokesperson for the Quinault Indian Nation, Johnstone has extensive experience in management of salmon, steelhead, crab, clams, black cod and halibut. He has served as Quinault’s commissioner to the NWIFC since 2000 and as treasurer from 2009 to 2021. He serves on the Southern Panel of the Pacific Salmon Commission and the Intergovernmental Policy Council, a forum of tribal and state co-managers of the ocean area that includes Olympic Coast National Marine Sanctuary. Johnstone previously served on the Quinault Tribal Council from 1996 to 2002.

“The treaty tribes of the Northwest Indian Fisheries Commission have a responsibility to make tough decisions as stewards for the resources and to work with our state natural resources co-managers to protect fish for our children and their children,” Johnstone said. “Fish and fishing have been an inseparable part of my life for as long as I can remember, providing food, income and spiritual connection.

“In the 21 years I’ve represented the Quinault Nation, I’ve learned that tribes have to be at the table to protect our treaty rights and the fisheries resource,” Johnstone said. “Fisheries management has become more challenging every year with the ongoing loss of habitat, declining salmon runs and impacts of climate change. Sometimes, it seems like we’re losing more than we’re gaining, and we need to run just to try to keep up, but we have to keep fighting for those who don’t have a voice — the generations of fish and people still unborn.”

Johnstone will carry on Loomis’ work, as well as that of Billy Frank Jr., who was NWIFC chair for 30 years until his passing in 2014.

“Being chosen to follow the footsteps left by Billy and Lorraine is a great honor and I take the responsibility seriously. I’ll give it all I’ve got,” Johnstone said. “I’ve learned a lot from those who have come before. My brother Guy McMinds taught me when to fight and when to shake hands. Quinault leader Jim Harp taught me the need to stand up for what’s right and to persevere. Tribal leaders like Joe DeLaCruz, Billy and Lorraine knew when to step in to provide vision and leadership to inspire others to join hands in times of need.

“The challenges we face today are huge, but not insurmountable. Tribes can’t go it alone. We have to tell others who we are and what we stand for, remind our federal trustees of their responsibilities, and forge enduring partnerships to succeed. Tribes need to be a strong and growing force for change.” – Kari Neumeyer
The Tulalip Tribes coordinated a juvenile salmon sampling project in offshore marine areas throughout Puget Sound last summer, continuing efforts to learn more about poor marine survival.

“We know that early juvenile salmon growth after they enter the ocean is related to their survival, but we haven’t been sampling their growth consistently across the sound each year using the same methods and time period,” said Mike Crewson, Tulalip fisheries enhancement biologist. “This is way overdue. Every watershed needs it.”

Monitoring juvenile salmon in the offshore marine environment has been identified as a major data gap in efforts to improve the understanding of poor marine survival.

In July, Tulalip natural resources staff were joined by salmon ecology consultant Elisabeth Duffy to sample juvenile salmon and marine fish with a purse seine at 18 sites covering eight main marine basins in Puget Sound, from Bellingham Bay to the Nisqually Reach, and additional sites in Hood Canal.

Some coho and chinook were retained to be analyzed later in Tulalip’s lab, but most of the fish were released after being weighed and measured. The researchers took length, weight and scale samples of the juvenile chinook and lavaged their stomachs before releasing them, while otoliths were collected from a smaller number of samples for analysis back at the Tulalip Stock Assessment Laboratory.

The samples will provide growth rate data that will be used along with the stomach contents to help inform continued research in the Salish Sea Marine Survival Project. That project released findings in July that two of the main reasons for poor marine survival of salmon are a lack of prey and too many predators.

The timing of this sampling provides a snapshot of the out-migrating salmon that have been in the marine environment for a couple of months, before larger fish move out to deeper water later in the summer.

“Previous studies have shown many of the slower growing juvenile salmon offshore aren’t making it,” Crewson said. “We want to look at what they’re eating, the growth of scales and otoliths, and then look at the growth of the successful adults later.”

Tulalip received funding to conduct offshore marine purse seining for the next three years, but for the data to be useful, a juvenile fish monitoring program for Puget Sound must be established and funded every year, Crewson said.

