

# *Northwest Indian Fisheries Commission*

# NEWS



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# Sum Of Chum's Value Greater Than Parts

Indian fishermen have always valued chum salmon – the entire salmon. But many players in the commercial fish market don't value the whole fish. The current market for chum lies not in the flesh, but in the eggs. And that demand has led Skokomish tribal fishermen to conduct their commercial fishery at the Hoodspout Hatchery as an egg-take fishery. "One of the only ways for Indian and non-Indian fishermen to make any money is to catch salmon solely for their eggs," said Dave Herrera, fisheries manager for the Skokomish Tribe. "It's a supply and demand economy, and tribal fishermen are simply supplying what the market is currently demanding."

Chum salmon don't require much time in fresh water, making the fish much easier and cheaper to produce at hatcheries than other species, such as chinook and coho. Because the fish mature quicker and are released earlier, the Washington Department of Fish and Wildlife's Hoodspout hatchery can produce larger quantities of chum. That has led to a very successful chum salmon program at the hatchery, where large runs continue to return each year. In fact, this year's run may reach 3 million fish, the largest return in almost a century.



Gussy Blacketer, a Skokomish tribal member, fills a bucket with chum salmon eggs during a tribal fishery at Hoodspout Hatchery. *Photo: D. Friedel*

times around \$5 per pound. Chum eggs are considered a delicacy in Asia and Europe and are particularly desirable in the caviar market because of their large size and ability to retain their shape. The eggs are processed locally and are shipped to foreign markets either fresh or frozen.

By the time the chum run makes it back to the hatchery area – one of the few places the tribe is allowed to harvest salmon – the fish have lost their bright silver color and their flesh is less desirable. For salmon in this condition, Indian and non-Indian fishermen would have a tough time finding a market for the whole fish even if there was a demand for chum salmon.

Market or no market, however, the tribe will continue to fish. Not only are salmon economically important to tribal

fishermen, they also are a vital piece of the Skokomish culture. Salmon fill smokehouses and are given to elders and others who can't fish. They are used in traditional ceremonies. They are donated to social service agencies and food banks. Most importantly, however, is the act of fishing, which preserves the tribe's culture.

"Fishing is part of who we are," Herrera said. "So, regardless of the type of fishery, it is important to Skokomish tribal members, who will continue to harvest fish and shellfish in our usual and accustomed fishing areas."

Not all of the chum salmon can be used by the tribe or given away. Still, the carcasses are put to good use. The fish are returned to Hood Canal, where they add nutrients to the ecosystem and become meals for crab, shrimp and bottom fish.

"It's also important to remember that not all salmon stocks are struggling," Herrera said. "In fact, the wild Hood Canal fall chum run is one of the most robust salmon stocks in the Pacific Northwest. And this year we had another good return." – *D. Friedel*

**'Fishing is part of who we are.'**

– *Dave Herrera*  
*Fisheries Manager,*  
*Skokomish Tribe*

Due to a glut of foreign farmed fish on the market, fish buyers are paying pennies per pound for salmon. Yet their eggs can fetch a decent price on the foreign market, some-

# *Pasture Becomes Salmon Habitat*



Students from Wah-He-Lut School welcome the incoming tide to newly created wetlands on the Nisqually River delta. *Photo: T. Meyer*

Removal of a dike by the Nisqually Tribe has allowed the rhythmic motion of the tides to enter 31-acres of estuary for the first time in nearly a century. “What we have done is allow the Nisqually River and the Puget Sound to interact in a way they haven’t in a long time,” said Jeanette Dorner, the tribe’s Salmon Restoration Program Manager. “This project opened up some important and scarce salmon habitat.”

Like many other tidal estuaries in

western Washington, the Nisqually was diked off in the early 20<sup>th</sup> century to provide land for farming or other uses. “If all of the diked estuaries in the Nisqually basin were restored, we could double the population of wild chinook salmon,” said Dorner. Nisqually River chinook are listed as “threatened” under the federal Endangered Species Act. In addition to chinook, coho, chum, and pink salmon, steelhead and cutthroat trout also depend on the Nisqually estuary.

“In addition to being the most important step we need to take to restore salmon in the Nisqually, it is also the most cost effective,” said Dorner.

Besides the 31-acre parcel opened up this summer, the tribe in 1996 opened up an 8 acre parcel on Red Salmon Slough in the estuary. “From what we saw from that experience, there was a high rate of success in opening up estuaries,” said Dorner.

Because of the unique life cycle of salmon, in which they move from freshwater to saltwater habitats, estuaries are key to their long-term survival. Salmon undergo a physiological change while in freshwater, which enables them to live in saltwater.

Young salmon from other rivers, not just the Nisqually, will also likely benefit from the newly opened estuary, said Dorner. “We’ve found salmon from as far north as the Green River using the Nisqually estuary,” she said. “That showed us how important these habitats really are.”

“It was so exciting to watch the tide come into the pasture and cover an area that hadn’t had saltwater for over 100 years. The shorebirds came in to feed immediately and we could see little fish jumping in the water,” said Georgianna Kautz, Nisqually tribal fisheries manager. “We are confident that now that we have removed the dikes Mother Nature will start taking care of herself again and fully restore the site.”

– E. O’Connell

## *NWIFC News Expanded*

You’ll note some changes to this edition of *NWIFC News*. First, we’ve expanded the total number of pages from 12 to 16. This will enable us to provide more coverage of the many natural resource management activities of the treaty Indian tribes in western Washington.

We’ve also added a new item called “Generations,” featuring historical photographs from NWIFC member tribes.

