NOOKSACK SALMON ENHANCEMENT ASSOCIATION

FISH TALES

Striving to recover salmon by engaging our community in restoration, education and stewardship.

Volume 25, Issue 2 • Fall 2017

THE NEWSLETTER OF THE NOOKSACK SALMON ENHANCEMENT ASSOCIATION

Welcome to NSEA! Renovations Complete!

By Rachel Vasak
Executive Director

Thank you for the patience and support you've shown this organization over the past four years while NSEA moved (2013), completed the conditional use permitting process (2014), wrapped up the successful capital campaign (2016), and finished the remodels and construction that were funded by the campaign (2017).

This has been a tremendous journey and it would not have happened without your support. Thank you!

Now that the construction is complete, please come see what has been accomplished with your help. The 6.33 acre property has been transformed!

The art at the front of the property invites visitors toward the native plant demonstration garden that was designed to mimic a restoration site. There is a potting shed with outdoor seating, and a new shop for tool storage across the driveway from the native plant nursery.

On the north side of the property is a new community building that hosts a resource room for interns, a public meeting room, a large storage bay for program and outreach supplies, and a laundry room. Finally, there is the renovated farmhouse and outbuilding used for office space.

These pictures offer a "virtual tour," but know we would love to show you around if you could stop by the facility for a visit. After all, NSEA is a community-based organization, and you are our community. This is your facility – we just work here!

Please come visit anytime NSEA's gates are open.

The "5 Salmon" sculpture greets staff and visitors and reminds us who we work for.

The shop provides storage and space to organize tools and materials used for restoration projects.

The native plant demonstration garden is designed to encourage restoration and landscaping with native plants.

Nooksack Salmon Enhancement Association
3057 East Bakerview Road
Bellingham, WA 98226
www.n-sea.org

Return Service Requested

NONPROFIT ORG.
U.S. POSTAGE
PAID
LYNDEN, WA
PERMIT NO. 20

The native plant nursery holds more than 10,000 native trees and shrubs, waiting to be planted by students and volunteers along salmon-bearing streams to improve salmon habitat.

FISH TALES

Fish Tales is a biannual newsletter of the Nooksack Salmon Enhancement Association (NSEA).

Opinions expressed in *Fish Tales* are those of the authors and do not necessarily represent the official position of NSEA.

Original articles, unless specifically noted, may be reprinted without permission if appropriate credit is given to this publication. Please contact NSEA before reprinting any graphics.

NSEA welcomes articles, photos and artwork.

Please submit articles via email to info@n-sea.org.

NSEA Contact Info:
Mail: 3057 East Bakerview Road
Bellingham, WA 98226

Phone: (360) 715-0283
Email: info@n-sea.org
On the Web: www.n-sea.org

Fish Tales Production:
NSEA Staff, *Editors-in-Chief*
Theodore Parker-Renga, *Copy Editor*
Thom Barrie, *Layout*

Print date: November 2017

From the President:

Why Do They Come?

When I go to NSEA work parties, I always marvel at the number of people who decide to join us. I frequently ask volunteers, guests and local stakeholders, "Why did you come?"

It's a simple question that even I have a hard time finding the right words to answer. The gist of many answers is that volunteering for NSEA just "seemed like a good thing to do."

While I am grateful that so many consider NSEA "a good thing," my impression is that some answering my question did not find the words they needed to express themselves fully.

Nonetheless, "good" is great every time I hear it.

Phelps McIlvaine, NSEA Board President

State of Self-Actualization

Many of you will remember Abraham Maslow's hierarchy of needs. At the base of the hierarchy are physical needs to preserve life, the need for safety that creates feelings of comfort and security, the need of belonging (love) leading to a feeling of strength and warmth, and the need for the appreciation and recognition of others creating self-esteem or confidence.

Maslow postulated that people seek these things in their lives because they live in a "deficit" when these things are not present. But when these primary needs are met, a person then seeks self-actualization, a state in which people are at their very best.

Maslow theorized that humans are hardwired to self-actualize, and when humans self-actualize, they are able to live with nothing taken away. Kurt Goldstein expressed self- actualization as "the desire to give to and/or positively transform society," in his book *The Organism: A Holistic Approach to Biology Derived from Pathological Data in Man*.