“This would be the last missing piece needed to develop an ecosystem indicators program that would combine the fish data with zooplankton and other physical oceanographic data that is already being collected,” he said. “We need annual monitoring to document the effects of changing conditions to understand how climate is affecting prey availability, early marine growth and survival of juvenile salmon, along with the community dynamics of zooplankton and forage fish throughout Puget Sound.” – Kari Neumeyer
Northwest tribes are supporting southern resident orcas by releasing more fish from their hatcheries so the whales have more prey to feed upon.

A lack of salmon, especially chinook, is a primary reason for the decline of the whales, and chinook stocks from Puget Sound have been identified as priority stocks for their diet.

The state Legislature has provided funding to tribal and state hatcheries to increase production for the orcas, said Ron Olson, NWIFC hatchery programs manager. Initially, the funding was just for chinook, but it has been expanded to include coho and chum salmon, which orcas also eat.

The goal of the funding was to identify facilities with unused rearing capacity to raise more fish, Olson said, and if needed, make minor infrastructure improvements to help support expanded capacity, such as installing new net pens or rearing containers. Nine tribes and 12 hatcheries are involved.

The Port Gamble S’Klallam Tribe received more coho yearlings this year through the implementation of Gov. Jay Inslee’s Southern Resident Orca Task Force recommendations. The Port Gamble Bay coho net pen program releases an average of 380,000 smolts annually but was able to release 486,000 in 2021.

For 2022, the tribe anticipates receiving 550,000 yearlings from the state’s George Adams Hatchery near Shelton for its net pen program. The fish are reared in saltwater net pens for three to four months prior to their release so they can acclimatize to increase survival.

The Skokomish Tribe benefited from the program by being able to improve the infrastructure at its Enatai Hatchery while increasing the capacity to raise fish.

The tribe removed old concrete raceways and 50-year-old fiberglass tanks, and will upgrade to circular ponds. New incubation boxes were installed, as was a chiller system to help regulate the growth of fish.

The Skokomish Tribe currently raises 3,000,000 juvenile chum at its hatchery and plans to increase that to 5,000,000. The upgrades also would allow the tribe to add new fish stocks, such as coho salmon, said Jonathon Wolf, the tribe’s natural resources deputy director.

The Tulalip Tribes also received funding that contributed to long overdue hatchery upgrades to the Bernie “Kai-Kai” Gobin Hatchery, including new wells and raceways, and increasing the water supply by four times to support increased chinook production and improve water quality.

The success of the effort will depend on monitoring hatchery releases as they out-migrate from the rivers and when they return as adults, said Mike Crewson, Tulalip Tribes fisheries enhancement biologist.

“The best, most robust way to increase hatchery production to support the orcas is to assess chinook growth as they move through the estuary and nearshore to the deeper offshore marine environment, and compare that to the returning adults’ growth and survival, so we can refine rearing and release strategies if warranted,” he said.

Monitoring will help assess contribution to the whales’ diet and address concerns regarding how hatchery fish affect the survival of natural-origin chinook.

“The bottom line is that we’re trying to increase the contribution to southern resident killer whales’ diets with the least impact on wild fish,” Crewson said.
A European green crab can consume 40 half-inch clams a day and will dig six inches to hunt one down. It preys upon young oysters and can take out a Dungeness crab its size. It burrows into marsh banks and uproots eelgrass beds, which are considered important nursery habitat for juvenile salmon.

“It’s an aggressive predator,” said Ben Starkhouse, fisheries harvest manager for the Lummi Nation. “That’s common for a lot of invasive species that get introduced to an area and don’t have natural predators to keep the population in check. They can get established and their populations can grow quite quickly.”

And so it is with this invasive green crab, whose population growth in Lummi’s waters spurred the Lummi Indian Business Council on Nov. 23 to declare the green crab invasion a disaster, setting in motion steps to at least control it. A task force will lead development and implementation of a comprehensive response strategy, which Chairman Willie Jones Jr. said will likely entail aggressive trapping.