NWIFC Chairman Billy Frank’s column, “Being Frank,” has been moved to Page 5 and will appear there regularly.

This issue’s cover photograph shows sockeye salmon in the Adams River, a tributary to the Fraser River in British Columbia. Nine treaty tribes in western Washington harvest the fish, which are managed under a treaty between the U.S. and Canada. The photo was taken by Mike Grayum, director of the Fisheries Services Division of the NWIFC.



# 'Salmon Soldiers' Lend A Hand



Pvt. Kenneth Harmon passes a female chinook for spawning at the Nisqually Tribe's Clear Creek Hatchery. *Photo: E O'Connell*

On any given day, he might be practicing for war, but today Sgt. Ken Gutierrez is helping the next generation of salmon. Gutierrez wades through waist deep water, removing a few dead salmon from the adult holding pond at the Nisqually Tribe's Clear Creek Hatchery. It's the peak of the spawning season at the hatchery, which is located on both the Nisqually Indian Reservation and the Fort Lewis Military Reservation. "Its fun doing this; every time I'm out here I learn something new," said Gutierrez, whose permanent home is in Salem, Ore., and who often fishes the Columbia River. "I love salmon; this is a great way to help out."

Ever since the tribe began operating their Clear Creek Hatchery, it has grown in profile with the local military community. "We are good neighbors; we have had a close relationship with the Army for a long time," said Georgianna Kautz, the tribe's Natural Resources Manager. It wasn't long after the hatchery opened in 1991, said hatchery manager Bill St. Jean, that soldiers started asking if they could pitch in. "Hey, the more the merrier," he said of the military aid in the often grueling work.

"It's a lot of fun, getting hands on with the fish," said Sgt. Sean Humble, who has been volunteering at the hatchery for the past two years. Like many soldiers who come down to the hatchery, Humble's first intention was just to pick up some free fish which the tribe gives away after obtaining

eggs and milt. "One of my friends told me about the free salmon, and I was just standing in line for some fish. Next thing you know, I'm down there handling them."

Soldiers and their families make up most of the crowd who show up for free salmon on spawning days. The tribe has been distributing salmon at their Clear Creek and Kalama Creek hatcheries for several years; they also contribute to local food banks and neighboring communities. "It has been amazing what kind of response we've had in the past few years," said Kautz. "Sometimes it's been on the magnitude of hundreds of people, almost three times a week."

"It's a very good thing that they give these fish away," said Teresita Frisbee from Spanaway, who has been here every day they have been

available. This is her first year coming to Clear Creek. "I love fish and this is a very nice place. It's a great thing that absolutely nothing goes to waste, everything gets used."

**'We're happy that so many good things can come out of reviving the salmon runs on the Nisqually River.'**

*– Georgianna Kautz,  
Natural Resources Manager,  
Nisqually Tribe*

In recent years, the tribe has seen increasing amounts of fish coming back to their hatcheries. "Since 1996, both hatcheries have been self sustaining; we haven't imported any outside salmon eggs into the basin," said David Troutt, tribal Natural Resources Director. "Nisqually hatchery chinook are adapting to this river, which is one of the reasons our returns have been so good."

"The goodwill that is sown with Fort Lewis and the surrounding communities is a great fringe benefit of the Clear Creek Hatchery," said Kautz. "We're happy that so many good things can come out of reviving the salmon runs on the Nisqually River." – *E. O'Connell*

# Democratic Process The Winner

By **Billy Frank Jr.**  
**NWIFC Chairman**



In the weeks after the general election, the writing is still on the wall. The tribes are a political force to be reckoned with.

This is true here in Washington, just as it is true in other parts of the country. In South Dakota, for example, tribes have been credited with winning re-election for U.S. Senator Tim Johnson in the recent election. That was a victory worth celebrating.

Just as worthy of celebration is the defeat of Jim Johnson in his bid for position 3 on the Washington State Supreme Court.

It would have been a travesty for this man to gain a seat on the state's highest court. He held himself up as a champion of citizens' rights and of the Constitution. He even presented himself as a green candidate, a self-proclaimed expert in fish and wildlife management. In actuality, none of these claims were true. Yet he almost pulled the wool over the eyes of the public, just as he did several newspaper editorial boards.

The fact is that he is an "Indian fighter"—a long time opponent of Indian rights, as evidenced by his quarter century history of litigating against the tribes in Washington, as well as in other states across the country. It was clearly important for the tribes to take action. Working through the First American Education Project – the same coordinating entity used to help deny Slade Gorton re-election – tribes raised enough money to produce and run a television ad. In a clear but succinct way, the public was informed that the camouflage Jim Johnson was using in an effort to portray himself as a middle-of-the-road candidate was deceptive. Working with the Washington Conservation Voters, tribes reached out and told people that he was an enemy of the environment as well as the tribes, and that he was too extreme for the State Supreme Court. The tribes also reached out through further networking, email campaigns, letters, calls and news releases. And, after all the votes were in and Mary Fairhurst was declared the victor in the campaign, even Johnson himself said the campaign was lost because of the tribal/environmental effort. That was no small achievement, given the fact that Johnson campaigned with great vigor and almost evangelical enthusiasm.

As one newspaper reported, the ultimate winner in the campaign was the democratic process. The tribes had to convey the message, but voters had to cast the ballots. Tribal members gladly exercised their right to vote because they know every vote counts. When tribes unite, and develop networks of support, it speaks loudly in the political process. But the credit for denying a seat on the state's highest court to someone with Johnson's record belongs to all the voters who demonstrated their understanding of true democratic values and human rights by voting for his opponent.

