EDUCATE RESTORE CELEBRATE

NORTH OLYMPIC SALMON COALITION

Kilisut Beach Seining

Jake Gregg, USGS Fish Biologist in the green shirt is helping interns and volunteers identify fish from the seining.
Image by Cheryl Lowe.

By Cheryl Lowe

Last year, on a cold, damp morning in April, I found myself on a small motorboat with a few other volunteers, speeding across Kilisut Harbor toward a sheltered section of the Indian Island shoreline. I was part of a crew of community volunteers and scientists studying nature's response to the Kilisut Harbor restoration. That day would be a glimpse into a magical world I knew very little about.

Most of us know that in fall of 2020 NOSC's Kilisut Harbor project re-opened a channel that increased tidal flow and circulation in the bay, reducing water temperatures and making it possible for out-migrating juvenile salmon to easily access the sheltered marine habitats between Indian and Marrowstone Islands (Learn more about the Kilisut Restoration Project). Although NOSC and its partners anticipated that the project would enhance diverse ecological components, funding and capacity to monitor a wide range of biological and ecological responses was very limited.

"It's important to demonstrate that the restoration actually affected change in the nearshore," explains Jake Gregg, Fish Biologist at the United States Geological Survey (USGS) Marrowstone Field Station and Project Lead. He put together a team of scientists, teachers, eighth-grade students, and community volunteers who have been conducting a long-term monitoring beach-seining study since 2015. Gregg has been the overall project lead since the beginning, with Leslie Shively (Blue Heron Middle School) and Bill Kalina (Naval Magazine Indian Island) as leads in their respective agencies. Beach seining involves setting a net close to shore, in this case near some eelgrass beds adjacent to Indian Island, then pulling in the nets, putting what they caught into large floating tubs, then smaller buckets to identify fish species, count them and measure a sample number before releasing them all carefully back into the water.

"We sampled the same stretch of beach for seven years: 2015 to 2019 and 2021 to 2022. Each year we pulled four seine sets at the site over two days," says Gregg. "The primary **scientific** goal was to detect changes in the nearshore fish assemblage that resulted from the habitat restoration," he explained. "The primary **educational** goal was to show 8th graders how a fisheries research project gets done, and to let them experience the work of a fishery biologist first-hand." In all kinds of weather, with fisheries experts and volunteers assisting teams of 8th graders, the students identified, counted, measured and recorded the thousands of fish and other marine life caught in the seining nets and transferred them into sloshing buckets, then picked out one by one to record, put in a different bucket of seawater, and gently returned to the bay.

So what did they find?

Salmon!

Beach Seining at Kilisut Harbor.
Image by Wyatt Anthony (US Navy)

In spring of this year, the team saw a significant jump in juvenile salmon numbers post-restoration. Pre-restoration, a total of only six juvenile salmon were found in five years of annual beach seining. In spring 2021 (the first year after project completion), 161 salmon were counted over two days (160 chum & 1 coho). In spring 2022, the team counted 978

juvenile salmon over the same two days! (38 chum, 1 coho & 939 pinks)

That's not the whole story, though. By a long shot.

More Species Diversity
From an ecological perspective, species diversity is a fundamental indicator of habitat health. In 2022, the monitoring team counted 28 different nearshore fish species compared to a high of 19 species in any single year pre-restoration. Total individual fish counts were also much higher -- 24,640 individuals this year, which was higher than any previous year's count (pre-restoration, it ranged from 340 to 9,121 fish in any single year.) Some species only showed up post-restoration; these include penpoint gunnel, kelp perch, padded sculpin, speckled sanddab, roughback sculpin, and showy snailfish. Gregg also noted, "One other striking thing was the huge number of forage fish we captured this year--around 16,000 surf smelt and around 5,000 sand lance." These forage fish are a critical food source for salmon, larger fish, marine birds, and many marine mammals.

"In addition to water temperature data, we are also tracking Olympia oyster populations, nearshore geomorphology changes and species utilization and distribution in the areas adjacent to the restoration project site." said Bill Kalina, Naval Magazine Indian Island Environmental Site Manager. Gregg added that it's looking like temperature stratification of the water column has been eliminated in Kilisut Harbor (i.e. better mixing) and extreme temperatures (high and low) happen less frequently. Others have noted dissolved oxygen levels have improved. Salmon, shorebirds, waterfowl, shellfish and eelgrass all benefit from these changes.