“The European green crab is a serious threat to our treaty fishing rights,” Jones said. “We need a huge increase in effort and resources to properly address the green crab invasion, and it’s going to take a coordinated response from tribal, state and federal partners. There is no time to waste.”

The green crab is originally from Europe and northern Africa and is highly adaptable. It was first reported on the East Coast of the U.S. in the mid-1800s, and in the last decade was implicated in the rapid decline of Maine’s steamer clam industry. The invasive crab was first detected on the West Coast in 1989, likely having arrived either in a ship’s ballast water or in a shipment of live seafood from the East Coast, Starkhouse said. Green crab populations have since been reported on the coast of Oregon, Washington and British Columbia as well as within the Salish Sea.

The first handfuls of green crab on the Lummi Reservation tidelands were found in late 2019 in the Lummi Sea Pond, a shallow, 750-acre aquatic area where the tribe cultivates shellfish and juvenile salmon. Within two years, more than 70,000 have been captured within the sea pond.

“At this point, a complete eradication of European green crab from the Salish Sea, and from the Lummi Reservation tidelands, is not likely,” Starkhouse said. “The plan is to significantly increase our trapping and removal efforts and reduce the population to a level that’s not going to cause an immediate threat to the surrounding nearshore environment or habitat.” – Richard Walker
The Makah Tribe used a mark-recapture method to learn more about the invasive European green crab that are competing with Dungeness crab in the Tsoo-yes River.

The tribe has trapped and removed more than 5,000 European green crab since 2017. The tribe’s marine ecologist, Adrienne Akmajian, wanted to know more about them.

“We are trying to get a clearer picture of what the impact is of these invasive crabs in these river systems,” she said.

In mark-recapture studies, scientists typically set traps, mark individual crab caught, see how many previously marked individuals have been recaptured, count the number of unmarked individuals and release everyone. Using that information, scientists can generate a population estimate.

Tribal natural resources staff spent a week in mid-August setting 12 shrimp traps baited with herring in the Tsoo-yes River channel, catching up to several dozen Dungeness and European green crab per trap.

When retrieving the traps daily, the crew measured up to 10 male and 10 female Dungeness and European green crab to get a random sample of the population, and then marked all of the crab with a swipe of epoxy that was stained with a color of the day – white (Tuesday), yellow (Wednesday), red (Thursday). All were released back into the river except for the female European green crab to prevent further reproduction. Over the course of the week, the tribe recaptured several of the marked crab.

“This mark-recapture effort is primarily targeting adult-sized European green crab that we normally see in the main river channel,” Akmajian said. “It is important to get a clearer picture of this overlap in habitat use by the native Dungeness and invasive green crab and evaluate the potential impacts of green crab on our native species.”

By the end of the marking week, the tribe had marked more than 900 individual Dungeness crab and more than 100 European green crab. – Tiffany Royal

After four years of carefully rearing cockles from broodstock, the Suquamish Tribe celebrated its successful efforts with clam bakes last year.

“Historically, with the decline of the cockles, it’s almost impossible to get enough to feed a family,” said Jay Mills, a Suquamish tribal councilman and fisherman. “It’s so important – it’s the memories of being able to go to the beach and bring home a bucket of cockles to share with your grandmother, mother, and aunt and uncle.”

The tribe harvested cockles from the beaches at Kiana Lodge and George Lane near Agate Pass in 2018, and partnered with the Puget Sound Restoration Fund to spawn and raise the offspring.

“We have preliminary genetic data showing that there are only very small genetic differences between populations within the main body of Puget Sound, so we hope to move toward some direct seeding of cockles,” said Elizabeth Unsell, a Suquamish Tribe shellfish biologist. “Working with tribal members to make such an important traditional food available through multiple community cockle bakes has been extremely rewarding.”

Elders as well as younger tribal members have observed the cockle population diminishing over the past few decades, Unsell said.