"Feels Pretty Darn Good"

"Self-actualized people are guided by their inner values, appreciate life, form deep relationships, are accepting of other people and express themselves freely and clearly," stated Stephen Joseph, Ph.D., in this article "What Doesn't Kill Us" published on www.pyschologytoday.com.

It struck me that self-actualization is a pretty good description of what happens at NSEA work parties. It explains why mud, rain, snow and wind have little impact on our volunteers. While NSEA's sponsors provide great food and drink at outdoor events, it seems unlikely food is the main reason why people come.

As Maslow suggested, our volunteers may be hardwired to seek the comradery, enthusiasm, cooperation, optimism, intent and resolve of those engaged in caring for our watersheds. These are emotions that fulfill some of our highest psychological needs. We seek them as a matter of human nature. Our motive is built in. We can feel it even when we have a hard time saying it.

If I am right, those of us who volunteer for NSEA are quenching an inherent human thirst. In its simplest form, the reward that comes from volunteering is something many of us crave. For me, I have to admit it feels pretty darn good.

Our Hierarchy of Needs

For the last 25 years, NSEA has worked through its own hierarchy of needs. Mike McRory started with the basics – motive, tools, gloves, garbage bags and a sweet old truck. Slowly but surely, NSEA has matured. Today, our operations and administration are top drawer. Our physical plant and equipment are the best in the business. Our community support is the pride of the Regional Fisheries Enhancement Group (RFEG) Program. The NSEA brand is well established and trusted. Now, NSEA must embark on our own form of self-actualization.

NSEA has always relied to some degree on grant funding for our well-established programs, including stream restoration projects, educational programs, landowner outreach and monitoring. In the future, however, NSEA will have to seek greater financial independence and a more varied audience of funders to establish our new identity. NSEA must expand and accelerate our impact on the residents and watersheds of Whatcom County. I use the word accelerate intentionally.

Strategically and Soon

Earlier this year, the NSEA board invited Greg Epperson, conservation director at the Whatcom Land Trust (WLT), to share WLT's strategic plan for land preservation in Whatcom County. He noted that by 2040, the US Census estimates forecast the greater Seattle area may grow by 1,400,000 people; the greater Vancouver, B.C., area may attract another 800,000 people; and the population of Whatcom County may increase by 75,000 people. Whatcom County grew by 3,670 souls last year alone. Nothing focuses strategic planning like the arrival of 2,200,000 people for dinner.

The economic forces behind these forecasts are significant. Seattle's technology industry has created the strongest state economy in the nation. The myriad of relationships between Seattle, Vancouver, B.C., Hong Kong and mainland China generate vast international trade in technology and commodities. As Asia grows, international trade is likely to continue to expand, attracting more job seekers and immigration to the Pacific Northwest.

Even if these population growth estimates are off by half, the potential environmental impact of such rapid population growth is considerable.

For NSEA, this means we have less time to reach more people through education programs, do more stream restoration work and find more ways to improve our lowland watersheds quickly. NSEA has less time than we thought even five years ago. NSEA needs to grow. It is possible to create a stronghold for wild salmon even in the midst of major metropolitan expansion, but we need to act strategically and soon.

NSEA will build a model for self-sustaining wild salmon runs in Whatcom County for the rest of the Pacific Northwest to follow.

– Phelps McIlvaine
NSEA Board President

Salmon Science

Aquaculture: Farming Atlantic Salmon in Marine Net Pens in Washington

By Dave Beatty
NSEA Board Member

In North America, the native range of Atlantic salmon *(Salmo salar)* is from coastal drainages of northern Quebec southward to Maine and previously to the Housatonic River in Connecticut (possibly to the Hudson and Delaware rivers at an earlier time) and inland in the St. Lawrence River to Lake Ontario, where they became extinct.

In Europe, it is native from inside the Arctic Circle to Portugal. Overall, wild populations of Atlantic salmon (AS) are significantly reduced throughout its natural range in eastern North America (ESA listed as "endangered" in Maine) and western Europe.

