



Northwest Indian Fisheries Commission

NWIFC News

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Working for Tomorrow Every Day



by Lorraine Loomis
NWIFC Chair

I am honored and humbled to follow in the footsteps of Billy Frank Jr. as chair of the Northwest

Indian Fisheries Commission.

Of course no one can ever truly replace our longtime chairman and friend, Billy. It will take all of us to do that.

Billy wrote this column for many years. The tribes decided to keep the name to honor him and remind everyone what this column is about: Frank, honest talk from the treaty Indian tribes in western Washington who are co-managers of the natural resources.

Like many people, I drew much strength from Billy over the years. But the biggest source of strength for me has always been my family, especially my parents.

My dad, Tandy Wilbur, was the first general manager of the Swinomish Tribe. He and my mother, Laura, worked tirelessly to secure the funding that founded the Swinomish tribal government. When he passed away in 1975, my mother continued their work. She served 50 years in the tribal senate and was instrumental in tribal advances in housing and health care before her passing in 1997.

I started out in the fish processing business in 1970. It was hard work and long hours. I switched to fisheries management following the Boldt decision in 1974. I thought that maybe fisheries management might be a little bit easier than working 14-15 hours a day, seven days a week.

I was wrong.

My dad told me that it would take about 10 years before the Boldt decision would operate as it should. There was a lot of fighting with non-Indian fishermen in the early days after the Boldt decision. You never knew what to expect when you went out on the water. It was 1982 before true co-management became a reality through development of the first joint Puget Sound Salmon Management Plan by the tribes and state.

As my tribe's fisheries manager for 40 years, I've seen incredible advances in salmon co-management, both regionally and internationally.

I am especially proud of tribal involvement in developing and implementing the U.S./Canada Pacific Salmon Treaty that governs the sharing of salmon between the two countries. I continue to serve on the Fraser River Panel that manages sockeye and pink salmon through the treaty. I also coordinate tribal participation in the North of Falcon fishery planning process with the state of Washington. I have served as an NWIFC commissioner for the past 30 years, most of them as vice-chair.

I love fisheries management. When we have a fishery opening – and salmon fishing is not open a lot these days – you see the happy faces of the tribal fishermen. You know you have done your job. I live for that. It's my life.

None of us tribal natural resources managers are working for today. We are all working for tomorrow. We are working to make certain there will be salmon for the next seven generations.

We face many challenges in the years to come. Salmon populations continue to decline because we are losing habitat faster than it can be restored. As the resource continues to decline, salmon management becomes increasingly difficult because there is less room for error. That puts our tribal treaty rights at great risk.

We need hatcheries and habitat to bring back the salmon. We need hatcheries to provide salmon for harvest, support recovery efforts and fulfill the federal government's treaty obligations. We need good habitat because both hatchery and wild salmon depend on it for their survival.

We also need to work together, because that is always best. We've known for a long time that cooperation is the key to salmon recovery, and that we must manage for tomorrow every day.



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On the cover:
Tulalip hatchery technicians April Bosley and Erick Chance collect female chum to be spawned at the Bernie "Kai-Kai" Gobin Hatchery.
Photo: K. Neumeyer

"We are working to make certain there will be salmon for the next seven generations." – NWIFC Chair Lorraine Loomis

Tribal Community Nurtures Traditions

New property managed for hunting, gathering, jobs

Muckleshoot tribal members got a first-hand look at 96,000 acres of commercial forestland recently purchased by the tribe at a two-day community event.

“I don’t know when the last time we would have been up here, cooking fish in the woods,” said Louie Ungaro, a tribal council member. “We used to have summer camps up here, where we would go fishing and pick berries. Having this land back in the tribe means we can bring that back.”

The community event showed tribal members how the land will be managed and used for gathering and hunting.

“We bought this land to awaken the relationship that our ancestors had with the land,” Ungaro said. “It is important to practice your sovereignty, but it is also important

to honor your ancestors.”

The tribe bought the forestland, mostly in the White River watershed, from Hancock Timber in 2013.

Tribal members can access the forest using free passes available from the tribe. Non-tribal members are also able to buy access permits through Hancock.

“This land is opening up opportunities for people who want to sustain a way of life based on the environment,” Ungaro said. “There are people in our tribe who want to work in the woods.”

Five tribal members have been hired to work in the forest, and a new after-school program at the Muckleshoot School will focus on forestry and stewardship.

“This forest is about jobs and economic growth,” Ungaro said. “Not just about jobs, but



E. O’Connell

Muckleshoot tribal members learn about their newly acquired forestland, formerly owned by Hancock Timber.

about being able to support ourselves harvesting and foraging, the way we’ve always done it.”

One of the first projects in

the woods is to map locations of huckleberries to provide tribal members with regular access. – E. O’Connell



E. O’Connell

Muckleshoot Tribal School kitchen coordinator Shawn Saylor prepares salmon for school lunches, as part of an effort to serve traditional foods to the community.

Salmon served up in school lunches

Six Muckleshoot tribal kitchens – including at schools and elder facilities – are encouraging a traditional diet.

The Muckleshoot Indian School has designated at least one day a week for traditional foods. The school kitchen began introducing the foods four years ago, said Shawn Saylor, the school kitchen coordinator. But even then, students were still able to choose a cold sandwich if they didn’t like the traditional option. After a while that changed.

“We don’t even make the sandwiches available on traditional food day anymore,” Saylor said. “The

kids just forgot they didn’t like salmon. We don’t even do things like sloppy joes anymore because the kids just don’t like them. Parents come in and visit us and they end up saying ‘I didn’t know they fed you so well here.’ ”

Each Thursday the kitchen staff prepares a meal following traditional food protocols. Popular choices include halibut, seafood soup (which includes clams, shrimp, mussels and salmon), fish tacos or salmon.