“What happened this year was a start – I think it could really help our members get back to their traditional foods they are accustomed to,” Mills said. “If we can learn from this to make it better for future generations, it will be important.” – Tiffany Royal

Cisse Trawally, with her grandfather Rob Purser, fisheries director for the Suquamish Tribe, put together to-go boxes of manila clams and cockles for the tribe’s drive-thru community clam bake in July.
June’s intense heat dome, ill-timed with extremely low tides, left shellfish dead on some beaches across Puget Sound and the Washington coast. A heat dome is a heat wave that lasts multiple days over one region.

A research paper about the event is under peer review, using data collected by scientists from tribes, government agencies, universities, non-profits and marine resources committees. The data was analyzed by the Jamestown S’Klallam, Skokomish and Swinomish tribes, University of British Columbia, Washington Department of Fish and Wildlife, Puget Sound Restoration Fund, Washington Sea Grant and the University of Washington (UW).

The impacts of the heat dome on shellfish varied across the region, said Wendel Raymond, a UW nearshore ecology research scientist who is leading the analysis.

Some beaches fared better than others. Shellfish on the coast generally had better survival than those in the Eastern Strait of Juan de Fuca and Puget Sound, Raymond said. It’s believed this had to do with the tide cycle during the heat dome, as the lowest tides happened early in the morning on the coast compared to midday in Puget Sound.

By the afternoon on the coast, the tide was high enough to cover and protect the shellfish, he said, while the beaches in Puget Sound were exposed at the hottest time of the day.

Narrowing the scope even further, scientists discovered that some species fared better in certain kinds of habitat. Pacific oysters near the Dosewal lips and Duckabush rivers in Hood Canal experienced less mortality compared to Pacific oysters in other parts of Hood Canal that were far from water sources.

Larger estuaries have a constant freshwater supply that may have kept shellfish cool while the tide was out, Raymond said.

Mortality estimates for oysters in Hood Canal have been as high as 30 percent, said Blair Paul, Skokomish Tribe shellfish biologist, while other beaches with some refuge ranged from 5-18 percent.

Survival also depended on the species’ preferred habitat. California mussels, which live among the big waves on the coast, had a better outcome than bay mussels found in sheltered and shallow areas of interior waters.

Cockles suffered a lot of mortality, Raymond said, as they are generally found on top of the sediment or are buried just below the surface. In comparison, butter clams, which live deeper in the sediment, experienced less mortality.

“The loss of clams, particularly cockles, on our local beaches is devastating for our tribal community,” said Swinomish interim fisheries manager Tandy Wilbur. “Understanding the extent of the mortality is a first step for us in determining how to respond now and in the future to these types of events.”

Overall, the data set is limited, said Wendel Raymond, as it is more qualitative than quantitative, meaning the scientists weren’t able to get exact numbers of how many animals died, but they were able to provide quality observations about what they saw on the beach. This is an essential first step in understanding the impact that the heat dome had on shellfish resources.

“The next phase of this work has begun, with a lot of discussions to determine the shellfish harvest season for 2022,” Paul said. – Tiffany Royal
Extreme Weather Threatens Salmon Recovery

After last summer’s record high temperatures and low water flow, Lummi Natural Resources staff discovered about 2,500 dead adult chinook in the South Fork Nooksack River.

The tribal and state natural resources staff that sampled the water and fish carcasses determined that the die-off was the result of severely degraded habitat quantity and function. “Specifically, the salmon were killed by high water temperatures and low flows that greatly stressed the fish and increased the prevalence of naturally occurring pathogens that can cause disease in fish,” said Lummi hatchery program manager Tom Chance.

All of the fish tested positive for three pathogens well known to kill salmon when water temperatures rise above acceptable levels: *Flexibacter columnaris*, *Ichtyophthirius multifiliis* and freshwater diatoms.

Even without extreme weather events, South Fork Nooksack chinook have been exposed to lethal conditions for the past 40 years. “Climate change is the straw that broke the salmon’s back and resulted in this tragic die-off,” said Lummi Indian Business Council member Lisa Wilson. “We cannot simply blame climate – we need to look at what each and every one of us is doing that is contributing to the demise of the salmon.”