The Washington State Department of Natural Resources (DNR) issued an Aquatic Lands Net Pen Lease No. 20-B12517 to American Gold Seafoods LLC (a subsidiary of Icicle Seafoods) for aquatic lands at Cypress Island's Deepwater Bay. The term was for 15 years beginning on Jan.1, 2008, and ending on Dec. 31, 2023.

Earlier, three groups of net pens were permitted and constructed between 1983 and 1986 at Deepwater Bay. Starting in 1999, new pens with structural improvements replaced the old pens at the three sites (1, 2 and 3) for a total of thirty 24-meter by 24-meter cages in three rafts: 8 at Site 1, 10 at Site 2, and 12 at Site 3.

Cooke Aquaculture, a New Brunswick, Canada, company, bought Icicle Seafoods in 2016 and became the tenant to rear AS in these marine pens. Cooke also has DNR-issued leases for aquatic lands for AS farms at Hope Island (Skagit Bay), Bainbridge Island (Rich Passage) and Port Angeles.

Escaped Salmon

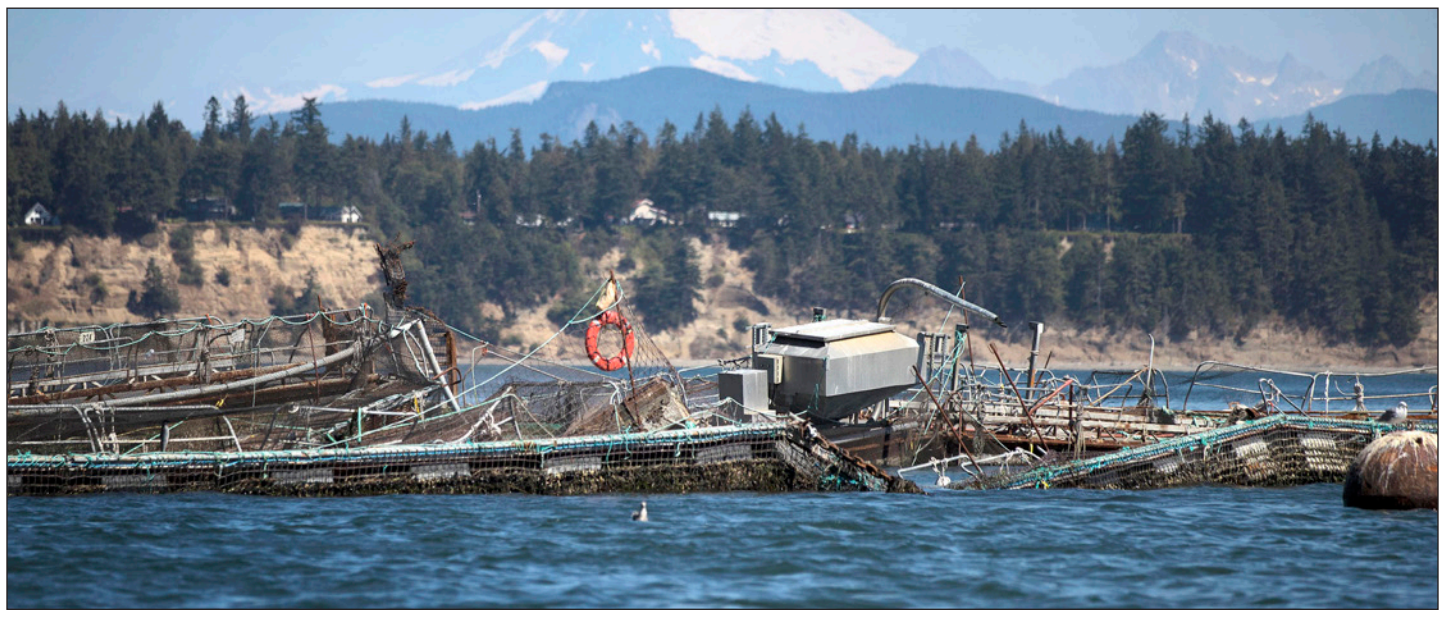
On Aug. 19, 2017, the rectangular raft of floating cages at one of the Cypress Island sites, containing approximately 305,000 nearly-ready-for-market AS, collapsed into a mass of nets and twisted metal. At least 160,000 fish escaped into the open ocean and began moving throughout the area of the Salish Sea and beyond.

