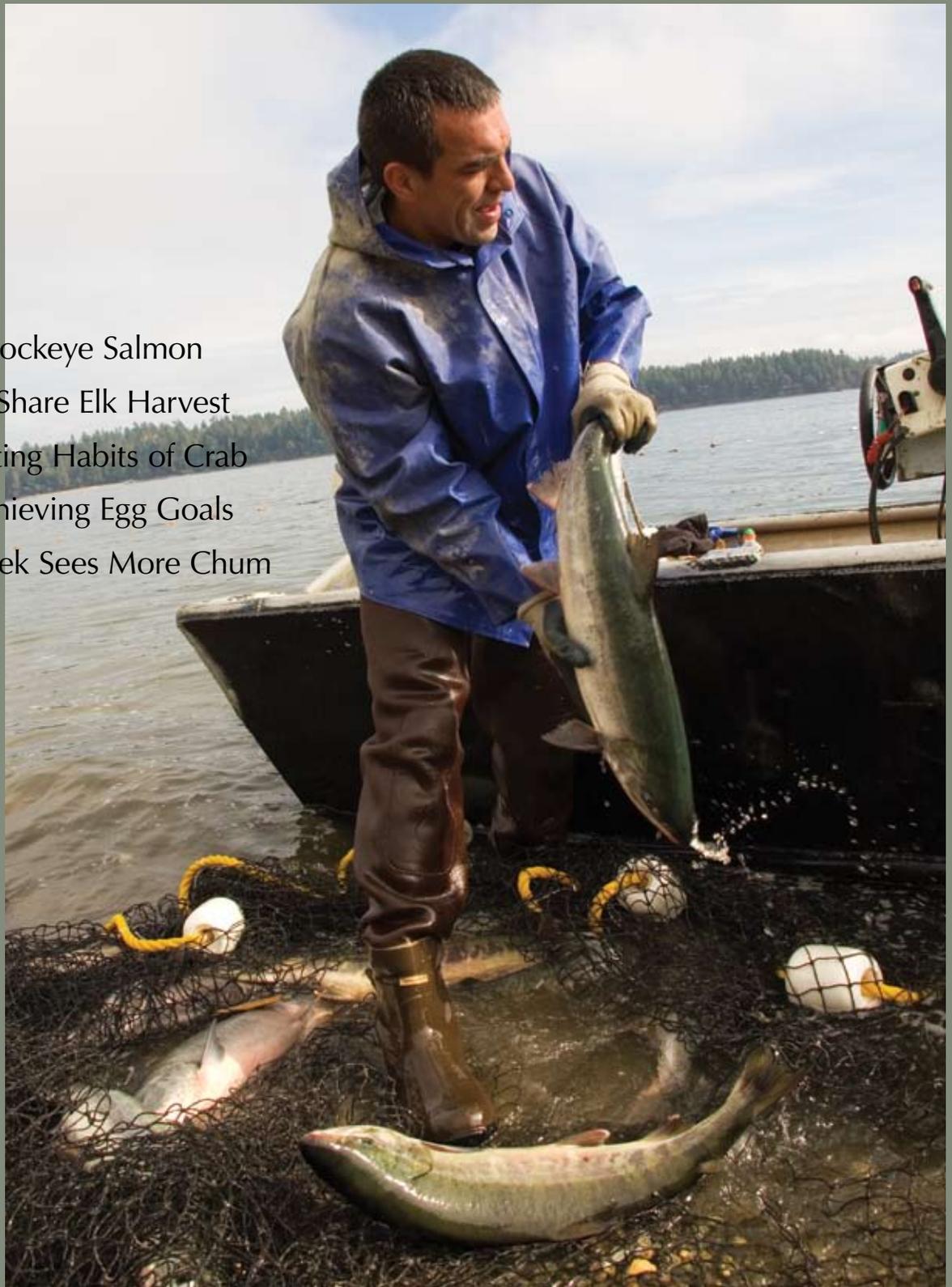




Inside:

- Recovering Sockeye Salmon
- Tribes, State Share Elk Harvest
- Studying Mating Habits of Crab
- Hatchery Achieving Egg Goals
- Restored Creek Sees More Chum



Now is the time to be bold about Puget Sound

By Billy Frank Jr.
NWIFC Chairman

The Puget Sound Partnership recently released its Action Agenda, a pathway for fixing the problems that are slowly killing Puget Sound.

For the tribes, restoring Puget Sound is about our cultures and the food we eat. It was the same when we made treaties with the U.S. government. We gave up nearly all the land in western Washington, but we



kept our rights to salmon, shellfish and other resources.

An unhealthy Puget Sound means no salmon returning to our rivers; it means the few shellfish able to survive on our beaches will be too poisoned to eat. With these cornerstones of our culture gone, it would be the end of us. We need a clean

Puget Sound because we depend on the resources it provides.

We also need bravery from the non-Indian leaders in this state. We can't let the Puget Sound Partnership become the latest failed effort to turn this region around.

Words, plans and agendas are important, but they don't matter without money and action.

We are encouraged by the Partnership's progress so far and we feel there are some places where the Action Agenda can be tightened:

- Require that all water treatment plants achieve zero pollution discharge by 2020. We have the technology to do this; we need the political will to make it happen.
- Take a close look at the permits that are issued to allow for stormwater runoff. And, while we're at it, examine Hydraulic Permit Approval permits issued by the state to allow builders and others to do work near salmon-bearing waters. Are these permitting programs consistent with our efforts to clean up Puget Sound?

When you're at the edge, the next step is hard to take. We have to take that step – and each following step – because there is no more room to let the health of Puget Sound slide any further. This is where we move forward and save Puget Sound or we stand and watch it die.

I applaud all of the hard work by the Partnership during these past couple of years and I look forward to continuing our efforts.

The Partnership's Action Agenda is a roadmap, but that's all. We need money for fuel and all of us cooperating behind the wheel if we are going to make this journey.

NWIFC News

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Fisheries Commission
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Olympia, WA 98516
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NWIFC News is published quarterly. Free subscriptions are available. This edition is also online at www.nwifc.org. Articles in NWIFC News may be reprinted.