A bay pipefish is one of the species found during the beach seining.
Image by Kelly Zupich

Collaboration & Key Partners
Jake Gregg serves as Project Lead for USGS Marrowstone Field Station, with support from Paul Hershberger (USGS Marrowstone Field Station Chief), Ashley Mackenzie, Willie Richards and Lucas Hart, (formerly USGS, and now Northwest Straits Commission Executive Director.)

A number of teachers from Blue Heron have been involved in the project. Leslie Shively (Social Studies) and Jenn Manning (Science and Math) were the prime movers at the school in the first few years. Other teachers included Roger Mills, Melinda Schroeder, and Niall Twomey.

Bill Kalina (Environmental Program Manager) and Sara Street (Natural Resource

Manager) from Naval Magazine Indian Island have done all the logistic work necessary to get permission to work on the base. They often bring other staff from the environmental resource office and interns from Navy Region Northwest out to help on the beach as well. The commanding officer (CO) grants access each year, and every CO has taken an interest in the project, often visiting the team on the beach during the seining.

Jake says, “For me, the most crucial piece in this project has been the expertise brought by [fellow scientists who] have spent their own time and money year after year to come out and help on the beach. We couldn’t have done it without them.” These include Dan Cooper and Lyle Britt (NOAA Alaska Fisheries Science Center); Kathryn Sobocinski (Assistant Professor, Marine and Coastal Science Department at Western Washington University); Mark Nelson (formerly with NOAA and now Finfish Biologist with the Lummi Nation) and Bridget Gregg (WSU Extension Office). Greg Jensen (University of Washington) and Pam Jenson (NOAA) have volunteered since 2017 and make it possible to positively ID crabs and shrimp captured as well as fish.” NOSC personnel and other community volunteers have also assisted over the years.

Fish caught in the nets are first put into floating tubs then transferred to 5-gallon buckets for identification.
Image by Kelly Zupich.

Putting it All Together

Gregg first heard about NOSC’s plans to reconnect Oak Bay and Kilisut Harbor in 2014. “I thought this was a great natural experiment and wondered who would be monitoring the effects of the restoration.” He learned that NOSC had no plans or funds to monitor the fish assemblage changes that occurred as a result of the restoration, nor did other state or tribal entities. Then, late in 2014, Leslie Shively, Blue Heron Middle School science teacher, contacted Jake about an end-of-year, two-day field experience she and Jenn Manning were trying to put together for 8th grade students. A beach seining was exactly what they were looking for.

The students “came out and did this work in good spirits (mostly), even when the weather was not nice. It was really great this year to tell them that THEY had demonstrated that the restoration was a success. Also, great to tell them that not everything in the environment is going ‘backwards’”, says Gregg.

I had no idea how many different species of fish are foraging and sheltering in healthy, shallow marine waters. I only see what is visible from above. A person doesn't have to be part of this annual monitoring crew to see how much has changed. Anyone who has explored the water’s edge under the new bridge can appreciate the diversity of the new channel—eddies, pools and a healthy array of seaweeds that provide choice habitat for crab, small fish and other critters. Look for sculpins, crab, nudibranchs and anemones in

the channel during any low tide. You may even see some of more unusual fish species listed above moving through.

True to NOSC's vision, community stewardship and collaborative work are at the heart of this monitoring effort. Thank you to all the students, teachers, scientists, environmental staff and volunteers who have made this possible!

Check out this video to learn more about the beach seining project:

Upcoming NOSC Projects Update

Snow Creek has downcut into its stream bed leaving behind high banks that prevent the creek from getting onto its floodplain except in very large floods. The brackets in the photo show the height of the floodplain in feet due to downcutting.

Image by Scott Katz, Natural Systems Design..

The Salmon Coalition has two budding river restoration projects which are in the design phase. One is on Snow Creek in Jefferson County and the other on the Hoko River in Clallam County. Both watersheds are being plagued by incision which is the downcutting of a streambed. Salmon are unable to thrive in an environment where the gravel they build their redds (nests) in is scoured out on even the smallest of rain events and where streambank sediment clogs the air spaces between the gravels of their redds.

One cause of downcutting is a lack of in-stream wood. On the Hoko River, wood was removed to transport timber downstream in the early days of timber harvest. A splash dam built of wood stored water and logs until the spillway was opened to release the water and floating logs on a log drive to the sea. This process tore apart the riverbed and banks and peeled any instream wood right out of the creek and it floated to sea along with the harvested timber.