“We end up doing salmon a ton of different ways,” Saylor said. The school buys salmon directly from the tribe’s

seafood enterprise.

The kitchen staff have also served elk and venison, even though it drives up the cost of the meals.

“We will occasionally have a hunter donate meat to us,” he said.

The protocols also call for eliminating processed foods, trans-fat oils and high-fructose corn syrup.

The kitchen staff regularly meets with students to discuss how to make traditional Thursdays better.

“The best part of my day is when kids come through the line on traditional food day and say, ‘This is awesome,’” Saylor said.

– E. O’Connell

Keeping Track of Hatchery Salmon



K. Neumeyer

Tulalip fisheries technicians spawn female chum salmon at the tribes' Bernie "Kai-Kai" Gobin Hatchery. Nick Langley, left, removes the eggs from the salmon, while Erick Chance collects the fish from the holding pond.

The Tulalip Tribes began marking the otoliths of hatchery chum embryos in 2013. When the fish return as adults, fisheries managers can tell their origin by examining the otolith under a microscope.

With the addition of chum marking, all of the hatchery chinook, coho and chum released by Tulalip are now genetically marked with their hatchery origin and brood year.

Otolith markers tell hatchery managers the origin and brood year of returning fish

Tribal and state co-managers continue to improve their ability to track hatchery salmon in the Snohomish watershed.

Both the Tulalip Tribes' Bernie "Kai-Kai" Gobin Hatchery and the state's Wallace River Hatchery recently installed new chillers to better mark hatchery chinook, coho and chum salmon.

"One hundred percent of all Tulalip chinook, coho and chum, and all regional chinook hatchery production, is now marked by location and brood year," said Mike Crewson, Tulalip salmon enhancement scientist.

By altering the water temperature during incubation, hatchery managers can leave a distinct pattern on each fish's otolith – a mineral structure often referred to as an ear bone, which accumulates daily rings. When fish return as adults, their otoliths are examined under a microscope to identify where and when they were released.

A portion of Snohomish regional hatchery fish also have coded-wire tags inserted into their snouts for identification in fisheries where otoliths are not examined. Also, adipose fins from most hatchery chinook and coho are clipped, which identifies them as hatchery fish but does not tell fishery managers where they are from.

While both of these meth-

ods can be expensive and hard on the fish, otolith marking is a cost-effective way to ensure that all the fish are marked and uniquely identifiable simply by changing the temperature of the water going to the eggs.

Tulalip also has hired additional staff and increased the number of returning fish that are sampled from the spawning grounds and in regional fisheries and hatcheries. Tribal technicians remove the heads of spawned-out fish in rivers and hatcheries, and from a representative number of the catch, and read the otoliths in the tribes' stock assessment lab.

"We run all the otoliths for the entire area," Crewson said. "It's an important tool to assess straying and genetic risk and protect tribal treaty rights."

Data show a significant reduction in hatchery strays since 2004 when 100 percent of the remaining hatchery chinook production was switched to the local native Skykomish River summer chinook brood-stock.

"Our treaty fishing rights depend on these fish," said Terry Williams, Tulalip's fisheries and natural resources commissioner. "As long as natural production is limited by habitat loss and damage, we will need hatcheries."

– K. Neumeyer

"We run all the otoliths for the entire area. It's an important tool to assess straying and genetic risk and protect tribal treaty rights." – Mike Crewson, Tulalip salmon enhancement scientist

Stormwater Runoff Toxic to Spawning Salmon, Eggs

Peering through a microscope at the Suquamish Tribe's Grovers Creek Hatchery, biologist Tiffany Linbo uses two pairs of tweezers to gently peel the protective layer off an 18-day-old fertilized coho salmon egg.

Linbo, who works for the National Oceanic and Atmospheric Administration (NOAA), needs to avoid piercing the yolk sac so Washington State University (WSU) toxicologist Jen McIntyre can take a closer look at the development of the embryo's heartbeat, blood flow and eyes.

Linbo and McIntyre are looking at eggs that have been exposed to urban stormwater runoff collected from roadways in Seattle; they want to know if the embryos show signs of developmental toxicity.

In a partnership with the Suquamish Tribe, the project is part of an ongoing study by NOAA, WSU, U.S. Fish and Wildlife Service, and the Environmental Protection Agency to better understand how untreated urban stormwater is affecting coho salmon during their freshwater life stages in urban Puget Sound watersheds.

"Some as-yet unidentified chemicals in runoff are prematurely killing adult salmon as they attempt to spawn in urban streams," said David Baldwin, NOAA research zoologist,

who helped design the study.

Since 2011, the scientists have been conducting similar exposure tests on adult coho salmon, studying fish behavior and toxicity levels in the organs. They have profiled the baseline chemistry of urban runoff across multiple storms, spanning multiple years.

The scientists are looking at the effects of different dilutions of stormwater on embryos compared to embryos exposed only to the hatchery's clean well water. The team also is monitoring the development of eggs exposed to full-strength stormwater filtered through experimental soil columns filled with sand, compost and mulch, mimicking bioswale filtration systems.

"We expect it will take multiple short exposures before we see effects on the eggs," McIntyre said. "If the contaminants target the gills, the liver or the heart of the adults, those organs were not yet developed when we did the first exposure to the eggs."

"In actual urban spawning habitats, salmon embryos develop over a period of several weeks, during which they are likely to experience repeated rain events," added Julann Sromberg, NOAA toxicologist. "We want our study to reflect this reality of multiple exposures." – *T. Royal*



Above, coho eggs are examined under a microscope after being exposed to stormwater. Below, Jen McIntyre of WSU notes the development of a coho embryo.



T. Royal (2)

Hood Canal Chum DNA Key to Managing Mixed Stock Fisheries

The Skokomish Tribe sampled chum this fall to supplement genetic baseline data to include all three Hood Canal hatchery stocks: the tribe's Enetai hatchery, and Wash-

ington Department of Fish and Wildlife's Hoodsport and McKernan hatcheries.