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Tribal contact information is available under *Member Tribes* at www.nwifc.org



On the Cover: Larry Bradley, a Squaxin Island tribal member, lifts a chum salmon during the tribe's fishery in deep South Sound. *Photo: E. O'Connell* (see related photo, page 8)



Makah Tribe Tracks, Collars Roaming Fisher

The 18 fishers reintroduced into Olympic National Park (ONP) earlier this year by wildlife biologists were expected to do some roaming. But few expected one of the weasel-like animals to journey nearly 60 miles from its Elwha River watershed release site to the Makah Tribe's reservation in Neah Bay. Crossing mountains, rivers and busy roads, the fisher reached the Makah Reservation within six months.

Fishers were trapped to near extinction in Washington by the 1930s, with pelts fetching up to \$150. Weighing up to 12 pounds with dark brown fur, fishers are agile tree climbers that eat rabbits, mountain beavers, squirrels and birds. State, U.S. and Canadian agencies and non-government conservation groups worked together to make the reintroduction of the fisher a reality.

All the fishers were fitted with tracking devices. When the traveling fisher was discovered on the Makah Reservation, Rob McCoy, tribal wildlife biologist, volunteered to help track its movement. "We are out tracking our radio-collared deer and bears as part of our work anyway," McCoy said. "We record the fisher's movements and send that information to ONP and the state Department of Fish and Wildlife (WDFW) every couple of weeks."

"It would have been expensive and time-consuming to track one fisher that far out of the area from the rest of them," said Patti Happe, ONP wildlife biologist. "It's been great to have the Makah staff assist with this effort."

In late October, the wildlife biologists noted that the fisher's tracking device was beginning to malfunction. McCoy set three traps within the area of the fisher's last known location and captured it within hours. Makah, ONP and WDFW personnel anesthetized the animal and attached a new radio collar. The animal was released near the capture site the following day.

The wandering fisher is likely to move toward the national park in search of a mate late this winter. No other fishers have been released in the Neah Bay area. The reintroduction plan confines releases of fishers to Olympic National Park, although it is understood the animals may disperse outside ONP.

Additional males and females will be released in the Hoh River drainage in ONP, increasing the odds that the wandering Neah Bay male will run into a mate. A total of 100 fishers, obtained from British Columbia, ultimately will be released over a three-year period.

"The Makah Tribe, as a co-manager of the wildlife resources on Olympic Peninsula, is happy to assist with the fisher reintroduction on the Olympic Peninsula and will continue to work with ONP and WDFW to ensure the success of the project," McCoy said.

Regular updates about the fishers and the reintroduction are posted on the WDFW and ONP Web sites at <http://wdfw.wa.gov/wlm/diversty/soc/fisher/updates.htm> and <http://www.nps.gov/olymp/naturescience/fisher-reintroduction.htm>.

— D. Preston



Left: Rob McCoy, wildlife biologist for the Makah Tribe holds the fisher that was found roaming the Makah Reservation. Above: The anesthetized weasel-like animal is examined and fitted with a new radio collar. The Makah Tribe helped capture the fisher after its tracking collar malfunctioned. Photos: Makah Tribe

Tribes, State Share Nooksack Elk Harvest



A limited number of bull elk in the Nooksack herd can be harvested without affecting herd productivity. *Photo: D. Preston*

Tribal and state wildlife co-managers agreed for a second year to share the harvest of 30 bulls from the Nooksack elk herd, which has rebounded as a result of cooperative recovery efforts.

The tribes and the state also have finalized a regional plan to continue their successful co-management of wildlife.

Last year marked the first time in 10 years the Nooksack elk population was large enough to support harvest without interfering with herd productivity. State and tribal wildlife biologists determined there was an adequate bull-to-cow ratio for a limited hunt of 30 bull elk.

The nine Point Elliott Treaty tribes shared 15 permits, and non-tribal hunters were allowed to harvest the other 15 bull elk. The co-managers made the same agreement this year. The Point Elliott tribes are Lummi, Nooksack, Muckleshoot, Sauk-Suiattle, Stillaguamish,

Suquamish, Swinomish, Tulalip and Upper Skagit.

“Through cooperation with our state co-managers, we have improved the management of the Nooksack elk herd,” said Todd Wilbur, chairman of the Inter-Tribal Wildlife Committee for the Northwest Indian Fisheries Commission and a member of the Swinomish Tribe. “Working with agencies that care about preserving elk is the best way to ensure that we have healthy elk herds well into the future.”

In the 1990s, Indian and non-Indian hunters stopped hunting the Nooksack herd, also known as North Cascades elk. The herd’s numbers were declining rapidly, in part because of the loss of habitat. Following restoration efforts by the tribes and the state, the herd recovered from a low of about 300 animals to between 600 and 700 animals.

Twenty years ago, the herd numbered about 1,700 elk.

To enhance hunting communication, data-sharing and regulation, Point Elliott tribes and the state negotiated a regional management agreement for hunting elk and other wildlife such as deer, bears and goats. Separate regional agreements are being developed between the state and tribes on the Olympic Peninsula and in South Sound.

The agreements coordinate hunting seasons, harvest reporting and enforcement regulations. The tribes and state plan to share research data such as herd population and mortality estimates – information that is crucial to planning harvests. Other goals are to promote joint efforts to increase access to private industrial timberlands and provide a forum to address issues of mutual concern between the tribes and the state.

– K. Neumeyer

Puyallup Tribe Opposes Expanded S. Rainier Elk Hunt

The Puyallup Tribe of Indians is opposing a proposed expanded hunt on the South Rainier elk herd, which has fewer than 1,000 animals.

To decrease unwanted human and elk interactions, the state of Washington has proposed expanding the hunt on antlerless elk along state Route 12 between Packwood and Morton. The tribe is concerned that an expanded harvest could cause the weak elk population to crash. The herd’s target population is more than 2,100.

The Puyallup Tribe is one of the tribes that co-manage the South Rainier herd with the state. Tribal hunters harvest fewer than 10 percent of available elk in the total South Rainier herd.

“There is already enough harvest on this herd,” said Barbara Moeller, wildlife biologist for the Puyallup Tribe. “The elk population in the Cowlitz Valley is too small to support more hunting.”