The mass mortality in September coincided with a record number of chinook returning to the tribe’s Skookum Creek Hatchery. The work to bring that population back from extinction was undermined by an overall failure to protect and restore riparian habitat. “Sadly there is no political or public will to fix the problems, and very few options exist to prevent this catastrophic event from happening again,” Wilson said. “A major change is needed to restore and protect salmon habitat, especially with Washington state’s booming population growth.”

Federal and state permitting regulations make it easier for new housing developments to destroy habitat than it is to restore habitat. Among these regulations is the Federal Emergency Management Agency’s “no-rise” policy that prevents Lummi from conducting in-river restoration that could prevent another fish die-off from happening.

In the South Fork Nooksack, water temperatures consistently exceed the established lethal threshold for adult chinook. The habitat also suffers from legacy impacts and ongoing destruction from land conversion like logging, agriculture and population growth. “We are using our Lummi-owned hatcheries and working with our regional co-managers here in the Nooksack watershed to solve a problem we didn’t create, so we can recover this traditional food source and live our Schelangen (way of life),” Wilson said. “We need private, local, state and federal partners to step up and do their part.” – Kari Neumeyer

Torrential Fall Floods Follow Summer Heat Dome

November floods on the Nooksack River were the worst that hatchery manager Marlin Dennis has seen in his 41 years working at the Lummi Nation’s Skookum Creek Hatchery. The rain-swollen creek delivered a torrent of sand and gravel that clogged the hatchery’s 36-inch intake and affected water clarity in the hatchery’s rearing ponds.

Hatchery staff members moved eggs and used shovels to remove sand and gravel, Dennis said. Meanwhile, the hatchery’s water reuse system captured solids and re-aerated water in the hatchery to increase oxygen levels for fish.

Dennis estimates 1,000 adult coho returning to spawn were lost to the raging flood waters.

“We saved all of our young fish,” he said. “If we had lost our young ones, we really would have been hurting bad.”

The hatchery has 1.4 million juvenile coho that are maturing, and 2.4 million coho eggs and 750,000 chinook eggs in incubation. Some 3 to 4 percent will return as adults to the Nooksack River.

Past logging practices have affected the amount of sediment and debris carried by the creek during storm events. “And the water temperature is warmer because there’s no shade – all the trees are gone,” Dennis said.

Forest practices have improved over time, said Lummi habitat restoration manager Kelley Turner. “There are increased riparian buffers, but we’re playing catch-up – a lot of the bigger trees were removed from the system a long time ago.”

Lummi’s habitat program is applying for funding for restoration projects in the watershed.

“With the Nooksack Salmon Enhancement Association and the Whatcom Land Trust, we’re looking at how to address some of these impacts to salmon,” Turner said. “The creek doesn’t have a lot of instream wood that can help catch some of the gravel, sand, and sediment moving down toward the hatchery.”

There’s a sense of urgency to the restoration work in the watershed. “This was an all-time, record-high flood event that was followed by another flood event,” Chance said of the November storms. “I wouldn’t be surprised if we run into something again.” – Richard Walker
Northwest Trek Animals Enjoy Nisqually Salmon

Cheveyo, a bald eagle who lost one of her wings to a gunshot, approached a chunk of chinook cautiously, then enthusiastically.

A staff member at Northwest Trek in Eatonville placed the salmon on a branch for Cheveyo, who enjoyed the tasty treat under the watch of not only the wildlife park’s other three eagles, but also many students from St. Martin’s University, Northwest Indian College and the Nisqually River Education program.

The other eagles would get their turn.

Both the salmon and the students’ November visit were made possible by a donation of about 50 adult salmon from the Nisqually Indian Tribe’s Kalama Creek Hatchery.

“The animals at Northwest Trek are very lucky to receive such enriching sustenance from the Nisqually Indian Tribe and we are all very grateful,” said Desiree Kennedy, development manager of the Northwest Trek Foundation.

Not only do the park’s animals – including river otters, cougars, martens and wolverines – enjoy the meal, but the presence of the fish also helps the park’s bears practice hunting behaviors at a water feature in their enclosure. The bears dunk their heads underwater to search for the (dead) salmon, bring them up to the surface to feed, and exhibit other hunting and feeding behaviors, said Northwest Trek animal keeper Haley Withers.