The fall chum genetics baseline has been represented only by the Hoodsport Hatch-

Cindy Gray, Skokomish Tribe

ery and from the spawning grounds.

These samples could improve managers' ability to distinguish different stocks of hatchery and a natural-origin fish, said Cindy Gray, the tribe's finfish harvest manager.

"Collecting the DNA will help expand the baseline data about Hood Canal's fall chum runs," she said. "This information will be especially helpful when trying to evaluate potential commercial fisheries in areas with mixed stocks and overlapping fishing areas between tribes."

Compared to 2013's unusually large return of 1.5 million, the 2014 run was in the "normal range" at about 570,000, Gray said.

The fall chum fishery is a cornerstone for both tribal and non-tribal commercial fishermen in Hood Canal.

"It's a significant part of the tribe's traditional culture and economy, as the fishermen rely on the run as a big part of their livelihood," Gray said. "The tribe's ability to exercise treaty rights is inherently tied to these fish." – *T. Royal*

Skokomish Tribe hatchery staff take tail and scale samples to test the DNA of an adult chum.



Hatchery Renovation Improves Fish Handling, Monitoring, Water Quality

The Quinault Indian Nation (QIN) is wrapping up a project at the Salmon River Hatchery that improves water quality and handling of broodstock. It also has started a project to replace a six-decade-old building at its Lake Quinault hatchery.

At the Salmon River Hatchery in the Queets River watershed, QIN is using \$760,000 of federal hatchery reform dollars to replace an earthen channel with concrete raceways, hydraulic fish lift and a new spawning shed.

“This project eliminates the old earthen channel that caused water quality issues in the past, and allows for improved handling of coho and steelhead broodstock,” said Tyler Jurasin, operations manager for the Quinault Department of Fisheries.

The new raceways allow hatchery staff to remove accumulated sediment before adult salmon are processed.

“We’re also improving efficiency of handling and sorting fish by adding a hoist for fish,” Jurasin said. A covered porch area where fish were processed will be upgraded to allow for better cleanup after spawning and improve the work flow.

“Salmon River coho and steelhead have been selected for early run-timing for the purpose of a segregated harvest strategy,” Jurasin said. “Having the ability to efficiently separate broodstock is vital to our program objectives.”

At Lake Quinault, the tribe is replacing a more than 60-year-old building that housed an office, a break room and storage with a new \$450,000 structure to improve security for equipment currently kept outside, as well as add sleeping quarters for when fish need to be monitored around the clock during power outages.

QIN is providing an estimated \$100,000 on top of \$350,000 from the Bureau of Indian Affairs for the 4,200-square-foot project.

“We’ll gain a little kitchen, laundry facilities to clean and dry clothing, and the layout will actually improve parking, which is somewhat limited right now,” said Marty Fig, hatchery manager. The project also updates the collection and processing of stormwater runoff from the facility grounds. – D. Preston



D. Preston

Hatchery technicians for the Quinault Indian Nation collect Salmon River coho from the partially completed raceways at the Salmon River Hatchery. The completed system will increase water levels and includes a hoist for moving fish to a new processing shed next to the raceways.



Pete Wilson, Quinault fisherman, runs a buoy past a sensor to demonstrate a new monitoring system.

Crab Enforcement



D. Preston (2)

Dungeness crab fisheries are among the most lucrative in the state. The Quinault Indian Nation is testing an electronic system to improve enforcement.

Electronic monitoring helps tribal crabbers keep tabs on pots

Quinault Indian Nation (QIN) fishermen are testing an electronic crab pot monitoring system that could dramatically improve enforcement.

“The Quinault fishermen asked for this tool,” said Joe Schumacker, QIN marine scientist. “It’s a big ocean out there and it can be hard to enforce properly.”

The Dungeness crab fishery is one of the most lucrative fisheries in the state of Washington, valued at nearly \$62 million in 2013 for both tribal and non-tribal fishermen.

State and tribal regulations to limit over-capitalization and maintain crab populations include maximum numbers of pots per fisherman and crab size minimums.

To monitor the catch, Quinault has placed quarter-sized radio-frequency tags in crab pot buoys. When the pots are pulled on board, the fishermen run the buoy past a sensor that transmits the identification number and GPS location to a computer on the boat. Each pot is registered to only one owner.

“What this helps the fishermen do is make sure someone else isn’t pulling their pots and makes sure everyone is fishing the right number of pots and in the right areas,” Schumacker said. “It works similar to the scanner in the department store that reads whether you’re leaving the store without paying for something.”

Three QIN fishermen are testing the tags and sensors during the first part of the 2014-2015 crab season that began in November.

A non-profit firm, EcoTrust

Canada, is processing the data for Quinault as they do for the British Columbia crab fleet.

“If it works well, we’re hoping to have it on all fishing boats in the future and would love to see it used by the non-tribal fishermen as well,” Schumacker said.

While the goal is strictly to aid enforcement now, the system could be used in QIN’s work to retrieve derelict crab pots and eventually deliver important information on stock distribution and structure.

– D. Preston

“It’s a big ocean out there and it can be hard to enforce properly.”

– Joe Schumacker, Quinault marine scientist



K. Neumeyer

Lummi youth dig clams on the beach in Portage Bay in 2011. The beach was closed to shellfish harvest in September because of fecal coliform.

Water Pollution Leads to Shellfish Bed Closure

High levels of fecal coliform prompted the Lummi Nation to close 335 acres of Portage Bay shellfish beds in September.

The fecal coliform – mostly from livestock, human and pet waste originating upstream from the reservation – exceeds federal bacterial standards, meaning the shellfish could be unsafe to eat. The voluntary closure affects Lummi’s treaty-protected ceremonial, subsistence and commercial harvest.