Since 2003, the Puyallup Tribe has taken the lead in monitoring and studying the South Rainier herd. “Information that we’ve gathered points to a population that is much smaller than previous estimates,” Moeller said. “The herd can certainly sustain hunting, but we should err on the side of caution.”

State guidelines require pursuing non-lethal means as a first response to problem animals, yet, “It looks like their first proposal was to expand hunting,” said Fred Dillon, the tribe’s natural resources policy representative. “Elk trampling a garden is not a good reason to doom an entire herd.”

He added: “This is an elk herd that needs more habitat, not more harvest. The best way to ensure the health of this important population is to make sure there is enough food and space for them to live.”

The tribe has taken the first steps in creating an elk reserve in the valley by purchasing 45 acres of bottom land for elk.

– E. O’Connell

Tulalip Tribes Meadow Thrives

Small green buds of clover and winter rye poked through a mint-colored coating of wood fiber mulch, less than one week after Tulalip Tribes wildlife staff sprayed the cleared forestland with a slurry of seeds, mulch and fertilizer.

“Everything’s germinating; it’s popping all over the place,” said Mike Sevigny, the tribes’ wildlife manager.

The burgeoning 3-acre meadow was the second phase of the tribes’ effort to create wildlife habitat. Last year, wildlife staff hydroseeded 6 acres of clear-cut forestland with red and white clover, winter rye, chicory and small burnet – plants that provide high-quality nutrients for birds and animals.

Hydroseeding is an efficient way to convert forestland into a haven for wildlife, the tribe has found. The seeds germinate more quickly than with traditional sowing, and hydroseeding reduces soil erosion and keeps seeds moist.

Sevigny said he had expected it to take five years to turn the forest soil into a meadow attracting animals such as deer, grouse, red-legged frogs and mice. But just one year after hydroseeding the meadow, he’s seen all those and more.

“There are a lot more species than I ever hoped,” Sevigny said. “Once the an-

imals found the meadow, they came back.”

The Tulalip Reservation has about 8,000 acres of working forestland. When too many trees grow too close to each other, forest growth is slowed.

Beneath a closed canopy of 20- to 30-year-old trees, there is little forage opportunity for wildlife. The result is a population decline of species like black-tail deer and grouse.

Tulalip plans to replicate the success of the wildlife meadows off-reservation as well. The wildlife department is working with the Stillaguamish Tribe and the Rocky Mountain Elk Foundation to create meadows for North Cascades elk in the Hamilton/Lyman area and Concrete.

“This is one of our programs of focus right now – creating enhancement areas both on and off the reservation and maintaining them for long-term use,” Sevigny said.

Wildlife meadows provide alternative habitat that also benefits forestry – deer



Tulalip Tribes wildlife technician Ross Fenton hydroseeds a 3-acre meadow in the tribe’s forestlands. *Photo: K. Neumeyer*

that eat young cedar trees might be inclined to leave the trees alone if they had nutritious plants to eat elsewhere.

Another population that is served by the wildlife meadow is tribal members themselves.

“I like to go out there and meditate,” said Darrell Enoch, a tribal elder and a fish and wildlife enforcement officer for Tulalip. “It’s a nice quiet, beautiful place.” Enoch takes his nephews and grand-nephews there to show them traditional uses of plants for medicine and tea.

“I teach them how to get back if they get lost,” he said. “They learn the ways of living off the land.” – *K. Neumeyer*



Generations

Squaxin Island tribal members Mary (Jackson) Krise, David Krise and Nita Krise (circa 1945) prepare Pacific clams near Little Skookum Inlet in the 1940s. Little Skookum is a productive shellfish bay near the tribe’s reservation.

Photo: Squaxin Island Tribe



Tom Ostrom, Suquamish Tribe environmental biologist, measures the width of a crab for a study on crab mating in Puget Sound. *Photo: T. Royal*

Crab Mating Study Raises New Questions

cent years, they could expect one-third of that in June, and by October, they'd be lucky to get two or three pounds of crab per pot.

"Dungeness crab have always been managed under the assumption that all the males over 6 ¼ inches can be harvested," Williams said. "The downward spiral of harvest in Hood Canal has raised concerns that the traditional management approach may not be protective of crab populations in all areas."

If all the big males are harvested, biologists wonder if there will be enough left to fertilize the females. In 2007, the Suquamish Tribe and Washington Department of Fish and Wildlife (WDFW) started studying crab mating success in Hood Canal, Everett and between Edmonds and Seattle. In 2008, the Jamestown S'Klallam Tribe joined the study, sampling in the Strait of Juan de Fuca.

Male crab can fertilize several females a season and their sperm lasts for two years. Males are sexually active for at least a year before they are big enough to be caught. In theory, there should be plenty of small males to go around.

But in Hood Canal in 2007, 86 percent of the females sampled had been fertilized compared to 98 percent at Everett. In 2008, only 59 percent of the females sampled in Hood Canal were fertilized. Scenic Beach had the lowest number in Hood Canal: 74 percent fertilized in 2007 and just 39 percent in 2008.

"This study is raising some interesting questions: it looks like overharvest, but other factors may be involved," Williams said. "We know very little about the fate of crab larvae as they float in the currents and develop. Are water quality conditions affecting them?"

Funding and project support comes from the Suquamish Tribe, King County, WDFW and the Jamestown S'Klallam Tribe. — *T. Royal*

While Dungeness crab harvest is booming in some areas of Puget Sound, it's a bust in Hood Canal. To understand why, shellfish managers are taking a second look at traditional crab management.

Between 2000 and 2005, harvesters could expect 15 pounds (30 crab) a pot when the season opened in June, said Paul Williams, the Suquamish Tribe's shellfish management biologist. In re-

Lower Elwha Klallam Rescues Mussels From Dredge



There was a sense of urgency when tribal, state and federal biologists recently snorkeled for thousands of freshwater mussels along

the bottom of a 300-foot-long shallow side channel of the Elwha River. A dredge was slated the next day to dig up the side channel as part of construction of the Elwha Water Treatment Facility.

This mussel rescue was part of the larger preparation for the removal of the Elwha River's two fish-blocking dams; the 108-foot-tall Elwha Dam and the 210-foot-tall Glines Canyon Dam will be removed starting in 2012. The new treatment plant will help filter out river sediment that will be released after the dams are removed.