Lummi Nation fishers, seining for fall Chinook several miles away, were likely the first to notice the escapees when several AS were caught within a short time of their escape.

Although Cooke spokespersons attributed the collapse to high tides, strong tidal currents and it coinciding with the solar eclipse, the tides were not unusually high and they implied the role of the eclipse was spurious.

The collapse was due to previous damage to the raft, raft anchors loosening and insufficient pen maintenance as the company attempted to obtain a few more weeks of fish growth before marketing the fish and replacing the pens under a permit previously granted by the state.

The escaped AS were of special concern within the Lummi Nation, other fishers and three state agencies (Washington's Department of Fish and Wildlife [WDFW], DNR and Department of Ecology) with regulatory authority on net pens.



Atlantic Salmon Pen-photo taken from kuow.org

Myriad of Concerns

Included in the tribal concerns and those of others and featured widely in the news: Will the escapees prey on juvenile Pacific salmon (PS) and the prey of PS? Will they enter streams (AS are fall spawners) and vie for space with PS or otherwise disrupt PS spawning? Will they spawn successfully and thereby produce wild populations that become colonized throughout the area? Will they hybridize with PS? Will they transmit diseases and parasites to PS?

There are no definitive answers to these questions other than there has never been a successful mating of AS with PS, even under controlled laboratory conditions, to produce viable hybrids. Controlled and natural mating can occur between species of PS (genus Oncorhynchus), but do not occur naturally to any significant extent because reproductive isolating mechanisms exist, such as behavior, time of spawning (temporal), site of spawning (spatial) and even being genetically incompatible.

Interestingly, rainbow trout *(O. mykiss)* will hybridize with native cutthroat trout *(O. clarkii)* but steelhead (anadromous rainbow) do not normally hybridize with anadromous sea-run cutthroat, perhaps due to spatial and temporal segregation when spawning.

Will AS mate with steelhead to produce viable hybrids? The AS used in salmon farming start spawning in early October and finish by the end of November, whereas wild steelhead in western Washington spawn from March through June. This would seem to eliminate any chance for hybridization in the wild. Furthermore, nonnative rainbow trout have been introduced in the native range of AS with no evidence of naturally produced hybrids.

It has been postulated the ancestral salmonid line leading to the genus *Oncorhynchus* diverged from the line leading to the genus *Salmo* over 15 million years ago and subsequent speciation within the genus *Oncorhynchus* started about 10 million years ago. Thus, the evolution of species within the two genera has been separated for so long as to prevent natural hybridization.

Impact on Pacific Salmon

It is documented that farmed AS escaping from net pens in British Columbia have spawned successfully (juvenile AS have been seen) in a few rivers on northern Vancouver Island. However, there is no evidence of wild AS (the escapee's progeny) persisting to spawn in subsequent years either as freshwater resident fish or as truly anadromous fish.

There are ongoing studies on whether farmed AS is a source for the infestation of sea lice (a parasitic copepod) on juvenile PS that swim into or close to the pens and are infected to lethality with the parasite. Likewise, there are studies to determine whether farmed AS transmit virus and bacterial diseases to PS.

The farmed AS are fed a specific diet of pellet food to obtain optimum growth, quite different from the natural food these fish would find in the open ocean. Consequently, predation on juvenile PS, although a concern, is not likely to be significant. However, stomach analysis on caught AS is essential to measure the extent of predation.

Unless there are large numbers of the AS reaching the PS spawning areas, vying for space or otherwise disrupting PS spawning is unlikely. However, if runs of PS continue to decline, the presence of substantial numbers of AS could be a significant competitor.