“Feeding our bears whole salmon in their pool can create an experience similar to that of a wild grizzly bear fishing in a river,” Withers said.

“We hope this is the beginning of a long partnership where we can reintroduce salmon from the Nisqually watershed to the animals that traditionally eat them,” said Bill St. Jean, salmon enhancement program manager for the Nisqually Tribe.

“Chinook return to the hatchery each fall. It’s terrific to see this traditional food returned to these animals in our shared watershed.”

The donation of fish gave an opportunity for the college students to consider salmon’s life cycle and its importance to the environment and all the creatures in it.

“It’s a grand and unique chance to have this opportunity,” said David Stepetin, community outreach coordinator for the Nisqually Environmental Team, who helped orchestrate the visit between the schools and Northwest Trek.

“It was an incredible opportunity for us to gather, learn and share from one another’s experiences,” Kennedy said.

–Trevor Pyle

More Risk Than Meets The Eye

On the first morning of a November crab fishery in Skagit Bay, boats heading out to fishing grounds saw 1-foot swells whip up to 5 feet within 20 minutes as the sky turned cloudy and the breeze went from light to moderate.

“It can be dangerous for a lot of folks,” said Scott Schuyler, Upper Skagit Tribe natural resources director and fisherman. “People watch the program The Deadliest Catch and they don’t realize that, for us, a 24-foot boat in 5-foot swells is relatively the same as 25-foot seas for one of those 125-foot boats in the Bering Sea and is very dangerous.”

Crab harvested from these waters provide income to fishermen as well as meet subsistence and ceremonial needs.

“The shellfish resource has not declined in the same manner as the salmon populations have,” Schuyler said. “The crab fishery is a safety net.”

Schuyler, left, is pictured with Jason Fernando pulling up a crab pot.
Tribal wildlife staff, partnering with the state to estimate black bear density in the North Cascade Mountains, were warned: “The lure stinks.”

The lure's key ingredient is aged cattle blood, which leaves a wide aromatic footprint. The Sauk-Suiattle Indian Tribe stored it in barrels at the edge of a field, as far away as possible from the tribe's natural resources department.

From May through July, staff from the Sauk-Suiattle and Stillaguamish tribes poured the fermented blood, along with fish oil and fruit-scented lures, onto piles of logs and sticks surrounded by barbed wire corrals. Attracted to the smell, bears crawled under and through the wires, snagging their hair in the barbs and leaving behind DNA samples that could be used to learn more about the population.

Importantly, the scent was to lure the bears inside the corral, not set bait for them to eat. “We don't reward them for going in,” said Gary Tatro, Stillaguamish wildlife policy representative. “We don't want to disrupt their normal behavior.”

The two tribes partnered to collect bear hair from 36 sites in the upper North Fork Stillaguamish sub-basin on state, federal, tribal and some private lands, with permission.

Individual samples were collected, packaged and sent to a lab in Canada for genetic testing. Known as a mark-recapture study, the DNA analysis will reveal when repeat samples are collected from the same bear.

“The Stillaguamish Tribe is interested in learning more about black bear populations within the Stillaguamish watershed, so we will be collecting hair in both the North Fork and South Fork sub-basins,” said Stillaguamish wildlife biologist Jennifer Sevigny.

Previous bear population estimates were based on research originating in the 1970s, calculated based on habitat quality, precipitation and vegetation. However, a more recent four-year study led to a Washington Department of Fish and Wildlife (WDFW) monitoring protocol in 2019. This research determined that the average density estimates in the North Cascades were almost 50 percent lower than what was expected.

“Given the human population growth and development that's occurred since the 1970s, updating bear density estimates will improve our ability to manage black bears sustainably,” said Stillaguamish wildlife biologist Amanda Summers. “With human population growth has come increased pressure on black bear habitat through encroachment and disturbance via recreation.”

The tribes offered to assist WDFW in last year's study to more accurately estimate population density. Eventually, the data will determine harvest levels and other management actions.