"Mussels naturally help protect the quality of the water because they are filter feeders," said Larry Ward, the Lower

Elwha Klallam Tribe's hatchery manager. "While they are able to move around a little bit to find better habitat, the high levels of sediment expected in the river after the dams come down means they'd most likely get wiped out. We're trying to make sure they're preserved."

The mussels were temporarily stored in the tribe's hatchery raceways before being replanted in the Elwha watershed. Overall, divers rescued more than 9,700 mussels.

Recently hatched mussel larvae attach themselves to fish, such as chinook salmon, a common species in the Elwha River. After feeding off the gills of host fish for a few weeks, the larvae drop off into the streambed and continue their development.

"The lack of mussels above the dams could have something to do with the fact that there are no salmon above the dams either, because fish can't get past the tall structures," Ward said. "Once the chinook colonize upriver after the dams are removed, we hope to see a population boost in mussels and other species too."

— *T. Royal*

Left: Small freshwater mussels are re-located before the Elwha River dams come down starting in 2012. *Below:* Larry Ward, hatchery manager for the Lower Elwha Klallam Tribe, sorts through mussels rescued from a side channel of the Elwha River.

Photos: T. Royal



One Clam at a Time

The Squaxin Island Tribe is using an innovative technique to track how quickly clams grow in southern Puget Sound waters.

Tribal biologists are attaching tiny numbered red tags to individual clams planted on beaches throughout South Sound. Clam growth typically is measured by randomly surveying clams on a beach, but that technique isn't very exact.

"We can track the growth of individuals and determine how overall productivity changes in different parts of a beach," said Eric Sparkman, shellfish biologist for the tribe. "Just simply knowing that we're looking at the same clams each time we survey gives us a whole new level of understanding."

For the past several years, the tribe has been boosting clam populations to benefit both tribal and sport shellfish harvesters. "Clams put on a beach as part of an enhancement project and clams that are naturally there look exactly the same," Sparkman said. "Now we can get a good idea of how just the planted clams are growing."

The colorful plastic tags, which are about the size of the head of a pushpin, are handmade by tribal staff and attached to individual clams with strong glue.

Rana Brown, a tribal shellfish technician, developed the technique to track populations of tiny beach crabs. "We were looking for a way to tag individual crabs as they moved," Brown said. "The tags had to stay attached even while the crabs were scraping across rocks. With clams, the tags can probably stay attached for years."

Because of its productive shellfish beaches, southern Puget Sound is important to commercial, recreational and tribal harvesters. "Rather than depending on the clams to replenish themselves, we're helping them along," Sparkman said.

In the last century, harvestable shellfish populations have diminished due to development and pollution. "Some of the beaches that we once depended on don't exist anymore or are inaccessible and can't support enough shellfish for harvesting," said Andy Whitener, natural resources director for the tribe. "By planting clams where we can, we're bringing that resource back."

— E. O'Connell



Shellfish biologist Eric Sparkman digs clams on a test plot near Allyn. Photo: E. O'Connell



Tribal Voice

Squaxin Island Tribe: We Know What We Have to Do to Heal Oakland Bay

Oakland Bay is vital to the ecologic and economic health of Mason County, the shellfish and timber industries and the Squaxin Island Tribe. In fact, the original name of Mason County, including Oakland Bay and Hammersley Inlet, was Sa-Heh-Wa-Mish.

Key to restoring Oakland Bay is buy-in from private landowners to further improve stewardship of our lands and waters to reduce pollution. To do that, we created the Sa-Heh-Wa-Mish Stewardship Initiative with our neighbors. The initiative was funded by a West Coast Estuaries grant from the U.S. Environmental Protection Agency (EPA) to the Squaxin Island Tribe. The effort involves many partners to maximize resources for the community.

Sustainable shellfish harvest is both the objective of the initiative and measure of success for Oakland Bay. This requires the entire Oakland Bay watershed to be healthy. The shellfish industry is one of the largest employers in Mason County; more than \$10 million in shellfish is taken from Oakland Bay each year, including more than 3 million pounds of clams and nearly 2 million high-value oysters. More than 200 tribal harvesters make at least part of their annual income in Oakland Bay. Around 2,000 recreational harvesters visit the bay every year.

Water movement in and out of Oakland Bay is constrained by the narrow Hammersley Inlet, which allows water pollution to linger for long periods. The main sources of pollution in Oakland Bay are obvious – failing onsite septic systems and livestock manure. Nutrients, from lawn fertilizer, for example, and stormwater runoff also contribute.

Immediate solutions for Oakland Bay are far simpler than for the rest of Puget Sound. We don't have low levels of dissolved oxygen and toxic contamination is limited. We know what we have to do to fix the problem – we just have to do it.

The Squaxin Island Tribe has led the way in developing credible science to tackle pollution in Oakland Bay. We arranged to work with EPA to use DNA to identify fecal bacteria hosts, and we will monitor the achievements of the Sa-Heh-Wa-Mish Stewardship Initiative.

Oakland Bay is a tremendous opportunity for the Puget Sound Partnership. Our energized community action coalition is ready, willing and able to model a new, collaborative paradigm to clean up Puget Sound.



Andy Whitener is natural resources director for the Squaxin Island Tribe.

Stillaguamish Tribe Simulates Chinook Redds



Face down in frigid water, Stillaguamish biologist Jody Brown arranged plastic buckets of gravel in the North Fork of the Stillaguamish River.

The 2-quart buckets are artificial salmon nests, or redds, which the tribe is using to study the fine sediment that accumulates in the gravel where salmon spawn.

Fine sediment can smother chinook redds. When small granules fill in the space that allows water to flow through gravel, sediment cuts off oxygen to the

eggs. With larger particles up to ¼ inch, oxygenated water may get to the eggs, but newly hatched fry may not be able to emerge from the gravel.

By measuring fine sediment in the buckets during an “incubation cycle,” the tribe can estimate survival-to-emergence rates for naturally spawning North Fork Stillaguamish chinook.

“We incubate them from when chinook spawn in September and October to when you’d normally expect to see fry emerge from gravel in January,” Brown said.

This fall, Stillaguamish Natural Resources staffers dug three artificial redds each at seven locations on the North Fork. They buried six buckets in each redd and covered them with the clean gravel that chinook use. Buckets will be retrieved at intervals throughout the incubation period to observe changes in sediment concentration.