On Snow Creek channel clearing and stream relocation has left the creek lacking the wood which when missing, eliminates the complex habitat that salmon prefer and also creates a fast-moving stream during high water. Additionally, on both systems tree removal has depleted a lot of the big conifers that would have fallen into the streams and helped hold the streambed elevation. As a result, these streams have cut down through 2.5 to 6 feet of streambed. This incision disconnects the streams from their floodplain. When storm flows arrive, they no longer spill out onto the floodplains and slow down. High volumes of water, course and churn their way through the confined, incised channel

corridor. The contained energy of all this water tears apart the stream bed, erodes stream banks, peels out salmon redds and washes eggs and young salmon downstream. The confined flood energy continues to drive the incision onward and downward, perpetuating the problem.

Note the height of the ground around the mature trees along the bank of Snow Creek. This was the original Snow Creek floodplain, now nearly 6 feet above the creek. A new terrace closer to the camera has formed, and even this 'inset floodplain' is too high to be occupied by our most common flood levels, creating energy that continues to scour and incise the channel.

Image by Scott Katz, Natural Systems Design.

The planned restoration projects employ an important restoration tool called ‘engineered log jams’ (ELJs) to remedy some of these problems. By mimicking a natural log jam, and building it to stay in place, the restoration project will slow flood waters, and build the stream bed back up naturally by capturing gravel and passing wood.

Engineered log jams, like these used on the 2010 Morse Creek Remeander Project, slow stream flows, collect wood on their upstream sides, accumulate gravel on their downstream sides and provide lots of instream habitat for adult and juvenile salmon to feed, hide and rest in.

Image by Kevin Long.

The projects will also be designed to connect the stream with the adjacent upland area (floodplain) during annual flood flows. Often in restoration projects, we have to work with current conditions as we restore stream habitat. In these two projects this means accepting that the modern day stream banks are much too high above the current riverbed to engage the historic floodplain and we will need to match the restoration project to stream bed elevations up and downstream. We therefore plan to lower some of the high banks, and carve out side-channels. The ELJ's and the new floodplain will combine to create a channel where the stream energy is lower and gravels being transported by the stream during floods drop out to further improve habitat. This builds nice spawning grounds for adult salmon and gives juveniles great rearing habitat and shelter from floods.

Engineers observe the lack of wood, the lack of pools and the uniform gravel sizes below a steep and scoured bank on the Hoko River.

Image by Kevin Long

The Snow Creek project is nearing 60% design. It is located on the property of our trusty partners, the Jefferson Land Trust. We expect to begin project construction in Summer 2023. The Hoko River Project is on State Parks land and is being done in partnership with the Makah Tribe and the Lower Elwha Klallam Tribe. Currently the Hoko project is at a conceptual design stage and we are pursuing grants that may allow us to put the project on the ground as early as Summer 2025. Both projects are funded by state and federal grants.

Upcoming Events

Trivia Night

Join the North Olympic Land Trust & North Olympic Salmon Coalition for an evening trivia! Win prizes and have a good time at Barhop Brewing and Artisan Pizza in Port Angeles. All proceeds from the suggested $5 donation to play will benefit local land conservation and

salmon habitat restoration.

Farmer's Market!

NOSC will be hosting an information table at multiple farmer's markets in Jefferson and Clallam County this summer! Come by to get a sticker, learn about NOSC happenings, and check out our merchandise!

Locations/Dates:

Port Townsend
July 2

Sequim
July 9

Port Angeles
July 23

The Work of RFEGs for Orca Recovery

Check out this blog post by WDFW on the importance of Regional Fisheries Enhancement Groups (RFEGs) like NOSC in helping with orca recovery!

Learn about the projects that other RFEGs are involved with in Washington by clicking here.

Kilisut Harbor Restoration Project between Indian and Marrowstone Islands. Image by John Gussman.

Donate Today

Get Involved

Base funding for the RFEG program comes from a grant from the U.S. Fish & Wildlife Service's Partners for Fish and Wildlife Program, a portion of state commercial and recreational fishing license fees, and excess egg and carcass sales administered by the Washington Department of Fish & Wildlife.

Give Us Your Feedback

Questions or Comments? Let us know what you think!

outreach@nosc.org
360.379.8051
www.nosc.org