Ideally, tribal wildlife managers would like to continue the work by setting snares in different areas each year. “Through our partnership with the Stillaguamish Tribe, we were able to acquire the necessary supplies to set up the hair snare sites near the Sauk watershed and the Sauk-Suiattle tribal lands,” said Emily Wirtz, Sauk-Suiattle wildlife biologist.

The tribes also set up motion-activated cameras at some of the snare sites to monitor the bears’ behavior.

– Kari Neumeyer
The Lower Elwha Klallam Tribe is restoring Ediz Hook for salmon and the public, on land and in the water. Below the surface, the tribe and partners Pacific Northwest National Laboratory (PNNL) and Washington Sea Grant have been restoring eelgrass beds on the sand spit’s south shore for the past four years, with greater success than expected.

Initially, 3,350 eelgrass shoots were harvested from Port Angeles Harbor in 2017 at the site of a proposed U.S. Navy pier. Of the harvested shoots, 1,100 were replanted in test plots in the harbor and 2,250 shoots were planted in an eelgrass nursery at PNNL’s Sequim facility.

By 2021, nearly 20,000 shoots had been cultivated at PNNL from the initial 2,250 shoots. Divers planted most of these along shallow subtidal areas of the interior of Ediz Hook.

Eelgrass meadows buffer the effects of ocean acidification, stabilize the nearshore, and are used by juvenile salmon and other fish and invertebrate species for foraging, spawning and rearing. Decades of wood waste deposition from the mill at the western end of the spit had led to degraded eelgrass beds and marine life habitat.

The tribe and partners will continue to collect data about the performance of the eelgrass plantings as well as distribution and recolonization of natural eelgrass meadows, which will be helpful in long-term monitoring efforts, Beirne said.

Upland, the tribe spent the last half of the summer restoring the beach at the former Olympic Rowing Club site.

The rowing club had moved an overwater structure upland but did not have the funding to restore the beach. They partnered with the tribe, which secured a grant from the Pacific Coastal Salmon Recovery Fund. The Port of Port Angeles also donated several dozen log booms to the project.

The tribe’s restoration crew removed existing piers and shoreline armoring such as concrete, creosote beams, riprap and metal, and brought in logs and clean beach sand. A former building pad and parking area was removed and will be planted with native dune grass in 2022.

“The project is designed to improve habitat for forage fish and marine birds, improve salmon migration corridors and facilitate human recreation opportunities,” said Mike McHenry, the tribe’s fisheries habitat manager.

“The stewardship demonstrated by the Lower Elwha Klallam Tribe for this critical nearshore habitat is unsurpassed,” said Nathan West, Port Angeles city manager. “This work continues to result in the repair and removal of multiple industrial-era structures and features that saw decades of neglect.

“These restorative actions along Ediz Hook have resulted in enhancements to the experiences of community members and visitors alike as they learn, explore and recreate.” – Tiffany Royal
The Jamestown S’Klallam Tribe’s new setback levee on the Dungeness River can withstand a 10,000-year flooding event – an amount of water equal to a 100-year flood event, times four. "This is the bulldog of river levees,” said Randy Johnson, the tribe’s habitat program manager. “It’s short, squat and powerful.”

It is also 5,000 feet long and beefy enough to withstand a river as big as the Mississippi, Johnson said. The tribe constructed the new levee on 65 acres of land they purchased in 2020 – 25 acres from Dungeness Valley Creamery and 40 acres from the McLane-Wallacker Trust Farm.

The tribe’s new levee will replace the old one that is located near the bank of the river and restricts flow, eliminates floodplain connectivity and damages salmon habitat. Natural resources managers have long considered the old levee to be one of the most egregious human impacts to Dungeness River’s salmon habitat, Johnson said. The new levee will nearly quadruple the area in which the river can move and spread out.

On average, the new levee is located about 550 feet farther away from the river than the old levee. The land between the levees is historic floodplain that settlers cleared and converted to agricultural land in the early 1900s.