To get a sense of which sites are likely to have high sediment deposits, natural resources staff-

ers are measuring suspended solid particles in the water at each location.

During the first year of the study, in 2006, Brown found there was a 15 to 66 percent chance of survival; in 2007, the estimate ranged from 6 to 40 percent.

“The estimates are based solely on fine sediment infiltration,” he said. A number of other factors affect the survival of eggs to emergence, such as flooding, redd disturbance by other spawning fish and other natural factors.

This is the final year of a three-year project to provide insight on the survival-to-emergence of naturally spawning North Fork chinook. The impact of fine sediment on chinook redds is listed as a data gap in the Stillaguamish Salmon Recovery Plan. – *K. Neumeyer*



Above: Buckets of gravel are used to simulate chinook egg nests. Above left: Biologist Jody Brown (left) and Rick Rogers, field project coordinator, arrange an artificial redd in the North Fork Stillaguamish River.

Photos: *K. Neumeyer*



Chum Running

A chum makes its way to the spawning grounds in Kennedy Creek.

Because of lower than normal chum returns to South Sound, the Squaxin Island Tribe closed its chum fishery to protect returning salmon. Only after on-the-ground surveys indicated enough chum had returned did tribal fishermen return to the water.

Photo: *Fran Wilshusen, NWIFC*

Sockeye Salmon

PSE Licensing Project to Boost Baker Sockeye

The Sauk-Suiattle, Swinomish and Upper Skagit tribes were among the dozens of stakeholders that worked on PSE's relicensing to ensure protection of fish, wildlife and cultural resources.

"Our priority was making sure the sockeye run was restored to a harvestable amount that actually meant something for the tribe," said Scott Schuyler, natural resources director for the Upper Skagit Tribe. "This settlement with PSE will benefit the tribe for generations."

PSE estimates that it will spend \$360 million to meet the new license provisions and operate the Baker facility. More than half of

that will go to fish-enhancement projects. Key elements include a new hatchery and new fish passage system around the two Baker River dams. The improvements, including new artificial spawning beaches, are designed to quadruple the number of juvenile sockeye produced to 14 million.

"Buyers pay more for sockeye than other salmon," said Lorraine Loomis, fisheries director for the Swinomish Tribe. "Enhancing the Baker River sockeye run is a huge help to tribal fishermen."

The Baker River sockeye run, and those who fish it, will benefit from Puget Sound Energy's investment of more than \$180 million into the Baker River Hydroelectric Project.

In October, Puget Sound Energy (PSE) received a new 50-year operating license from the Federal Energy Regulatory Commission. The license was issued after years of discussions with interested parties, such as tribes, environmental organizations, fisheries interests and other governments.



Left: Staffers at the Baker Lake hatchery collect adult sockeye salmon. Above: Natural migration of adult sockeye is blocked by two dams on the Baker River.

Photos: K. Neumeyer

PSE's Baker River Hydroelectric Project has hindered natural sockeye migration for more than 80 years. Adult fish are collected below the Lower Baker Dam and trucked either to the hatchery or above the Upper Baker Dam to Baker Lake where they spawn on their own.

Before the construction of the Lower Baker Dam in 1925, the natural sockeye run was estimated at about 20,000 fish. The run was nearing extinction in 1985, when only 99 fish returned. The pre-season forecast for the 2008 return was 25,000 sockeye salmon. — K. Neumeyer

Fraser River Sockeye Run Declared Fishery Disaster

Fraser River sockeye returns have been increasingly poor for several years, prompting the Lummi Nation and other treaty tribes to ask the federal government to declare a fishery disaster.

U.S. Commerce Secretary Carlos Gutierrez made the declaration in November and allocated \$2 million dollars to be shared by state commercial fishermen and the northwest Washington treaty tribes that fish Fraser River sockeye.

The tribes agreed to divide the money based on historical catch records, but plan to petition for more money. "We need to look at this as a partial remedy," said Lummi Chairman Henry Cagey. "With more than 600 fishermen, Lummi is the tribe most affected by the failure of the run; we need \$5 million just to compensate our fishermen."

Fraser River sockeye originate in British Columbia. Nine treaty tribes in western Washington have treaty-reserved rights to catch them in U.S. waters before they migrate upstream. The Fraser River sockeye treaty tribes are Lummi, Jamestown

S'Klallam, Lower Elwha Klallam, Nooksack, Makah, Port Gamble S'Klallam, Suquamish, Swinomish and Tulalip.

In the 1990s, sockeye numbers were plentiful and prices were high, making the fish an important part of tribal fishermen's income, but the run began a steep decline in 1999.

"It's been a disaster for several years now," said Lorraine Loomis, fisheries director for the Swinomish Tribe and tribal representative to the Pacific Salmon Commission, which manages the Fraser sockeye run for the United States and Canada.

Poor ocean conditions, shifting currents and climate change are blamed as potential causes for the run's decline. This is the second time Fraser River sockeye were declared a fishery resource disaster. A similar determination was made in 2002.

The failure of the fishery is detrimental to all tribal members, not just the fishermen who depend on the income, Loomis said.

"Our people are so hungry for sockeye, and we couldn't even get any for the table," she said. — K. Neumeyer

New Hatchery Reaches Egg Goal

The Puyallup Tribe's Clarks Creek salmon hatchery has reached its goal of collecting 1.1 million chinook eggs for the first time since it opened four years ago.

"We'll be running at full capacity this winter and spring," said Blake Smith, enhancement biologist for the Puyallup Tribe. As in most hatcheries, more than 90 percent of the eggs will survive to be released, translating into 1 million juvenile hatchery salmon swimming out into the Puyallup River early next summer.

"When they return as adults in a few years, these fish will be a big part of fisheries for both tribal and non-tribal fishermen, providing increased opportunity," Smith said.

The hatchery features rearing ponds that mimic natural salmon habitat with tree rootwads and gravel. These features help young chinook develop better survival skills.

"Fish born in the wild develop instincts that help them find food and avoid being eaten," Smith said. "Unfortunately, this isn't something we see a lot of in hatchery fish raised in featureless cement ponds. The more salmon learn to survive in the wild, the more hatchery fish will

return to the river in a few years."