## Northwest Indian Fisheries Commission News

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# Tribe Drawing Map To Nearshore Restoration

Looking for sandlance eggs is a lot like panning for gold; the methods are the same and the results might be just as valuable. Michelle Stevie, a habitat biologist with the Squaxin Island Tribe, sifts a mixture of beach gravel and sand, separating out larger rocks so she can find much smaller sandlance roe. The sandlance is an important food fish in the life cycle of salmon; they spawn on sandy beaches that mark critical habitat for the restoring wild salmon stocks.

“Wherever sandlance are found spawning, eventually juvenile salmon will be found feeding,” said Stevie. “By finding where species such as sandlance, surf smelt and herring are, we can draw a more accurate map of the nearshore environment.”

The Squaxin Island Tribe and Washington Department of Fish and Wildlife have partnered to prepare a map of the nearshore environment for much of Mason County, showing how it can be protected to help restore failing salmon populations. The nearshore is the swath of submerged land roughly 30 feet below the lowest average tide that is always exposed to light. The study area includes East Case Inlet, and Pickering, Squaxin, Peale and Dana passages. The tribe will also be providing forage fish survey assistance to Thurston County Regional Planning for their nearshore assessment project.

The tribe, with a grant from the Salmon Recovery Funding Board, is taking inventory of nearshore habitat in hopes that the most valuable habitats can either be restored or protected. “This is an important first step in preserving and bringing back nearshore habitat in south sound,” said Jim Peters, the Squaxin Island Tribe’s Natural Resource Director. “Because so



Michelle Stevie, Squaxin Island Tribe habitat biologist, is assisted by volunteer Jim Heimburg in sifting beach gravel to find tiny sandlance eggs. Photo: E. O'Connell

little is known about how salmon interact with the nearshore, every piece of research is important for us to bridge that ‘data gap.’ ”

Due to the intensive shoreline development of many of these areas, there has been a dramatic change in shoreline functions, including changes in substrate composition and loss of shoreline vegetation, which negatively impact forage fish habitat. Available eelgrass and other seaweed beds, estuaries, adult holding areas and forage fish spawning areas will all be mapped and assessed. “The habitat we’re looking at is a very important contributor

in the life cycle of salmon,” said Stevie.

Estuarine and nearshore habitat is essential for salmon survival. It is a key transitional zone for the physiological transition to the marine environment and provides important opportunities for juvenile salmon to achieve a larger size before moving offshore. These areas are especially important for chinook and chum salmon, which tend to depend heavily on estuaries for juvenile rearing. In addition to its importance to Puget

Sound chinook, listed as “threatened” under the federal Endangered Species Act, the nearshore habitat being studied also supports coho, chum, steelhead and cutthroat trout.

Restoration projects could include restoring beach and estuary functions or adding sand and gravel to existing beaches and marshes. “We need to look at habitat restoration in a big picture sense,” said Peters. “By taking into consideration as much of the salmon life cycle as possible, we’re helping sustain harvestable populations of salmon. Increased salmon populations will help not only tribal harvesters, but everybody interested in the future of salmon.” – E. O’Connell

## Sandlance Fast Facts

- Scientific name: *Ammodytes hexapterus*, which literally means “dive or burrow into sand.”
- Sandlance are important food for young salmon: 35 percent of juvenile salmon diets are composed of sandlance. Juvenile chinook salmon depend on sandlance for 60 percent of their diet.
- When not buried in sand, this fish swims around with hundreds to thousands of other sandlance in large schools.
- Sandlance spawning occurs at high tide in shallow water on sand or gravel beaches.



# Quileute Tribe Conducts Extensive Water Quality Monitoring Program

Bobbing rhythmically with the incoming waves, Quileute tribal fisheries technicians Brent Ramsey and Gene Gaddie seem oblivious to the currents of chaos created where the Quillayute River meets the Pacific Ocean. They calmly drop the anchor of their small boat within the river mouth and begin to work.

The two men are taking water quality measurements in the mouth of the Quillayute River as part of a renewed water quality program. The Quillayute system doesn't have the headline-grabbing water quality problems such as a big industrial polluter. Instead, non-point source pollution - such as pollution from surface run-off rather than from a pipe - is the primary local issue.

The Quillayute River system is vast, with four major rivers draining into it. The tribe depends on the river system for its salmon fishery, vital for subsistence, ceremonial, and commercial catch. Monitoring the quality of these waters is critical to protect the fish resources that are so important.

While the tribe has conducted extensive water quality monitoring in the past throughout the Quillayute system under U.S. Environmental Protection Agency (EPA) funding, some six years have passed since that project. Again with EPA assistance, they are now embarking on a major training program that involves use of sophisticated, state-of-the-art devices that actually program data results into spreadsheet format. The devices measure factors such as salinity, temperature and dissolved oxygen.

The grant from EPA includes classes from a U.S. Army Corps of Engineers consultant for the river and from the manufacturer of the data-reading device. "It's been very interesting taking the classes and learning to use the equipment," said Gaddie, fisheries technician for the Quileute Tribe. He looks forward to learning to use the data they collect to create the "big picture" about water quality in the areas they are monitoring.

The work that tribal technicians are undertaking adds a new skill to previous water quality work by the tribe that included collection of insect larvae in stream beds and taxonomic identification. These macro-invertebrates are important indicators of water quality, since some species require clean water and others flourish under polluted circumstances.

"Ultimately, with the data, we will be able to better protect the salmonids that enter the four major river systems through the Quillayute mouth and estuary," said Krueger.