In addition to reconnecting the river with former floodplains, the newly opened area will allow new salmon habitat to develop, reduce channelization and high-water velocities, allow opportunities for wood accumulation, re-establish riparian forests, and allow public access to the river. The levee is 12 feet wide at the top and is open to the public for hiking.

In 2022, the tribe will remove the old levee, construct five logjams in a side channel and plant native vegetation in the newly opened floodplain. – Tiffany Royal

The tribe partnered with the Jamestown S’Klallam Tribe, the Quileute Tribe, Clallam Conservation District, Clallam County Environmental Health, Dungeness River Nature Center and Washington Department of Fish and Wildlife to host a variety of educational and cleanup events on the Olympic Peninsula to benefit salmon, which are a significant part of the orca diet.

Heavy Lifting for Habitat

Lora Burke, harvest monitor and field technician for the Lower Elwha Klallam Tribe, hauls out a piece of wood from Indian Creek in early October as part of Orca Recovery Week.

Tiffany Royal
Surplus Fish Released to Spawn Naturally

A Puyallup Tribe hatchery program to increase natural spawning in the Puyallup River reached two benchmarks this year.

Not only did the program release more adult chinook than it has in the past 20 years, but for the first time, some of the transplanted salmon came from the tribe’s Clarks Creek Hatchery.

In previous years, after the state hatchery met its egg-take goal, the Puyallup Tribe transported those surplus adult fish in tanker trucks to suitable spawning habitat, said Blake Smith, fisheries enhancement chief for the tribe.

“This year, we had enough surplus out of our own hatchery. It’s the first time we’ve been able to haul our own fish out,” he said. “Our goal is to put them in places where there are no fish spawning. We release them live and have them spawn in the watershed. We put a lot of effort into that.”

From mid-September to early November, the tribe’s tanker trucks made 33 trips to plant about 2,500 chinook and 3,500 coho along the mainstem of the Puyallup River and tributaries such as the Mowich River.

“Hatchery fish do know what to do (in the wild). You don’t have to spawn them,” Smith said. “They can do it on their own. If you don’t have any fish on the spawning ground, it makes sense to put them there.” — Trevor Pyle
On a misty November morning, Swinomish fish cooks Eric Day and Medicine Bear prepared coho for elders on the Swinomish Reservation. Senses were stirred by the earthy smell of alder smoke, by traditional music playing on Day’s sound system, by the sound of Day’s knife scraping clean an ironwood skewer, and, of course, by the scent of cooked salmon.

As often happens at an Indigenous place, the past, present and future meld here. Day and Medicine Bear cook every Wednesday outside the senior center, a newer building bearing traditional architectural details, overlooking Txiwu’c, an ancestral village site on Swinomish Channel that is now Swadabs Park.

This scene – the fish, the smoke, the sound of drumming and singing – would be familiar to the ancestors at Txiwu’c.

The fishing rights they reserved and the habitat restoration, environmental protection and fisheries management that are now taking place all lead to this: the ability to meet the spiritual and dietary needs of the people.

“A lot of times when we do have meetings with people who we want to talk with about fishing and what impact [a policy or action] has, I always mention that I cook fish for the community,” said Day, a member of the Swinomish Tribe’s Senate. “That’s part of what we’re protecting, the ability to be able cook for the people and provide the salmon for them. It’s not about money, it’s about the connection with the land and water. It’s about feeding the soul and the spirit.”

Day and Medicine Bear cook 100 pounds of fish each week for elders. The senior center delivers 60 to 70 plates and the remainder is picked up, Day said.

Coho fisheries were shorter this year because of low returns, Day said.

“I fished for humpies this year and we did pretty good, but it’s not like it used to be,” Day said. “When I went fishing out of high school, we’d have a four-day opener but we’d be out there for three weeks because they kept extending it. That’s how good it was.” – Richard Walker

Seven Generations

From left, two unidentified Skokomish tribal members, Mary Jackman Adams, and Joseph Sparr holding Helen Rudy enjoy a clam bake in this undated photo.
Sunny Summer Harvest

Port Gamble S’Klallam fishermen Matthew Tom, left, and Matthew Ives harvest coho salmon in Quilcene Bay in September.