“The reservation tidelands are deeply affected by activities along the Nooksack River, which flows into Portage Bay,” said Lummi harvest manager Ben Starkhouse.

Lummi shellfish harvesters lost an estimated \$8 million in revenue from 1996 to 2006, when 180 acres of shellfish beds were closed for the same reason.

During that closure, more than \$8 million was provided to the region’s dairy industry to stop the discharge of manure into the Nooksack River. But after the shellfish beds were reopened, federal and state assistance with inspections and monitoring was substantially reduced.

“I remember when the Portage Bay shellfish beds were re-opened in 2006 – unfortunately, some people haven’t

kept up their end of the deal to keep waste out of our water,” said Merle Jefferson, Lummi natural resources director. “As a result, tribal members who did not pollute the water nevertheless have to suffer the consequences of actions or inactions of our upstream neighbors.”

About 200 Lummi families make their living harvesting shellfish, and as many as 5,000 community members rely on the shellfish beds for ceremonial and subsistence purposes.

“Failure of our upstream partners to follow the policies developed to respond to the last closure has led to this disaster,” said Lummi Nation Chairman Timothy Ballew II. “Immediate actions are needed to right the problem.”

Environmental Protection Agency (EPA) Region 10 Administrator Dennis McLerran said the federal agency shares Lummi’s concern.

“EPA is providing significant funding for fecal coliform reduction programs as well as conducting compliance activities in the watershed,” McLerran said. “We are committed to work with the Lummi Nation, state and local governments, and others to achieve sustained improvements in water quality.”

– K. Neumeyer

Partnership Studies Fossil Fuels in Clams

Researchers from Oregon State University (OSU) are studying shellfish contamination on the Swinomish reservation and nearby Fidalgo Bay.

Both the Swinomish Indian Tribal Community and Samish Nation have partnered in the project with OSU’s Superfund Research Program, focusing on clam contamination on tribal lands.

Butter clams were sampled from sites in Fidalgo Bay near an oil refinery, and from the relatively pristine Kukutali Preserve. Kukutali is co-managed by the Swinomish Tribe and the state of Washington.

“We predominantly are looking for chemicals that come from fossil fuels,” said Blair Paulik, OSU Ph.D. candidate. “We were interested in seeing sites that were the extremes within the area. We expect if there’s going to be an area that’s more contaminated it will be near the refinery. We expect Kukutali to be less contaminated.”

Swinomish clam digger Benny James helped the OSU researchers locate butter clams on Kukutali. Butter clams specifically were sampled because they are an important part of the tribe’s traditional diet.

“The information will help us understand how much of these types of chemicals are already in the area, and how much we will have to clean up in the event of an oil or coal dust spill,” said Jamie Donatuto, Swinomish environmental health analyst.

The OSU team also tested a way to measure contamination using passive samplers. At each site where a clam was sampled, the team placed a small membrane in the sediment to soak up the chemicals. The results from the passive samplers will be compared to the data from the clams.

“Down the line, this could be used if you were worried, like the tribe is, about whether or not your seafood is contaminated,” Paulik said. “You could just put out our samplers instead of removing clams from the food source.” – K. Neumeyer

Swinomish clammer Benny James, left, environmental health technician Myk Heidt and OSU Ph.D. student Carey Donald dig clams on Kukutali.



Jamie Donatuto, Swinomish

South Sound Prawn Survey Could Lead to Tribal Harvest

A long-term study by the Nisqually Tribe is providing a better understanding of shrimp in South Sound.

“What shrimp populations are in the area is not well documented,” said Margaret Homerding, shellfish biologist for the Nisqually Tribe. “The state conducted surveys a decade ago but did not catch any spot prawns.”

The tribe is dropping three shrimp pots every few months in various locations from the Nisqually Reach to lower Carr Inlet. Each pot location is tracked with GPS and any catch is recorded.

“We started surveying when we saw our crabbers pulling up spot prawns from their deeper pots,” Homerding said. “We are looking for all species of shrimp, but we’re focusing our efforts on spot prawns, which are the commercially valuable species.”

So far, spot prawns and dock shrimp have been the most abundant species in the tribal surveys.

“The end result of the study should be a decision on whether there is a commercially viable tribal shrimp fishery,” Homerding said.

Currently, the tribe splits a combined 3,000-pound quota for all shrimp species with non-tribal harvesters, including 1,000 pounds for spot prawns.

“There isn’t any commercial harvest by the tribe right now,” Homerding said. “Even with the few shrimp caught incidentally in crab fisheries, the tribe doesn’t come anywhere close to actually accessing those pounds.”

Part of the surveys include tracking the sizes at which shrimp change from male to female. Because shrimp change sex during their life cycle, the relative sizes of male and female shrimp can tell biologists a lot about the health of the local population.

“If a population of shrimp is shrinking, we will see individuals changing sex earlier,” Homerding said.

Shellfish managers can consider the data the tribe is collecting now as a baseline for a healthy stock with little harvest pressure.