Brent Ramsey, Quileute fisheries technician, gathers water quality data near the mouth of the Quillayute River.  
*Photo: D. Preston*

"Also, as we complete habitat restoration efforts, we can monitor water quality for the effectiveness of those restorations. We are already adding water quality assessment to our smolt trapping projects throughout the Quillayute system. Finally, this work will help the tribe move to other goals like development of water quality standards to protect reservation waters at the mouth of the Quillayute River," she said. - *D. Preston*

## Grant Will Expand Tribe's Plant, Add Processing Jobs

A federal grant awarded to the Suquamish Tribe will go toward expanding a seafood processing facility, which will lead to more jobs.

The \$466,468 Rural Business Enterprise grant from the U.S. Department of Agriculture will be used to build a 5,650-square-foot plant on the tribe's land along the Highway 305 corridor. The current geoduck processing facility, which is inside the tribal center, employs five full-time and six part-time workers. The new processing plant should allow the tribe to add 11 new full-time and 20 part-time employees, said Salwa El Habib, grant development specialist for the tribe.

The larger facility will aid the tribe's geoduck marketing effort and allow for the expansion of operations to other shellfish species, said Habib.

# Tribe, Landowner Work To Restore Habitat



Paula Suter estimates the size of a salmon in Dogfish Creek, which flows through her family's farm in Poulsbo. *Photo: D. Friedel*

For Paula Suter, it's important to bring salmon and wildlife back to the creek flowing along her family's farm in Poulsbo. Equally as vital as restoring Dogfish Creek's habitat is preserving it for the future.

So Suter, with the help of the Suquamish Tribe, the Mid-Puget Sound Fisheries Enhancement Group and the Kitsap Conservation District, applied for and received a \$30,000 habitat restoration grant from the Washington Department of Fish and Wildlife. Plus, as part of the restoration project, Suter and the Great Peninsula Conservancy are seeking a conservation easement that will permanently protect the habitat.

"We have about two acres of wetlands that we want to make sure stay undeveloped and remain a sanctuary for birds and other wildlife, especially salmon," said Suter. "But it was like a jungle down here and you couldn't really get to the water because of the invasive blackberries. We wanted to find the best way to bring the land back to its natural state and keep it that way.

So we looked into the habitat restoration grant and the conservation easement."

A conservation easement is a legal agreement between a property owner and a conservation organization or a government agency that permanently restricts the use of property to protect habitat. The easement outlines the rights of the landowner and the restrictions on the property.

**'We wanted to find the best way to bring the land back to its natural state and keep it that way.'**

*– Paula Suter,  
Property Owner*

"It's probably the single most important way of protecting the land in perpetuity. Once the easement is agreed to, it becomes part of the legal prop-

erty description, and that's a really good thing when it comes to protecting fish and wildlife habitat," said Paul Dorn, salmon enhancement program manager for the Suquamish Tribe. "This also helps us with the salmon recovery work we are doing in the area right now."

That work includes studying salmon habitat at the mouth of Dogfish Creek in Liberty Bay. The National Marine Fisheries Service declared the creek critical habitat for Puget Sound chinook salmon, which are listed as "threatened" under the federal Endangered Species Act. Dogfish Creek also is habitat for coho and chum, as well as cutthroat and steelhead trout.

For the tribe, salmon are important economically and culturally. Recovery work on Dogfish Creek, where the Suquamish Tribe has harvested salmon for thousands of years, can help improve habitat and increase survival for that important resource, said Rob Purser, tribal fisheries director.

While some improvements are already noticeable, such as chinook spawning in the newly formed pools throughout the meandering creek, other benefits will become apparent over time. Habitat improvement does not take place overnight, said Dorn. But to help speed up the process, Suter plans to plant native vegetation and, eventually, create a small pond with downstream access for over-wintering habitat for fish.

"All the recovery work and the work on Dogfish Creek is extremely important," said Purser. "These landowners who are willing to put in place certain stipulations, which future property owners will be bound to, helps a great deal. They have made a big difference in our improvement project, which will help salmon and all the other wildlife along the creek." – *D. Friedel*



# Study Looks At Flooding's Effects On Salmon Nests



Nooksack Natural Resources biologist Tim Hyatt and technician Angel Rabang examine “scour chains” placed on the bottom of the Nooksack River. Photo: J.Shaw

“When you have a 90-pound load of rocks on your back, you want to be sure you don’t have to step over too many stumps,” says Tim Hyatt as he makes his way through the woods along the Nooksack River.

This is knowledge that seems apparent, but Hyatt and others from the Nooksack Tribe’s natural resources department have won this wisdom the hard way – packing stones, gravel and silt samples as part of a new study by Nooksack Natural Resources (NNR). The samples hold clues into the life of the spring chinook, and might just be signposts to recovery of the threatened fish.

The research NNR is undertaking will help determine to what extent floods in the Nooksack River undermine spring chinook survival rates. The findings, gathered from more than 20 sites along the north, middle and south forks of the river, could point the way to more effective recovery strategies for spring chinook, listed as “threatened” under the federal Endangered Species Act.

“Spring chinook are of extreme cultural importance to the Nooksack Tribe,” said Bob Kelly, director of Nooksack Natural Resources. “Saving these magnificent fish is our top priority, and this study is one important step toward that goal.”

When high water enters a system, it flushes the rocks on the bottom of the river to new locations. Since the average chinook salmon nest (or “redd”) is about 20 centimeters (not quite 8 inches) deep, people have speculated that floods are destroying the redds or smothering baby fish in their nests.