In addition to releasing fish from the hatchery itself, the tribe also uses the young fish from Clarks Creek to repopulate the upper Puyallup River watershed. Each spring, the tribe trucks thousands of juvenile chinook to three acclimation ponds in the upper Puyallup.

"This stretch of river has been open to salmon since 2000 when a fish ladder was built around Electron Dam," Smith said. "By putting juvenile chinook up there, we're giving the run up there a jump start."

Now that the facility is working at full capacity, there will be more hatchery fish available for harvest in the lower river, away from where wild chinook congre-



Dan Sandstrom, a fisheries technician with the Puyallup Tribe, hoists a chinook from a pond at the Clarks Creek hatchery.

Photo: E. O'Connell

gate. "If there are more hatchery fish to catch in the lower river, fishing pressure moves away from where wild fish are," Smith said. "Getting wild chinook into the upper watershed to spawn is a priority for the tribe." – E. O'Connell

Sport Fishermen Benefit from Short Tribal Fishery

Sharp cuts in fishing by the Puyallup Tribe of Indians this year allowed sport fishermen to start fishing for chinook on the Puyallup River two weeks early.

"The tribe was off the water more this year to reduce impacts on returning chinook, and this gave more opportunity for sport fishermen," said Chris Phinney, the tribe's salmon fisheries management biologist. The cuts by the tribe were agreed to last spring during the tribal and state salmon fisheries management process.

The Puyallup Tribe has been reducing its in-river chinook fishery for the past several years to protect returning wild chinook. This is the second year the tribe will have no directed chinook fishery.

Sport anglers on the Puyallup are required to release wild chinook, decreasing impact to the stock.

"This kind of selective fishery works best in places like the lower Puyallup River where there are a lot of hatchery fish and very few wild fish," Phinney said. Tribal and state co-managers estimate that more than 80 percent of the chinook return-

ing to the Puyallup this year will be hatchery fish. "With large numbers of hatchery fish available, it's easy for sport fishermen to sort wild and hatchery fish."

"Unlike in saltwater mixed stock areas, where there are dozens of stocks present, terminal areas like rivers are very effective places to have selective sport fisheries," he said.

While sport and non-treaty commercial fishermen can chase productive runs of salmon around the region, tribal fishermen are bound by treaty to fish only in certain areas.

"The Puyallup Tribe has an inherent interest in seeing more salmon return to the Puyallup River because this is our home river," said Herman Dillon Jr., chair of the tribe's fish commission. "If salmon don't return here, we lose an important part of our way of life."

"Fisheries have been constricted because the wild salmon we're trying to protect don't have much habitat to return to," Dillon said. "The first step in ensuring there are strong salmon fisheries in the future is making sure there is good habitat for salmon." – E. O'Connell

Right: Bernard Afterbufalo, Hoh tribal fisheries technician, holds a fin clip sample of a Hoh steelhead that will be analyzed for its genetic structure. *Photo: D. Preston*

The Hoh Tribe is conducting a study to determine the genetic relationships between today's Hoh River native steelhead and hatchery steelhead. The genetic study will reveal the extent to which a hatchery run of steelhead that shares the river has affected the genetic structure of the native steelhead.

An additional goal of the study is to determine the genetic origin of steelhead that stray into the Hoh from other rivers and whether they have contributed genetics to the native stock.

"We need to know the answers to these questions to make future management decisions," said Joe Gilbertson, fisheries manager for the Hoh Tribe.

The genetic data needed for the study comes from a small fin clip collected from steelhead caught by treaty tribal and non-Indian sport fishermen. Later in the study, as funding allows, the tribe also will take genetic material collected from wild steelhead prior to the hatchery steelhead influence (1980) and



Hoh Tribe Studies Steelhead Family Tree

ery stock.

While the tribe is focused on steelhead, samples of coho and chinook are being taken when possible as part of the cooperative study with Washington Department of Fish and Wildlife (WDFW) and Olympic National Park.

"We want to maintain a healthy native stock," said Gilbertson. "Collecting this genetic information is critical to determining how past hatchery practices have influenced the current genetic composition of the Hoh River wild steelhead population." – *D. Preston*

compare it to the genetic structure of the present wild steelhead.

About 100,000 hatchery steelhead are reared in the Cook Creek National Fish Hatchery southwest of Lake Quinault and released every May several miles above the Hoh Tribe's reservation. The peak of the hatchery run

is in December, while the peak of the wild run is in March, with some overlap between runs. The majority of the Hoh Tribe's steelhead fishing efforts are targeted on the hatch-



Lone Forager

A black-tail deer pauses from browsing in the Hoh River watershed in the quiet of late fall.

Black-tail deer are important for ceremonial and subsistence uses to coastal tribes. Browsing plants, black-tail deer must survive the winter without hibernating. By June, females at least a year old can birth a set of twins.

Photo: D. Preston

Tanwax Creek Reclaimed for Coho

The Nisqually Indian Tribe is helping a local landowner reclaim a stretch of Tanwax Creek for salmon.

Tribal technicians, volunteers and school groups are clearing a 5-acre infestation of reed canary grass along the creek, allowing coho salmon to access important habitat on James Tucker's property.

The tribe is using a grant from the National Fish and Wildlife Foundation paired with funds that Tucker is receiving from the Natural Resources Conservation Service to buy and plant native plants that will eventually out-compete the invasive grass.

The lower five miles of Tanwax Creek is infested with reed canary grass that blocks salmon migration and spawning. Imported to the area decades ago as cattle feed, reed canary infestation is a common obstacle for salmon in small streams.

When Tucker bought the property four years ago, he immediately began trying

to remove the reed canary grass, but was never able to get a handle on the problem.

"I wanted to try to restore the wetlands down there," Tucker said. "This is the property that I have; I might as well try to make it better."

After initial mowing, volunteers will plant a variety of native trees and shrubs that will eventually prevent the grass from growing back. Tribal employees and volunteers will periodically visit Tucker's property to check the plants and mow the area if needed.

Coho salmon will especially benefit from increased access to habitat in Tanwax Creek.