Fairly Common

Escapes of farmed salmon are a common occurrence. From 1996 through 2006, the industry reported to WDFW that more than 860,000 AS escaped from fish farms in Puget Sound, with 369,000 escaping in 1997 and none in five of the years. The industry reported to the provincial government that more than 280,000 AS escaped from pens in British Columbia (B.C.) from 1996 through 2005. Escapee numbers for 2007 through 2017 were not available for this article.

One can assume further significant escapes occurred in Puget Sound and B.C. in the years since, as witnessed here in 2017, and that the industry reporting is not necessarily accurate. Ongoing, independent monitoring for the numbers of escapees and whether they are affecting PS is required.

Alaska has a ban on farming finfish, such as AS. In 2005, Oregon listed AS to be one of the "100 Most Dangerous Invaders to Keep Out of Oregon," and California prohibits spawning, incubating or cultivating any exotic (meaning non-native) finfish in waters of the Pacific Ocean regulated by the state. NOAA Fisheries and WDFW have concluded the fugitive AS do not do well in the wild and are unlikely to threaten PS and other native salmonids.

AS smolts for the Washington net pens are produced from adult broodstock at the Cooke Aquaculture Hatchery near Rochester, Wash. At an earlier age, the smolts were treated with a regime of temperature changes to thermally mark the otoliths (a pair of ear bones near the brain) with a specific pattern that can identify the hatchery source of adult AS should they escape, then be captured and the otoliths removed and analyzed.

This marking-the-otolith technology is also used with certain species of PS to identify the hatchery of origin of cultured fish when caught as adults. AS smolts are tested and must be disease-free at the time of transport from the Cooke hatchery to its net pens.

Why Atlantic Salmon?

During the 20th Century, there were numerous attempts worldwide to introduce AS outside its native range, including into Washington, Oregon and California. None were successful in producing self-sustaining populations.

The first introduction in Washington occurred in 1904 and continued sporadically until 1981. Governments (federal and provincial) in B.C. made numerous attempts between 1905 and 1935 to establish AS by planting more than 8 million juveniles, mainly on the east coast of Vancouver Island and in the lower Fraser River. The plants were not successful in establishing any populations.

The introductions were done hoping for another anadromous species primarily for recreational fishing because many fishers considered AS superior to native species of salmonids.

If there is to be aquaculture of salmon on the West Coast, why are AS used and not PS? Commercial aquaculture of AS began in the early 1970s in Norway (native range) and developed extensively to be a significant Norwegian industry (the world's largest producer of farmed

Please continue on page 8

Education

New FLOW Program Cultivates Future Leaders

NSEA volunteer intern Tanner Kamila instructs a group of fourth-graders from Wade King Elementary School on how to conduct a habitat assessment during a Students for Salmon field trip.

By Annitra Peck
Program Director

Mentorship and leadership training is not a new thing at NSEA.

For more than 20 years, NSEA staff has been helping individuals find and define their career paths in the conservation field via training, participation and leadership through our community-based programs with real-world application.

However, Future Leaders of Whatcom Waters (FLOW) is a new internship program – directly funded by the Alcoa Foundation – that builds on these previous efforts to formalize a program for recruitment, training and support for volunteer interns. Through the FLOW Program, NSEA staff will train and ready young adult leaders by developing professional skills, building their knowledge and increasing their abilities.

The development of an environmental training and intern program was identified as a goal in NSEA's 2017-2020 strategic plan adopted by the NSEA board.

Through NSEA's competitive FLOW Program, college students and recent graduates will work directly on environmental education, habitat restoration and salmon habitat-focused stewardship. Interns will receive supervision and mentoring from NSEA's professional and expert staff, which will create a structured and formative experience.

FLOW Program interns will gain job skills while they serve in critical roles. In doing so, they will increase NSEA's capacity to meet community needs by implementing core environmental programs: Stream Stewards Restoration Work Parties, Students for Salmon education program, Nooksack River Stewards outreach program and Scientific Habitat Monitoring.

Additionally, interns will learn how community partnerships can result in cooperative action, illustrating valuable methods to address local environmental problems. The results of the FLOW Program will strengthen our community, create informed citizens, improve environmental conditions and sustain healthy watersheds in Whatcom County.

Annually, through the FLOW Program, 55 young professionals from the Whatcom County area will advance their professional experience and, in the process, benefit the environment and the community around them tremendously.