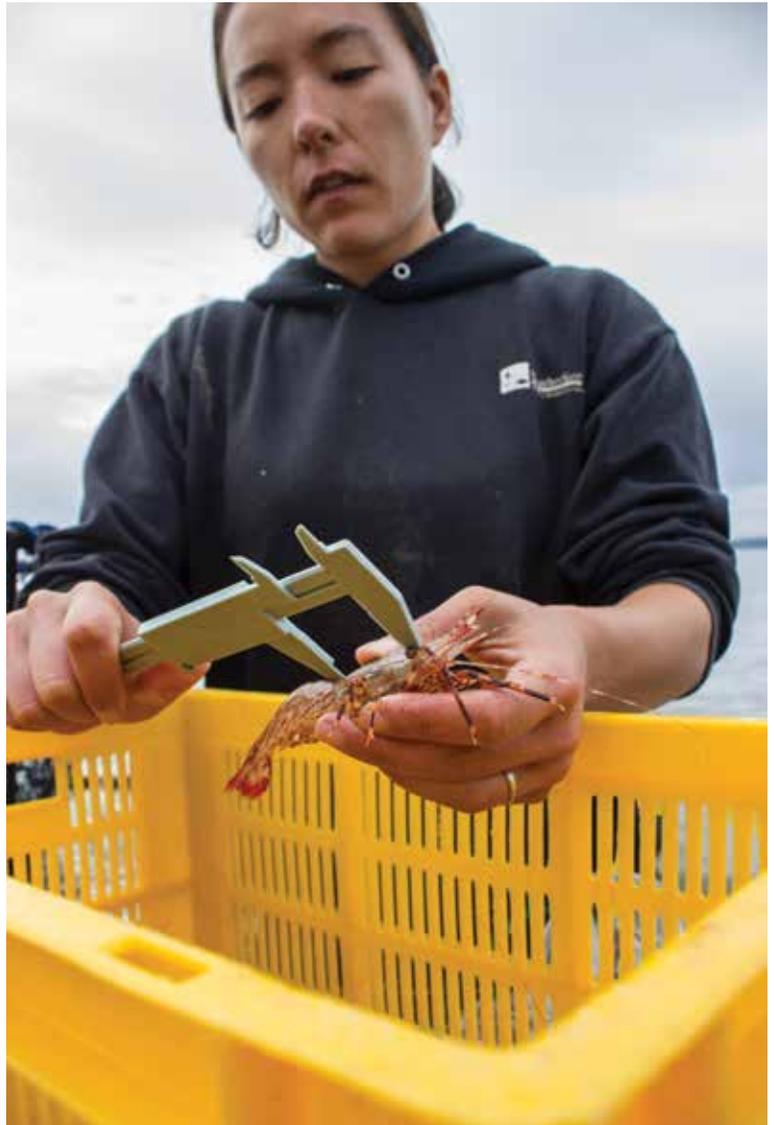
“But, if we see smaller females in later years, we can assume they’re feeling the pressure to

switch earlier, and we should reduce our fishing pressure,” she said.

The tribe also is tracking when shrimp are spawning. Usually, shrimp fisheries close when female shrimp are carrying eggs, protecting them from harvest.

“There’s no reason to fish for shrimp when the next generation is at its most vulnerable,” Homerding said.

“The basic information that we’re collecting now will help guide harvest in the future,” said David Troutt, natural resources director for the tribe. “The Nisqually Tribe is committed to smart management that benefits both tribal and non-tribal communities.” – E. O’Connell



Margaret Homerding, shellfish biologist for the Nisqually Tribe, measures a prawn during the tribe’s shellfish surveys of South Sound.

E. O’Connell

Wildlife Takes Advantage of Restored Elwha



T. Royal

A captured mouse is measured on the banks of the Elwha River for a study of how small mammals are using the restored habitat.

The Lower Elwha Klallam Tribe is studying how wildlife might help or hinder growth of new vegetation along the restored Elwha River.

“We hope our research not only provides interesting data on how wildlife recolonize newly exposed habitats, but that our results will also help

resource managers explore ways to incorporate wildlife into restoration planning,” said Kim Sager-Fradkin, the tribe’s wildlife biologist.

The tribe is watching how small mammals, elk, deer and birds are taking advantage of the newly opened plains of the former reservoirs of lakes Aldwell and Mills, in partnership with Olympic National Park, the U.S. Geological Survey and Western Washington University (WWU).

For the next three years, biologists will study which small mammal species are recolonizing the reservoirs and how their presence might alter revegetation efforts because of their tendency to either cache or consume seeds. In addition, to determine how much of the

small mammal population is using the reservoirs, for six weeks every fall, biologists are trapping animals such as mice, shrews and voles and noting species, sex, weight and length.

Biologists also will determine whether birds move seeds within the reservoirs to help naturally revegetate the area. Part of this work includes a WWU graduate student studying logs where birds perch and leave scat.

They are also locating scat samples from predators and other animals that eat seeds, such as bears and raccoons, and marking their location to see if the seeds germinate in the reservoir. – T. Royal

Tribe Tracks Woody Debris Floating Down Elwha

The Lower Elwha Klallam Tribe is tagging large woody debris moving through the newly restored Elwha River system.

“We’re tracking over 2,000 logs and tree stumps with silver tree tags, from the upstream end of Lake Mills to the river mouth,” said Vivian Leung, a doctoral student of geomorphology at the University of Washington.

She’s been working with the Lower Elwha Klallam Tribe since 2012 to study how large wood debris has affected the river during and after the removal of the river’s two fish-blocking dams.

“Not only did the dams completely block the supply of sediment downstream, but they also altered the transportation of large wood,” said Mike McHenry, the tribe’s habitat manager. “Both elements are critical for habitat-forming processes not only in the river but in the nearshore. The fate of wood is relevant to the recovery of the river and its aquatic resources,

especially salmon.”

As the dams came down, the Aldwell and Mills reservoirs were drained, leaving behind thousands of logs and tree stumps that had been buried under sediment and water for the past century. The natural action of the river transports the logs and stumps throughout the new riverbed, changing the dynamics of the river and creating better salmon habitat.

Leung is interested in how logjams form and affect channel patterns, how wood is transported through rivers and how the pools they create provide places for salmon to rest, feed and spawn.

“Surprisingly, there’s still a lot of research to be done to understand how large wood debris interacts with river systems,” she said. “So far we have found that logjams and salmon habitat are forming significantly faster in Aldwell than we expected.” – T. Royal



T. Royal

A helicopter transports logs within the former Lake Mills reservoir to help re-establish fish habitat in the river.

Eelgrass Comes Back to Bainbridge

Suquamish Tribe, agencies restore former creosote plant site with eelgrass transplants

Work started this fall on the final phase of a major eelgrass restoration project just outside Eagle Harbor on Bainbridge Island.