"Coho habitat is pretty limited in the Nisqually watershed," said David Troutt,

natural resources director for the tribe. "Coho prefer these kinds of small tributaries to the main river, like Tanwax Creek." – E. O'Connell



Rachel Simmons, a restoration technician with the Nisqually Tribe, pounds in a willow stake during a restoration project on Tanwax Creek. Photo: E. O'Connell

Tribe Watches Where the Water Flows in Ohop Valley

The Nisqually Tribe is studying how a habitat restoration project might impact groundwater in the Ohop Creek Valley. The tribe is placing piezometers – small wells that measure groundwater flow and pressure – throughout the valley floor.

Originally the Ohop Valley was a much wetter place than today. To clear the valley for farming, wetlands were drained by channeling most of Ohop Creek.

"While the farmers were able to drain most of the valley floor, they made the creek less hospitable to fish," said David Troutt, the tribe's natural resources director.

By altering the creek, the settlers also made the valley less absorbent to rainwater.

"Now whenever it rains in the valley, water quickly rushes out," Troutt said. "Fast-flowing water in the creek at any point isn't good for salmon."

"We're taking a look at what the groundwater is doing now, so we can see how much it improves later," Troutt said.

Over the next few years, the tribe and the South Puget Sound Salmon Enhancement Group will dig a new channel for Ohop Creek, providing better habitat for salmon.

The channelized creek dries out the valley in the summer. "There is less water stored in the valley floor, so when there isn't rain to recharge the creek, it becomes shallower and warmer," Troutt said. "These aren't good conditions for fish."

"There really isn't anywhere for fish to go in Ohop Creek. It went from a shallow, meandering stream that was very good for salmon to a straight deep ditch," Troutt said. "By restoring the creek, we'll not only provide more habitat to salmon, but change the flow of the water underground that is better for salmon and people." – E. O'Connell



Jesse Barham, a restoration biologist with the Nisqually Tribe, measures water level and pressure along the bottom of the Ohop Valley. Photo: E. O'Connell

Seeking Coho in Sherwood Creek



The Squaxin Island Tribe is taking a close look at where coho salmon live in the Sherwood Creek watershed.

Biologists from the tribe and the South Puget Sound Salmon Enhancement Group are looking for juvenile coho by snorkeling stretches of the stream and its main tributary, Schumacher Creek.

They'll compare the number of fish they see with data from temperature monitoring and habitat surveys. "We're not just trying to find where the fish are, but we're also trying to figure out why they're here and how well they're doing," said Sarah Haque, the tribe's Timber/Fish/Wildlife biologist. By monitoring the creek's temperature and looking closely at what kind of habitat the fish prefer, the researchers will get a better

understanding of how the watershed supports wild coho.

Coho depend on freshwater habitat more so than any other species of salmon because they spend more than one year in freshwater.

The tribe has a solid estimate of the total juvenile coho population in Sherwood because they count out-migrating salmon with a trap near the mouth of the creek. "We know pretty much how many salmon leave the system every year, but that doesn't give us a good idea of where the important rearing habitat is," Haque said.

Wild coho production is central to the tribe's salmon management planning. "Even though the tribe focuses its fisheries on abundant hatchery coho, we

would constrict our fisheries to protect a weak run of wild coho," said Joe Peters, the tribe's fisheries biologist. Because the tribe's fishery stays away from the inlets where wild coho congregate, its catch comprises more than 94 percent hatchery fish.

"The best way to make sure there's enough coho for everyone is to protect and restore the habitat they depend on," said Andy Whitener, natural resources director for the Squaxin Island Tribe.

— E. O'Connell

Above: Scott Steltzner, research biologist for the Squaxin Island Tribe, looks for juvenile coho inside a logjam on Sherwood Creek. *Photo:* E. O'Connell



Fisheries technician Bernard Afterbuffalo reads the flow of a creek in the Hoh River watershed as part of the Hoh Tribe's long-term water quality and quantity testing.

Photo: D. Preston

Hoh Tribe Guards Water Quality

Sunlight glints off the cold, clear water of Owl Creek near the Hoh Tribe's reservation on the Olympic Peninsula. On the surface, water quality and quantity don't appear to be a concern. The Hoh Tribe, however, knows that the lower reaches of 10 streams in the Hoh River watershed frequently exceed the 61-degree state standard for fish survival.

Tribal staff regularly monitor a variety of water quality indicators in the Hoh River watershed, including temperature, dissolved oxygen and turbidity. The tribe also records base flow levels for some streams, creating a record that protects fish and tribal water rights into the future.

"Folks who don't spend much time out this way assume we don't have any water quality issues because there isn't much development," said Warren Scarlett, water quality and habitat biologist for the Hoh Tribe. "Our water quality problems come from too much sediment in the water and increased temperatures that threaten fish health."

Too much sediment can suffocate salmon eggs while 70-degree or higher water temperatures make fish more susceptible to disease or kill them outright. Sediment can also prevent young fish from emerging from the gravel and impair their ability to feed by reducing visibility and killing aquatic insects they eat. Extensive road systems used to access timber sales continue to deliver a large amount of sediment to streams in the Hoh River watershed. Stream temperatures frequently range higher from reduced shade along streams as well as disrupted delivery of cooling groundwater due to timber harvest activity.

Each spring since 1999, the tribe has installed thermographs in tributaries of the Hoh River. This year, 48 thermographs were deployed on 45 different streams. Temperature readings are recorded every half hour, downloaded to computers and shared with the state and federal agencies as needed. — D. Preston

Chum Spawning in Jimmycomelately Creek

Threatened Hood Canal summer chum salmon have been spawning successfully in the restored area of Jimmycomelately Creek. The proof is in this year's returns – some of the adults are offspring of the first salmon that spawned in the restored channel of the creek in 2005.

These returns can be attributed directly to the habitat restoration that's taken place in the creek, said Scott Chitwood, Jamestown S'Klallam Tribe's natural resources director.

The tribe and the Washington Department of Fish and Wildlife (WDFW) also have seen success from the summer chum supplementation program they started in 1999 for the creek. From just seven chum returning in 1999, more than 1,000 have returned this year.

The program is largely dependent on its volunteers, which are led by WDFW's Cheri Scalf. Volunteers collect nearly 40 pairs of returning adult chum and spawn them. More than 900 adults

head upstream to spawn naturally.