A group of stream restoration interns gathers for a photo after leading a community work party along Terrell Creek.

Students for Salmon Program Works Toward Reducing Carbon Footprint

By Annitra Peck
Program Director

NSEA's Students for Salmon program is in its 18th year, continuing to build capacity and gain respect from schools throughout Whatcom County.

The program provides a unique opportunity for fourth-graders to deepen their understanding of salmon habitat needs, learn environmental indicators and recognize local environmental issues and impacts salmon are facing. Students and their families discover ways they can become active stream stewards in the community.

Offered at no cost to participating schools, the program gives teachers a series of building blocks linking classroom teaching to NSEA-led outdoor exploration, maximizing learning.

The Students for Salmon program consists of four main components for each classroom:

1. NSEA-led classroom intro presentation (1 hour)
2. NSEA-led field trip working through three learning stations and an active restoration work project (5 hours)
3. NSEA-led classroom post-visit with pledge ceremony (1 hour)
4. Teacher-led *Students for Salmon* curriculum, supporting the Next Generation Science Standards

Traditionally, schools have reserved buses for students to get to the NSEA-led, outdoor field trip component. Recently, NSEA staff and our long-standing Education Committee identified and increased field trip locations within walking distance for students. During the 2016-17 school year, **67% of the 26 schools were able to walk**. That is more than 1,000 students!

This created a beneficial shift not only for the financial bottom line but, more importantly, for students to get a sense of place in their watershed through foot travel. Students were able to release extra energy and be introduced to new green spaces and the inter-urban trail system, while reducing the program's dependency on fossil fuels.

NSEA additionally reserved funding to purchase a Nissan LEAF, utilizing an electric vehicle for many program travel needs.

NSEA's Nissan Leaf

We are working to increase the percentage of schools that can walk to field trip sites by working with area partners and landowners. This is not possible at every school, but we do have goals to reach at least 80% of students, reducing busing costs and reservation competition and further getting students outside and learning from their local environment.

Welcome Kyle Bradshaw and Vilina Sanburn-Bill, NSEA's New Education Coordinators!

Kyle Bradshaw

Vilina Sanburn-Bill

Kyle Bradshaw is an Olympia, Wash., native who recently graduated from Calvin College in Grand Rapids, Mich., with degrees in geography and community development. He loves hiking, kayaking, playing sports, gardening, cooking creative meals and reading good books. Kyle remembers learning about salmon as a fourth-grader in Olympia and is excited to be swimming upstream, back to Washington, to help continue the legacy of environmental education.

Vilina Sanburn-Bill grew up in the San Juan Islands and has always been in love with the Pacific Northwest. Both her parents spent time salmon fishing in southeast Alaska and Vilina spent the summer before high school on a tender in Lynn Canal. Her love of science and learning led to an internship with NSEA last year while taking time off from earning an environmental science degree from Western Washington University. Vilina aspires to be a high school science teacher; she believes that a love of learning and science should be cherished and inspired in everyone, especially children. This position is the combination of her many passions.

Volunteer and Stewardship

NSEA Salmon Sighting Events: FREE AND FUN!

Salmon Sighting Event at Oyster Creek, November 2016

By Annitra Peck
Program Director

Bring family and friends and celebrate the return of salmon to Whatcom County streams at free salmon sighting events on Saturdays in November, hosted by NSEA.

Perhaps more than any other creature, salmon define the Pacific Northwest. From a legacy in Native American culture to a role in the development of the Washington Territory, salmon are a vital link to the region's history and the health of its ecosystems and natural environment.

To observe salmon spawning in the wild is to watch the wondrous beginnings of life and the final stages of nature's cycle. The best time to view spawning salmon is mid-October through November and a few days after a big rain.

Join NSEA naturalists along a local creek while viewing salmon with a hot beverage in your hands. It's the ultimate family outing, or great first date! Folks all ages will enjoy learning about native fish in our local streams and how NSEA is working to improve healthy habitat.