Besides examining stones, tribal staff have set almost 250 “scour chains” – devices which measure rock movement along the bottom of the river – to see just how much of the channel bottom is moving and destroying vulnerable salmon nests.

Data continues to come in, but some preliminary conclusions seem likely.

“If this year’s results resemble last year’s, we’re finding that redds in the mainstem and braided parts of the channel usually get wiped out by large floods,” said Hyatt, a biologist with NNR. “Redds in tributaries and backchannels have a much higher survival rate.”

This could be due to the absence of large woody debris. Scientists say that logs and other wood served as a natural bulwark against destabilizing floods in the past. Without it, the water rushes everywhere through the main channel, eliminating refuge for the fish and their nests.

“A lot of people say flooding is natural, and it is – but what isn’t natural is the absence of very large pieces of wood in the system,” said Hyatt. “If wood historically stabilized parts of the channel, we might be seeing the effect of that wood’s absence.”

**'Spring chinook are of extreme cultural importance to the Nooksack Tribe.'**

*– Bob Kelly,  
Director,  
Nooksack Natural Resources*

When fish populations are depressed, habitat disruptions are often found at the root of the problem. Efforts like this help tribes ensure their habitat restoration efforts work efficiently.

“The questions we set out to answer with this study could help us tailor our restoration dollars to maximum effectiveness in the future,” said Kelly.

The two-year study will conclude in September of 2003, and has been funded by a Salmon Recovery Funding board grant. – J. Shaw

# After A Century, Salmon Return To Upper Watershed

When salmon reach the Electron Dam, high in the foothills of Mt. Rainier, they have already shown themselves to be survivors. But, up until now, they have also remained a mystery.

A new fish trap operated by the Puyallup Tribe at the Electron Dam will show what effect the largest salmon restoration

project in western Washington is having on these high climbing fish.

Two years ago, through an agreement between the Puyallup Tribe and Puget Sound Energy, a fish ladder was built at the Electron Dam. The opening of the ladder marked the first time fish passage has been available at the dam for about 100 years.

“That was one of the first steps we took in making sure salmon can use as much of the Puyallup River as possible,” said Russ Ladley, the tribe’s Resource Protection Manager. “It’s important that we find out how many fish are using the ladder to get into the upper Puyallup.

“Because of this trap, we’ll see every fish entering the upper Puyallup watershed,” said Ladley. The custom-built trap was fitted about a third of the way up the fish ladder. As a result of the new fish ladder, spawning and rearing habitat available for salmon was extended an additional 30 miles. In addition to coho salmon and cutthroat trout, the upper Puyallup is home to chinook salmon and bull trout, both listed as “threatened” under the federal



Blake Smith, Enhancement Manager for the Puyallup Tribe, examines a coho salmon moving above the Electron Dam on the Puyallup River via a fish ladder.

Photo: E. O’Connell

Endangered Species Act. The local steelhead population is a candidate species for federal protection.

The first naturally spawning chinook salmon was spotted last September by spawning surveyors. Because surveys can only be performed on a limited number of streams above the dam, the fish trap will provide a much more accurate picture of total escapement, said Ladley. Some streams are too muddy due to glacial turbidity to spot salmon and others are inaccessible.

“When we opened the ladder two years ago, there were coho teeming at the base of the dam, waiting to get up,” said Ladley. “We know salmon are getting above the dam, we just can’t see them all the time.”

The fish trap is a part of a larger effort by the Puyallup Tribe to restore naturally spawning salmon in the upper Puyallup. Since 1997 the tribe has operated three juvenile salmon acclimation ponds above the dam, and has annually seeded the upper watershed with adult spawners from the Voights Creek Hatchery. “We’ve been putting chinook and coho up here for five

years; we want to know what is coming back,” said Ladley. The tribe will also radio tag some of the fish moving upstream through the trap so they can be followed directly to their spawning grounds.

“Knowing how productive the upper watershed is and how much our work has paid off, will show us where to focus our efforts in the future,” said Ladley. “The mission to restore the upper watershed salmon populations is by no means complete. This trap will help show us where to go next.”

– E. O’Connell

## Chinook/Puyallup River Fast Facts

- Chinook scientific name: *Oncorhynchus tshawytscha*.
- Common names: King salmon, tyee salmon, black salmon, chub salmon, hook bill salmon, winter salmon and blackmouth.
- Spawning usually occurs in deep, fast water with fist-size gravel. Average nest, or “redd,” sizes can range between 43 and 162 square feet, buried approximately 7 to 8 inches in the gravel.
- Four species of salmon – chinook, coho, pink and chum – in addition to several species of trout, live in the Puyallup River.
- The Puyallup River originates from the Puyallup and Tahoma glaciers on the west and southwest slopes of Mount Rainier; the river flows northwesterly through the Puyallup Valley to Commencement Bay.
- Tributaries to the Puyallup include the Carbon, White and South Prairie rivers.



## Generations

Quinault Indian Nation members harvest salmon near the mouth of the Quinault River in 1912. Cape Elizabeth is visible on the right side of the photograph by E. Curtis. Photo courtesy of Quinault Indian Nation Cultural Affairs. Watch for other historical photographs from the treaty Indian tribes in western Washington in upcoming issues of *NWIFC News*.

## Swinomish Complete Cleanup Of Hazardous Waste Site

A cooperative effort led by the Swinomish Tribe has helped render a dangerous waste site harmless, protecting public health and water quality on the tribe's reservation.