Fertilized eggs are kept at Hurd Creek Hatchery for several weeks before they are returned to the creek in late October. The eggs are kept at two remote incubators on the creek. In February, when the salmon have reached the fry stage, they are moved into tanks by the volunteers and fed, then released in late March or early April.

The hours the volunteers put in are immense. In 2007, more than 800 volunteer hours were logged.

"If it weren't for this group of volunteers and Cheri's energy, I don't think the program would be as successful as it has been," Chitwood said.

The program will end in 2010, when the run is expected to be self-sustaining. – T. Royal



Volunteer Ted Shanks checks on chum eggs at a remote incubation site near Jimmycomelately Creek. Photo: T. Royal



Eyed eggs from this fall's Jimmycomelately Creek chum spawning. Photo: T. Royal

Tribes, Agencies Learn From 'The Jimmy Project'

Consider it a "how-to" guide for the next great habitat restoration project.

It's been two years since the Jimmycomelately Creek restoration project was completed. But the work didn't end then – the Jamestown S'Klallam Tribe recently released a 72-page report explaining how the 10-year, \$7 million project was started, the challenges it faced and what it took to complete it. And more importantly, it provides suggestions on how to deal with large-scale, multi-agency restoration projects.

Not a technical report, the document, *Jimmycomelately Ecosystem Restoration – Lessons Learned Report*, spells out the ups and downs of the project in an interesting and readable format.

"It's a good tool for a community group, non-profit or an agency looking to do a restoration project, or even a college student interested in habitat restoration,"

said Byron Rot, Jamestown S'Klallam Tribe's habitat program manager and a co-author of the report.

The idea for restoring the 15.4-square-mile ecosystem started in late 1996, following a massive rainstorm that flooded the creek, Old Blyn Highway and Highway 101 near the tribal center. Within days, discussions began about how to correct the resulting chronic flooding and habitat problems. These conversations evolved into what became the "The Jimmy Project."

During the eight years it took to complete the four-phase project, the tribe and their partners, including local property owners, Clallam County Conservation District, Clallam County, Washington departments of Transportation and Fish and Wildlife, and U.S. Fish and Wildlife Service, restored the creek and its estuary to a more natural state. Work

included diverting and rerouting the creek back to its historic path; removing remnants of an old log yard and restoring the estuary; and replacing two small culverts with a new bridge on Highway 101 to allow for proper flooding and fish and wildlife passage.

The report is broken down into 14 sections, detailing the work that was put into every step, including partnership development, communication techniques, engineering and design, property acquisition, permitting and monitoring of the finished product. Each chapter ends with a "Lessons Learned" section, recommending how to approach the challenges of each step and what could have been done differently. The report can be found on the tribe's Web site at www.jamestowntribe.org, under "Programs" – "Natural Resources" – "Jimmycomelately Restoration." – T. Royal

Internal Resources at Work

The Lummi Nation drew on its own resources during an instream habitat improvement project last summer in Bells Creek. Technician Chris Phair, a tribal member who had previous experience with heavy equipment, operated the excavator that placed more than 50 pieces of large wood in 400 feet of the channel of Bells Creek, a tributary to the North Fork Nooksack River.

“Having Lummi Natural Resources staff at the controls is an important step for us because we are developing our internal capacity rather than hiring a contractor,” said Jim Hansen, restoration coordinator for the tribe.

The Whatcom Land Trust contracted with the tribe to assess and improve the habitat on the property, which the trust acquired through a Salmon Recovery Funding Board grant. Lummi Natural Resources determined that placing a large wood structure in the North Fork habitat along the property would not be a good use of public funding at this time, but salmon habitat could be improved by placing wood in Bells Creek. A history of removing wood and straightening the channel for flood control left the creek devoid of the cover and pools needed by salmon.

Using Land Trust-derived Salmon Recovery Funding Board funds and a Pacific Salmon Commission grant, geologist Michael Maudlin, along with tribal technicians Phair, Frank Bob and Collin Bob, placed wood in and along the creek to restore woody cover without backing up flow in the channel. The pieces of wood were clustered to scour covered pools for spawning bull trout, steelhead and coho salmon.

The tribe also designed a project to establish a riparian buffer on two acres along the creek near its confluence with the North Fork, and plant conifer trees within 17 acres of existing hardwood stands.

– K. Neumeyer



Rootwads placed in Bells Creek are expected to help establish good salmon habitat.

Photo: K. Neumeyer



Chris Phair, Lummi tribal technician, positions a rootwad in Bells Creek. Photo: K. Neumeyer

Tribe Helps Salmon Find Resting Areas

Juvenile salmon will have more room to roam in the Nisqually watershed, thanks to a \$75,000 contribution from the Nisqually Tribe.

The tribe's gift to the Nisqually Land Trust covered the purchase of an old logging road that paralleled the Nisqually River and was removed last fall. Removing the road opened 300 acres of valuable off-channel habitat to salmon. A series of culverts under the road had been a partial barrier to fish access.

“The Nisqually Tribe has always depended on salmon, so we have an inherent interest in more salmon returning to our watershed,” said Cynthia Iyall, Nisqually tribal chair. “Salmon recovery won't happen without these sorts of projects going forward.”

“This Powell Creek project will open the largest off-channel wetland complex on the entire river,” said George Walter, chairman of the Nisqually Land Trust.

The land trust is a local non-profit whose mission is to conserve and restore natural areas and wildlife habitat throughout the Nisqually River watershed and to protect those lands in perpetuity.

“Off-channel habitat is rich in food that salmon need, such as aquatic insects,” Walter said. “If young salmon are to survive to come back as adults, off-channel habitat is vital.” – E. O'Connell



Kim Grindley, a project manager with the South Puget Sound Salmon Enhancement Group, surveys a fish-blocking culvert prior to a restoration project on Powell Creek.

Photo: E. O'Connell

Handle With Care



Top: Dahni Buesch, Lonesome Creek Hatchery manager for the Quileute Tribe (right), sorts eggs with state Department Fish and Wildlife fisheries technician John Larson.

Upper Right: Fungus on the dead and dying eggs can harm healthy eggs.

Lower Right: Brent Ramsey, Quileute fisheries technician, removes dead (white) chinook eggs at the state's Sol Duc Hatchery.

Photos: D. Preston