The project is at the site of the former Milwaukee Dock, near Pritchard Park. The dock, removed in the early 1990s, historically served the Wyckoff creosote plant; the area is now a federal Superfund cleanup site.

The dock was constructed in a dense subtidal meadow of eelgrass, which was further degraded by navigation channels that left two large depressions too deep for eelgrass to flourish.

Eelgrass is recognized as one of the most valuable ecosystem components in Puget Sound. This project will contribute to the Puget Sound Partnership's goal of increasing the amount of eelgrass habitat by 20 percent over the current baseline by 2020.

"The importance of eelgrass meadows to salmon and other fish and invertebrates is well documented," said Tom Ostrom, salmon recovery coordinator for the Suquamish Tribe. "The depth of these depressions is what has prevented eelgrass from growing. Because the surrounding eelgrass is so dense and so robust, it makes this site a prime candidate for restoration."

The Elliott Bay Trustee Council, which includes the tribe, began restoring the smaller of the two depressions

in 2012; the larger depression was filled in this fall. The work was coordinated by the National Oceanic and Atmospheric Administration.

Scuba divers from the Pacific Northwest National Laboratory in Sequim, which transplanted the eelgrass, will monitor the restoration site annually for at least five years to document how well the eelgrass is growing and to assess the overall success of the project.

The first phase of the project, restoring the smaller depression, was funded by the Elliott Bay Trustee Council from funds set aside for restoration efforts under a legal settlement with Pacific Sound Resources. The settlement addressed natural resource damages resulting from the contamination at two Superfund sites in Puget Sound, including the Wyckoff facility in Eagle Harbor.

Most of the funding for restoration of the larger depression was from a \$1.76 million grant awarded to the Suquamish Tribe from the Puget Sound Partnership through the Puget Sound Acquisition and Restoration Fund, a state fund program targeting high-priority restoration projects that benefit salmon recovery. The grant is administered by the Washington State Recreation and Conservation Office. The U.S. Army Corps of Engineers managed filling the larger depression. — *T. Royal*



T. Royal

Sam Payne, with the state Department of Natural Resources, holds up an eelgrass transplant ready for planting.

Eelgrass Facts

Scientific name: *Zostera marina*

- True flowering plant.
- Eelgrass meadows have high primary production rates and are the base of numerous food webs.
- Roots and rhizomes stabilize the seabed.
- Meadows contribute to oxygen levels, both above and below the seabed.
- Used for foraging, spawning, rearing, and as migration corridors by many fish and invertebrate species, marine mammals and birds.
- Isolates carbon, reducing the effects of ocean acidification.

Snorkeling for Elusive Coho in Deschutes



E. O'Connell

Squaxin Island Tribe snorkelers Candace Penn and Michael West float a tributary to the Deschutes River looking for juvenile coho.

“Finding where salmon rear in the Deschutes is the single largest data gap in proceeding with much-needed habitat work.”
– Scott Steltzner, Squaxin Island biologist

The Squaxin Island Tribe is conducting snorkel surveys throughout the Deschutes River watershed, looking for stretches where coho go to feed and grow.

Every spring for the last three years, the tribe has released 30,000 juvenile coho into the Deschutes. They then follow up for months with snorkel surveys to see where the fish go.

“What we’re looking for is coho habitat to protect and restore,” said Scott Steltzner, salmon biologist for the tribe. “Obviously, the coho know where the best coho habitat is.”

The problem is, low runs of coho to the Deschutes in recent decades mean there aren’t even enough coho to count.

“We can guess what sort of habitat coho want, but the best way is to get out there and find out first hand,” Steltzner said. “But to find where the good coho habitat is in the Deschutes, we need to put some coho in the river first.”

Because coho salmon spend an extra year in fresh water before heading to the ocean, they are more dependent on that habitat than other salmon species.

In the past, the Deschutes River was the largest producer of coho in deep South Sound. Coho have been returning in low numbers for more than 20 years since a landslide sent tons of sediment into the river.

“The landslide wiped out coho in their main stronghold on Huckleberry Creek and they haven’t been able to re-establish themselves since,” Steltzner said.

New forest practice rules put into place since the landslide would likely prevent the same type of catastrophic event from happening again.

The tribe will use the information from the snorkel surveys to plan on-the-ground restoration and protection efforts.

“Finding where salmon rear in the Deschutes is the single largest data gap in proceeding with much-needed habitat work,” Steltzner said.

Because the upper Deschutes River is relatively undeveloped – less than 10 percent has been paved over – it’s still possible to restore salmon habitat and productivity.

“There is a chance here to restore salmon productivity to historic levels,” said Andy Whitener, natural resources director for the tribe.

“Our way of life, our culture and economy have always been based around natural resources,” Whitener said. “Protecting and restoring salmon habitat is the most important thing we can do to restore salmon in the Deschutes and protect our treaty right to fish.” – E. O’Connell

Camera Counts Fish by Centralia Diversion Dam

The exact number of steelhead migrating up and down the Nisqually River always has been a mystery.

This year a new camera installed by the Nisqually Tribe at a diversion dam will allow fish managers to get a handle on the population of endangered fish.

The camera is located at a fish ladder at the city of Centralia's diversion dam on the Nisqually and will take a picture of every fish swimming by.

"We'll be able to identify the species and size of the fish as it goes by," said David Troutt, the tribe's natural resources manager.

While every fish species will be counted, the tribe is most interested in steelhead.

"Despite intense surveys throughout the winter and fall, we have a hard time getting a good idea of how many steelhead come back each year," Troutt said. "The only real way to know how many there are is to count them."

Centralia staff worked with the tribe to install the camera, lowering flow through the fish ladder for a few hours.

"We've been working with the tribe for decades to maintain the health of salmon in the river," said M.L. Norton, general manager of Centralia City Light. "The camera project fits perfectly with our vision of conserving the river's resources."