It may be raining – and we'll be there rain or shine – so please dress for the weather, wear comfortable waterproof shoes and exercise caution when parking and/or crossing roads. Some sites involve a hike to the stream (especially Arroyo Park). All locations have restrooms, hot beverages and snacks, prizes and more. Please join us!

Respectful Salmon Viewing Tips

- Approach a stream slowly and stand quietly at the edge. If you move quickly, salmon may assume you are a predator.
- Look for a "tail out" pool where gravel is about an inch in diameter.
- Observe females scooping out a depression in the gravel while one or more larger males fight for position.
- Wear polarized sunglasses to cut down on glare.
- Stay out of the stream to avoid damaging salmon eggs.
- Maintain control of pets, which may harm or scare spawning salmon.
- Be respectful of private property by staying next to roads or on public property.
- Stay on trails where they exist. Never trample streamside vegetation.
- Don't mourn for dead salmon or worry about carcasses in the stream. Decaying salmon release nutrients that become a critical part of the food chain.
- Have fun and enjoy!

Fall 2017 Community Work Party Schedule

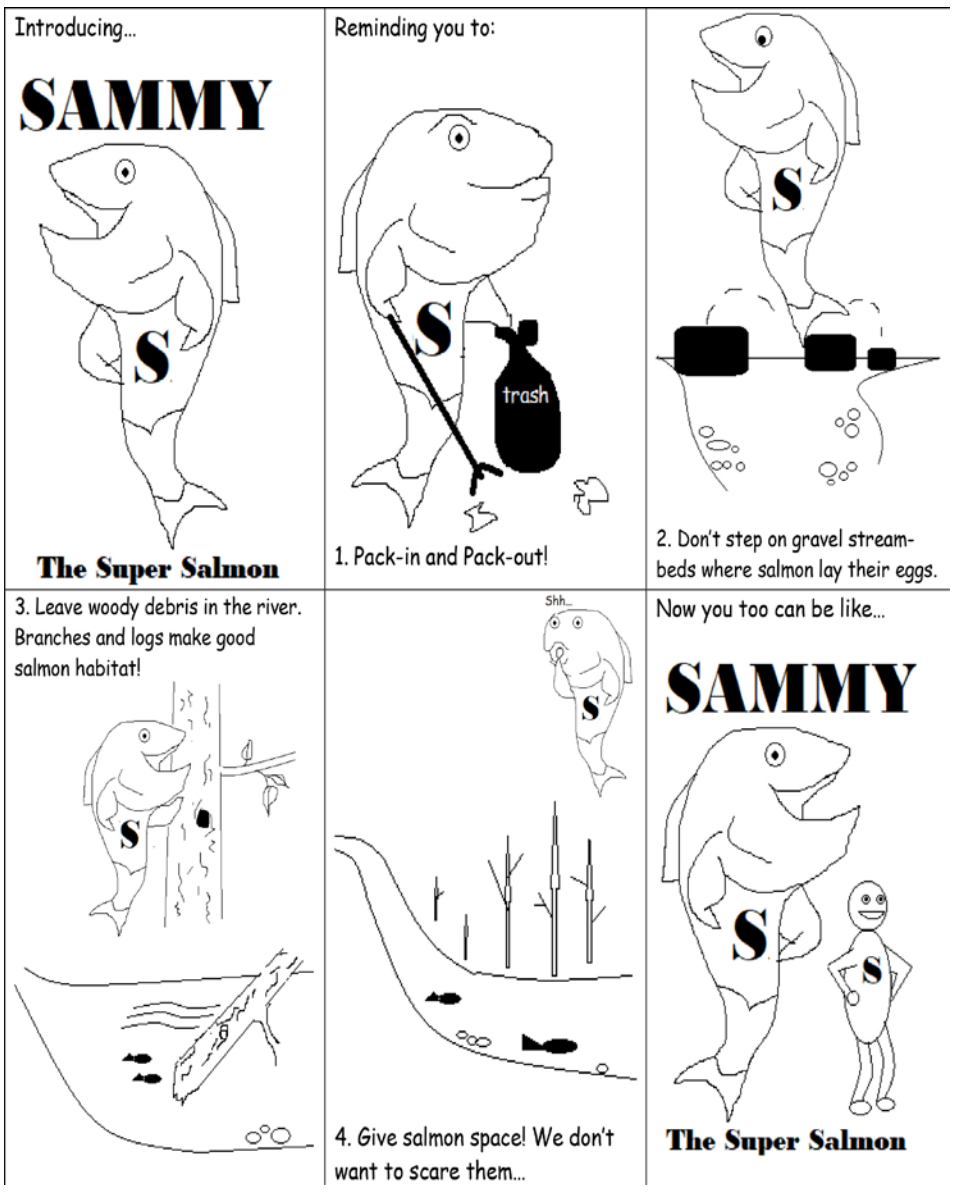
Whiskey Creek Work Party	Nov. 4	9am–12pm	Park at El Nopal Restaurant in Ferndale
Maritime Heritage Work Party	Nov. 11	9am–12pm	Maritime Heritage Park
NSEA Garden Party	Nov. 14-17	12pm–4pm	NSEA native plant nursery
Landingstrip Creek Work Party	Nov. 18	9am–12pm	Park at Acme Elementary School
Squalicum Creek Work Party	Dec. 2	9am–12pm	Park at the end of W. Orchard Dr. in Bellingham
Squalicum Creek Work Party	Dec. 9	9am–12pm	Park at the NSEA Campus