On Dec. 4, the Swinomish Indian Tribal Community celebrated completion of a \$4.5 million cleanup of 54,000 tons of chemicals and toxic soils from a serious hazardous waste site. Cleaning up the PM Northwest property is a significant step toward protecting water quality – the site is located over the lone source aquifer for the Swinomish Tribe's reservation.

Collaboration between the tribe, the federal Environmental Protection Agency, and two major oil companies led to the dangerous waste being removed and safely disposed.

"The completion of this cleanup demonstrates that by overcoming suspicion

and agreeing to work together we can accomplish great things," said Swinomish Tribal Chairman Brian Cladoosby. "The owners of the site, PM Northwest, Shell, ChevronTexaco, and EPA all deserve great credit for working beyond their comfort zone to find creative, collaborative solutions. We successfully avoided litigation and got the job done."

During the 1960s, waste chemicals from local petroleum refineries were disposed on the property. Potential hazards to groundwater were clear, given that drinking water wells exist within one-half mile of the PM Northwest property.

"Water quality is extremely important for people, animals and the environment," said Swinomish Fisheries Manager Lorraine Loomis. "Protecting

our water quality is an extremely high priority for Swinomish."

Besides working for 10 years on the site cleanup, the Swinomish Tribe also provided oversight of fieldwork on a daily basis. John Ryan, senior vice president with the strategic environmental management firm ReTec, praised local leadership provided by Swinomish.

"The tribe has really been phenomenal in this regard in my experience," Ryan said.

Since completion of the project, groundwater monitoring has indicated that contaminants have not seeped into the groundwater.

"This is a historic project," said Lydia Charles, tribal vice-chair. "Preserving our ground the way it should be is our goal." – *J. Shaw*



# Salmon Call Home On Way To Ocean

Once they migrate out to sea, scientists don't have much information on where salmon go and what they do. But now, researchers are getting a rare glimpse into the saltwater life of salmon.

Using innovative technology, the Squaxin Island Tribe is tracking juvenile coho throughout southern Puget Sound as they make their way out to the ocean. "We know that in general salmon leave Puget Sound and head out into the ocean and return after a few years," said Jeff Dickison, Policy Analyst with the Squaxin Island Tribe. "We've never been able to track them with this level of detail."

Using an array of acoustic receivers located south of the Tacoma Narrows Bridge, the tribe tracked a group of juvenile salmon as they made their way out to the ocean. "This is one of the first times anyone will get a near real time look at individual salmon in the saltwater," said Dickison. The pilot group of 48 will be followed up by nearly 200 coho this spring. "Last year we were making sure the technology was going to work for us. The real science starts in 2003."

A weak hatchery coho run in 1999 convinced the Squaxin Island Tribe that they had to find out what happened to the juvenile salmon once they were released from the tribe's netpen facility in Peale Passage. Although almost all other hatchery coho stocks that year in the Puget Sound came back at normal levels, south Sound hatchery coho returns were poor and no one knew why. "It wasn't freshwater mortalities; these salmon are kept in saltwater netpens until they're ready to be released," said Dickison. "It was something that had to happen out in the sound or out in the ocean."

When a tagged smolt passes between a pair of receivers, its individual frequency is picked up and can be tracked for several hundred yards. "If these salmon stay south of the Tacoma Narrows for any length of time, we are going to be able to gather a lot of detailed information," said Dickison.

Compared to earlier techniques of tracking salmon, such as coded wire tags inserted in the snouts of juvenile salmon, acoustic tagging is timelier and provides much more information. "With coded wire tags, you basically have two pieces of information: where the salmon was released and where it died, whether in a stream after spawning or after harvest,"

said Dickison. "But with acoustic tags, you can track many other aspects of salmon life in saltwater – for example, where a salmon might be feeding or how fast it travels through a particular area."

Even though the technology is fairly new – some experiments in British Columbia have also been performed in the

past few years – the south sound is a perfect place for it to get a test run, said Dickison. "There is only one place for these fish to leave the south sound, and that is through the Tacoma Narrows," said Dickison. "It's fairly easy for us to track a good amount of salmon."

The acoustic tracking program, backed by Hatchery Reform funds, is expected to lead to more efficient hatchery operations, said Dickison. "Having more information on how these juvenile hatchery coho interact with the natural environment can suggest better ways to run the net pen operation." Hatchery Reform is a systematic, science-driven effort to address how hatcheries can help recover and conserve naturally spawning salmon populations and

support sustainable fisheries. – E. O'Connell



Small transmitters placed in the abdomens of coho salmon smolts help track the young fish as they move through southern Puget Sound.

Photo: B. Stewart

## Tideland Swap Provides Shellfish Access For Tribe

As part of an unprecedented three-way deal involving the state and a land trust, the Suquamish Tribe received 9.4 acres of tidelands in front of its tribal center, allowing easy access to clams and oysters. In return, the state will receive 19.5 acres of tidelands on Bainbridge Island.

In order to get the deal done, the tribe purchased the 19.5 acres from the Bainbridge Island Land Trust. The two properties involved in the agreement are directly across from one another at Agate Passage.

"This beach is home to us," said Wayne George, executive director of the Suquamish Tribe. "The Suquamish people have always used this beach. We need a clean place of our own where we can come and harvest. We are going to use shellfish off this beach for our use and enjoyment."

The deal – more than two years in the works – was approved by the state Board of Natural Resources in November.

For the Suquamish people, the land swap is historic. The deal gives the tribe something it was lacking – land that supports oysters and clams. As for the state, it gets 10 more acres of land that will have public access and be open to recreational shellfishing. – D. Friedel

# Toxin Levels Curtail Razor Clam Harvest

There will be no Olympic coast razor clam harvest until well into 2003. In early fall, marine toxin levels in the mollusks soared to the highest levels ever recorded south of Kalaloch beach and remain at nearly five times the level safe for human consumption.