Because of glacial sediment clouding the water, the camera will only be able to identify fish species between February and August, when the bulk of the steelhead run is returning. The tribe operates a weir in the lower river during the fall that allows them to count chinook.

Nisqually steelhead are part of a Puget Sound-wide population that was listed as threatened under the federal Endangered Species Act in 2007. Nisqually steelhead populations have fallen from more than 6,000 to fewer than 1,000 in the past 20 years, despite relatively good habitat in the Nisqually River.

The tribal harvest on steelhead closed 20 years ago and sport fishermen stopped fishing for them seven years ago.

"In particular, these fish have great habitat in the upper watershed, above the Centralia diver-



E. O'Connell

Tom Friedrich, Nisqually natural resources technician, installs a camera in the fish ladder at the Centralia diversion dam.

sion," Troutt said. "The camera will give us an idea, year to year, how many fish are actually able to use that habitat."

– E. O'Connell

Generations

Jack Kalama picks a gillnet on the Nisqually River in the 1950s.

According to Jack's son Joe Kalama, the family spent weeks camped on the Nisqually River each fall. Jack poled his canoe up the Nisqually, setting nets and then allowing the river's flow to pull him back downstream.



Courtesy of Nisqually Tribal Archive

Point Julia Cleaned Up

The Port Gamble S’Klallam Tribe has spent 2014 improving the health of Port Gamble Bay, especially Point Julia, where tribal members regularly gather to exercise their treaty rights.

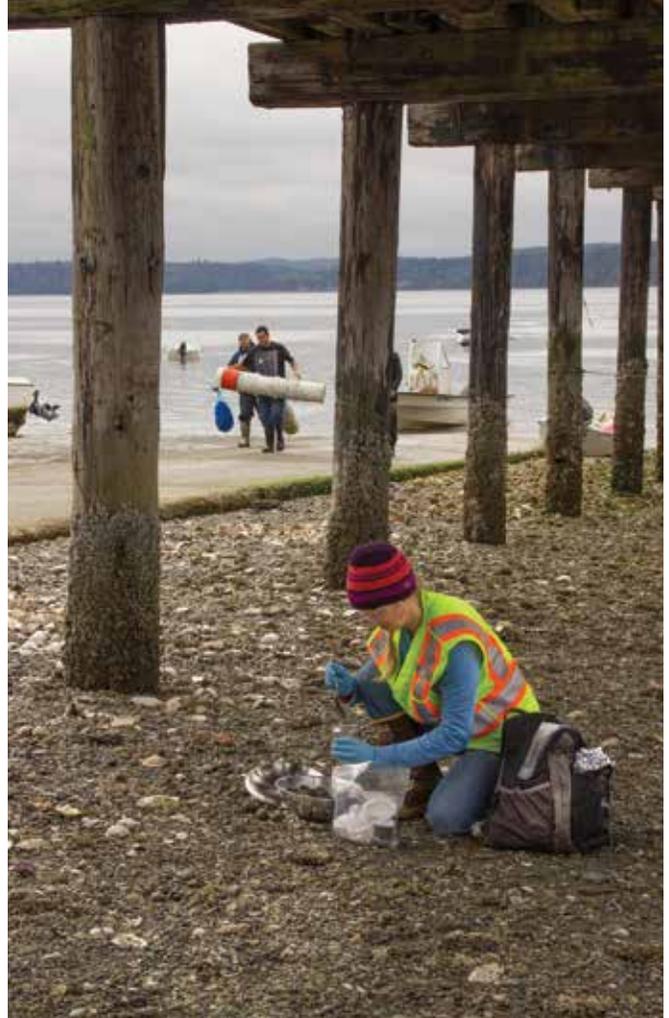
The tribe has been working through a list of more than 400 items for removal, including old creosote pilings and derelict fishing gear, on the beaches north and south of Point Julia. Also on the removal list was a large rusting barge north of Point Julia, a dilapidated pier and an old concrete boat launch, all of which were removed this fall.

“We had an intern from Northwest Indian College develop this comprehensive database of all the derelict gear and debris in the bay, which has really helped show how much is actually out there,” said Ahmis Loving, an engineer contracted by the tribe to develop the cleanup plan. “It’s providing a unique tracking system for identifying, locating and ensuring the removal of debris.”

Prior to this summer’s cleanup, a 2011 study identified sources of contaminants at Point Julia such as the creosote pilings and barge with lead-based paint, making the cleanup work even more of a priority for the tribe.

“Getting rid of all this debris will improve beach habitat for fish, shellfish and the residents, both tribal and non-tribal,” Loving said. “A big motivator was to remove the primary sources of contaminants, such as the creosote pilings from the pier and the rusty barge.” – *T. Royal*

Environmental consultant Devon Hayes take soil samples beneath the Port Gamble S’Klallam Tribe’s Point Julia pier, which was later demolished as part of the tribe’s cleanup project.



T. Royal

Makah Tribe Closes Old Dump, Adds Transfer Station

The Makah Tribe has successfully lobbied the federal Environmental Protection Agency (EPA) to add its Warm House Beach dump to the Superfund National Priorities List.

After years of effort, the tribe closed the dump that was used by the U.S. Air Force beginning in the 1970s for dumping household, solid and hazardous waste.



D. Preston

The Makah Tribe’s transfer station, above, has replaced a dump site that was recently put on EPA’s Superfund National Priorities List.

After the closure of the air base in the 1980s, the tribe used the dump for their waste needs until it closed in 2012, when a transfer station opened on the reservation. The dump is located three miles northwest of Neah Bay on a ridge that drains into the Strait of Juan de Fuca.

“We really want that dump material removed and cleaned up,” said Steve Pendleton, Makah environmental program manager. “Warm House Beach, which is directly below the dump area, is an important cultural site where we have harvested mussels, sea urchin and other seafoods.”