For the Quinault Indian Nation (QIN), it's an economic as well as cultural blow. Tribal members commercially harvest razor clams, providing an important source of income at a time when many seasonal jobs cease. The normal tribal razor clam harvest period begins in September and ends in May. This year, tribal members only harvested in September. That's when levels of domoic acid, a naturally occurring toxin that can cause illness or death in humans, rose to historic levels and halted all harvest, including ceremonial and subsistence gathering.

"Many tribal members participate in this fishery," said Joe Schumacker, marine biologist for the QIN. "There are a lot of people who depend on that commercial fishery to make ends meet," he said.



A Quinault tribal member harvests razor clams during the 2001 season. This year, there has been minimal razor clam harvest due to high levels of domoic acid, a marine toxin that makes the clams unsafe to eat. Photo: D. Preston

Eating shellfish with high levels of domoic acid causes amnesic shellfish poisoning. Severe symptoms include permanent short-term memory loss and coma. Less severe symptoms include nausea and vomiting.

Scientists are still working to understand what conditions lead to high levels of domoic acid in shellfish. The source of the toxin is *Pseudo nitzschia*, an algae that grows in coastal waters and is fed upon by clams. The toxin can also be found in razor clams and Dungeness crab.

Recent readings show levels of the toxin hovering around 100 parts per million (ppm) – about half the level recorded earlier in the fall – for the three beaches where tribal members harvest. Levels of domoic acid must be under 20 ppm to be safe to eat.

While the drop in levels is significant, past events have shown that the rate at which the toxin dissipates slows considerably during the winter, usually keeping harvest closed well into the following year.

In the meantime, the tribe and the State of Washington will continue to monitor the toxin levels in hopes of salvaging some part of the commercial and recreational harvest season. – D. Preston



## Gearing Up

Quinault tribal member Sam Goodman prepares crab pots in Westport prior to the opening of crab season. Crab abundance has been high and harvests have been good for Quinault fishermen. Unfortunately, those factors – combined with large harvests in California – have resulted in a glutted market and low prices paid to fishermen. Photo: D. Preston

# Tribal Hunters Help Fight Chronic Wasting Disease



Bull elk like this one are at risk for chronic wasting disease. Photo: D. Preston

ailment affecting the central nervous system, is a progressive and always fatal illness related to mad cow disease.

“No one is more concerned about the health and long-term viability of deer and elk stocks than the tribes,” said Todd Wilbur, chair of the Northwest Indian Fisheries Commission’s Inter-tribal Hunting Committee. “We want to make sure we stop any potential health problems within herds before they start in earnest.”

To date, no deer or elk with chronic wasting disease have been found in Washington — though the disease has been tracked in nine states and two Canadian provinces since first being discovered in Colorado in 1967.

“We want to be vigilant,” said Wilbur. “Hopefully, we can prevent this from becoming a problem here.”

The Washington Department of Fish and Wildlife has been testing deer and elk for chronic wasting disease since 1995. Last year, testing efforts involved sampling animals who were taken by hunters or killed along roads at various check-stations. But the program needed expansion, as many watersheds were not being sampled.

“Tribal hunters hunt throughout the state of Washington, so tribes are uniquely well-suited to keep tabs on deer and elk herds,” said Wilbur. “We’re happy to play a role in this effort, and we think it shows why tribal natural resource efforts can be so effective.”

Testing for chronic wasting disease is done by scientists in a laboratory, but couldn’t take place without hunters. Tribal hunters are being trained to remove the brain stem from harvested animals and preserve the organ for later analysis.

Sometimes, the way a deer or elk acts can be a clue as to whether it has been infected. Animals with chronic wasting disease may appear emaciated, uncoordinated or lacking energy.

To date, there have been no confirmed cases of wasting disease being transmitted from deer or elk to humans. Still, reasonable precautions should be taken. Hunters are advised to wear rubber gloves while field dressing any deer or elk, and to avoid consumption of various components of any harvested animals’ nervous system, such as the brain.

“The first step to solving a problem is awareness, and we’re trying to help spread awareness,” said Wilbur. “It would be nice, though, if the tests we’re doing now can help prevent the outbreak of a problem altogether.” — *J. Shaw*

## *Portage Bay Shellfish Beds Remain Closed*

Despite years of hard environmental work by Lummi Nation, Portage Bay shellfish beds could not be opened as planned this fall. An unknown pollution source — probably human or animal waste from off the reservation — has caused a spike in fecal coliform levels at the crucially important commercial shellfish harvest site.

“Shellfish are essential to our people and our way of life,” said Merle Jefferson, director of Lummi Natural Resources. “Culturally and economically, we have always depended on access to shellfish.”

Since 1996, though, fecal coliform contamination in the northern portion of Portage Bay has made shellfish there unsafe for human consumption.

Lummi Nation initially closed 60 acres to harvest out of health concerns. Over 150 acres became totally closed to harvest in the ensuing years. Officials estimate that \$250,000 in revenue has been lost each year merely from the initial 60 acre closure — making the closure economically devastating to the tribe.

“No one is more affected by this than Lummi Nation,” said Jefferson. “From the beginning, we’ve been committed to water quality. It’s unfortunate that water quality problems we didn’t cause are causing such trouble for us.”

The cause of the increased pollution has not been determined, though Department of Ecology officials have said it may be due to a broken sewer line at the Northwest Washington Fairgrounds.