The beach is also a historic fishing camp.

The EPA has found elevated levels of perchlorate, lead, cadmium, manganese, copper and zinc in the soils of the dump and in the sediments in the creeks draining from the area. Mussels on the beaches also contain elevated concentrations of lead.

The tribe’s transfer station features a trash deposit area and a place to leave reusable items.

“Folks used to comb through the dump for items for their projects, so we created an area to leave gently used items that we keep orderly to continue that recycle-reuse idea,” Pendleton said. – *D. Preston*



K. Neumeyer

Migration of the Sauk River as a result of climate change could threaten the Sauk-Suiattle Reservation.

Climate Change Threatens Sauk-Suiattle Reservation

The Sauk-Suiattle Indian Reservation, including residential housing and tribal administrative offices, is at risk from flooding and erosion, according to an assessment performed by Natural Systems Design.

The assessment looked at the impacts of climate change to both tribal infrastructure and the Sauk River ecosystem that supports fish and wildlife critical to the tribe. Natural Systems Design studied the flows and flooding of rivers, glacial melting and the impact of climate change in the valleys.

The reservation lies within the channel migration zone of the Sauk River and eventually could suffer catastrophic losses when the river channel moves into developed areas. Within the next 80 years, the magnitude of flooding is expected to increase 50 percent and the frequency more than double.

“The tribe currently has no defenses to stop the river from migrating into residential housing and tribal offices,” the assessment states. “Because of the warming climate this scenario is much more likely and poses an unacceptable level of risk to the Sauk-Suiattle Tribe over the next several decades. Severe and irretrievable damages, and possible loss of life, are an inevitable consequence of failing to move residents and facilities out of their current location.”

The tribal council has reached out to other governments for assistance obtaining additional lands, access to lands and putting lands into trust status with the federal government.

“Ideally, we would move the entire reservation,” said Jason Joseph, Sauk-Suiattle natural resources director. “The results of this study will assist in that effort. However, we still have to maintain our tribal lands in the meantime.” – K. Neumeyer

Read the report online at go.nwifc.org/saukclimate

Nooksack Dedicates Totem to School District

The Nooksack Indian Tribe dedicated a totem pole to Nooksack Valley Middle School in November. The pole was created by master carver George Swanaset Sr. from a cedar donated by the Muckleshoot Tribe. The gift recognizes a shared commitment to education and a strengthened bond between the tribe and the school district.

The carver’s son, George Swanaset Jr., is the tribe’s historic preservation officer and attended the middle school as a child. After the dedication ceremony, he said, “I never thought we would have heard these songs and saw these dances here, in this gym.”

From top to bottom, the pole depicts a thunderbird, mountain goat, and a lady cradling two children. Below, Nooksack Valley Middle School students examine the lady at the base of the pole.



K. Neumeyer

WALKING ON

Todd Wilbur

Swinomish tribal member Todd Wilbur, director of fish and game enforcement for the tribe and board member of the Skagit River System Cooperative, passed away Nov. 17.



Wilbur also was chairman of NWIFC's inter-tribal wildlife committee.

He was born in Pasco, Wash., on Nov. 12, 1959. He is survived by his parents Gwynn (Jones) Amaro and Dave Wilbur Sr.

Wilbur earned his associate's degree in fisheries science from Bellingham Technical College. In 1982 he was hired by the Swinomish Indian Tribal Community as a wildlife game manager and worked there for 31 years. He was instrumental in protecting tribal treaty hunting rights and he helped to increase the Nooksack elk herd in 2010.

He was preceded in death by his wife, Susan (Edwards) Wilbur, as well as his grandparents and granddaughter Rachel Bobb.

Survivors include his brothers Dave Wilbur Jr., Norman Wilbur and Eleazar Wilbur Salinas; sisters Leslie Renee Wilbur, Elizabeth Wilbur and Laura Wilbur; son James Bobb; daughter Brenda (Bobb) Williams; granddaughters Siomi Bobb, Kiana Williams and Alexis Bobb; and grandsons Ronald Williams III, James Bobb Jr. and Masen Williams.

Forest Thinned for Elk Forage

The Upper Skagit Indian Tribe's natural resources department thinned and mulched forestland on Puget Sound Energy (PSE) property this fall to improve elk forage in the North Cascades mountains.

Degraded and disconnected habitat is one of the main causes of the decline in numbers of the Nooksack elk herd, which went from a population of more than 1,700 in 1994 to about 300 in 2003. Since then, tribal and state co-managers have improved elk habitat in the region. Annual population surveys indicate that the herd is showing signs of recovery.

"Elk need a corridor of habitat that is rich in forage to keep them from becoming nuisances in populated areas," said Scott Schuyler, natural resources director for the Upper Skagit Tribe.

PSE acquired the land from the Department of Natural Resources as part of the mitigation requirements of

the 2008 relicensing agreement with the Federal Energy Regulatory Commission for the utility's Baker River Hydroelectric Project.

A crew used chainsaws to remove hundreds of trees on about 3 acres of land and 1,500 feet of road. The trees, mostly small Douglas fir, were then put through a wood chipper to mulch the dry, rocky soil.

"We needed to remove enough of the canopy to let light in so grasses can grow," said Upper Skagit timberland services manager Robert Schuyler. "The trees we left can be harvested later for a commercial crop."

The mulched ground was seeded with grasses, clover and small burnet.

"There's no forage out here, it's all knee-deep salal, Oregon grape and sword fern, which elk don't eat," said Tony Fuchs, PSE wildlife biologist. "Once we get grasses and clover established, elk will find a better place to forage." – K. Neumeyer



Robert Schuyler, Upper Skagit Indian Tribe

A crew for the Upper Skagit Tribe chips trees that were cut down on PSE property to thin the forest for elk habitat. The chips will mulch the soil to improve the quality of elk forage.