Before the recent spike in fecal coliform, the cooperative effort around Portage Bay looked to be headed for success.

“This has been a real blow to us,” said Jefferson. “We were the one damaged by this, and we didn’t do anything wrong.”

— *J. Shaw*



# Imported Plant Threatens Salmon Recovery



Jill Silver, habitat biologist for the Hoh Tribe, and Bob Howell, tribal fisheries technician, examine a Japanese knotweed plant. *Photo: D. Preston*

An invasive plant, imported for its decorative value, threatens to impair stream function critical to fish on the Hoh River. The plant, Japanese knotweed, has the potential to thwart much of the Hoh Tribe's salmon recovery efforts on the river.

Japanese knotweed – often found as an ornamental bush in gardens – spreads quickly, and can overrun all plants around it. It is even able to out-compete other notorious invasive plants such as Scot's broom. It comes from Asia, is commonly known as “false bamboo,” and it threatens fish habitat throughout the State of Washington.

“Knotweed can spread by very small root and stem fragments, and it especially likes new gravel bars such as those created every winter when the river floods and changes course into new channels,” said Jill Silver, Hoh Tribe habitat biologist. “It has the capacity to take over a river or creek's floodplain in a very short time, and once it's established, it's believed to be impossible to get rid of.” Knotweed is classified as a Class B noxious weed in Washington meaning that it's already spread too far to require control by landowners.

In just a few years, a single known clump of the plant has spread 30 miles along downstream from the intersection of the South Fork of the mainstem of the Hoh River.

Because it grows as much as 16 feet in one season, the plant can alter many of the habitat-forming and food production characteristics of streamside forests. They include insect production that feed salmon and plants that feed native wildlife. Perhaps most importantly, the plant prevents trees from growing alongside the river. Trees provide a number of critical functions for fish. They provide shade, keeping water temperatures lower. When they fall in the river, trees help create spawning and rearing habitat such as deep pools.

Japanese knotweed also requires a great deal of water, and steals it from adjacent native plants. The plant has no natural predators.

The Hoh Tribe wants to stop the plant before it spreads any further. “We've mapped 470 plants or groups of plants in 10 miles of river so far. We're working to map them first before beginning a control project so that we have a better idea how successful we are in our methods,” said Silver. “We will also track how much the plant moves around during flood season. We'll map again next summer.”

The tribe wants to inform the public about the weed by posting information at boat ramps and parks. “People need to understand how much of a problem this plant is becoming to river restoration. They can help by reporting plant locations and by not moving it around by picking it,” said Silver. Residents can also contact the State Weed Board at (360) 902-2053.

Because knotweed is so difficult to eradicate by hand, landowners are advised not to try to spray or pull the plant themselves as it often leads to the plant spreading.

The tribe is researching different methods of control, and hopes to begin an eradication project before spring.

– D. Preston



## Heading Home

A coho salmon takes advantage of the first fall rains to make its spawning run up the Hoko River on the Olympic Peninsula.

*Photo: D. Preston*

# Makahs Work To Restore Lake Ozette Sockeye

Combining state-of-the art laboratory genetics and old fashioned field biology, the Makah Tribe is leading the way in using hatcheries to rebuild threatened sockeye salmon populations in the lake.

What makes one salmon distinct from another? Why are those unique genetic characteristics important? These are the fundamental questions involved in many salmon recovery projects that can be difficult to obtain due to money restraints and the volume of research needed.

But the Makah Tribe has been able to move much closer to answering these questions about the Lake Ozette sockeye, a salmon listed as "threatened" under the Endangered Species Act. Using their own money, as well as funding provided through the Pacific Coastal Salmon Recovery Program and Hatchery Reform Project, tribal fisheries staff are close to having the information necessary to aid in the improvement of sockeye numbers without losing the genetic characteristics that set them apart.

Ozette sockeye return to spawn in Lake Ozette, an eight-mile-long body of water located south of the Makah Tribe's reservation on the northern tip of the Olympic Peninsula. The lake is also a part of Olympic National Park.

"Historically, sockeye are thought to have spawned at several areas within the lake and tributaries to Lake Ozette," said Mike Crewson, Salmon Division Manager for the Makah Tribe. "However, in recent years, no sockeye spawners have



Joe Hinton, Makah tribal hatchery manager, prepares to release a tagged sockeye into Umbrella Creek. *Photo: D. Preston*

been seen in the tributaries; they no longer spawn at some lake beach spawning sites where they used to spawn as recently as in the late-1970s, and there are only two small beach areas on the lake left where the wild fish spawn," he said.

In recent years, the tribe has been rearing eggs from the native stock and has re-introduced small hatchery-reared fry to the two main tributaries to the lake: Umbrella Creek and Big River. As a result, the numbers of sockeye returning to the Lake Ozette system in 2000 and 2001 are the highest on record since the 1920s. More than 50 percent of the returning fish were hatchery fish returning to the tributaries, said Crewson. "By keeping the hatchery-

rearing time short, we minimize the effects of rearing the native, wild stock in a hatchery environment. The returning adult sockeye moved all over those tributaries on their own, appeared to use appropriate areas for spawning, and we had no strays spawn in the lake – the perfect scenario," he said.

The returning lake and tributary sockeye are analyzed genetically to make sure they are not inter-breeding with kokanee and altering their gene pool.

The other genetic question the tribe is working to answer is the differences between the two remaining beach locations of wild lake-spawning sockeye. If genetic differences exist between the beach-spawning groups, they may be able to use these differences to monitor future reintroductions and the recolonization of beaches as the habitat improves. – *D. Preston*

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