For specific information, especially driving directions, please visit NSEA's website: www.n-sea.org/work-parties.

Welcome Raena Anderson, NSEA's New Volunteer Coordinator!

Raena Anderson

Originating from Hawaii and growing up in Arizona, Raena Anderson understands the importance of protecting and improving freshwater ecosystems. She studied environmental science at Western Washington University. Passionate about community engagement and restoring local habitats, Raena volunteered with NSEA as a stream restoration intern before becoming NSEA's new volunteer coordinator. In her free time, Raena loves to go trail running and camping with her husband and two dogs.



CREW CORNER

Welcome — New Washington Conservation Corps Crew

By James Van der voort
WCC Crew Supervisor

Along with rain and cooler weather, October has brought five new Washington Conservation Corps (WCC) members to the NSEA team.

As an AmeriCorps program, WCC creates future leaders through community involvement and mentorship. For nearly two decades, NSEA has sponsored one of WCC's 55 field crews, which restore critical habitat, build trails and respond to local and national disasters.

This year will be special for our WCC crew. We've added a new partnership with Whatcom County Parks and Recreation, so the crew will aid in building a new trail in the Lake Whatcom park system at Lookout Mountain Forest Preserve, along with helping at NSEA.

Crewmembers are excited for a year serving with NSEA and Whatcom County Public Works, having spent their first week working along Squalicum Creek and Dakota Creek.

Washington Conservation Corps crew members, from left: Supervisor James Van der voort, Chelsea Blank, Molly Adshead, Brad Morin, Damian Howder and Josh Assink

Chelsea Blank

I love salmon, I love being outside and I love things that are difficult. I figured working with WCC would be a good way to incorporate the things I love into my everyday life. I graduated with a bachelor's degree in environmental policy from Western Washington University, but have always been interested in learning more about science and the connection of everything! I want to save the salmon, so I can eat the salmon, so I can save the salmon some more.

Molly Adshead

Born in Coquitlam, B.C., I moved to Maple Valley, Wash., where I graduated high school. I've worked with a nonprofit in California and volunteered at multiple farms, all the while developing my passion for living creatures and the outdoors. I'm looking forward to contributing to the community here and learning more about Whatcom County while doing it.

Brad Morin

I began my journey in Spokane, WA, then moved to Bellingham, where I earned a bachelor's degree in environmental science with an emphasis in terrestrial ecology from Western Washington University in the fall of 2016. I enjoy wildlife so much that often I fantasize about leaving society to live amongst the wolves. The thing I am most excited about for my term with WCC is the opportunity to spend all day outside.

Damian Howder

I grew up on a small ranch in a rural community north of Spokane, Wash. I've spent my entire life enjoying the outdoors, which has inspired me to pursue a career protecting the environment. I graduated from Eastern Washington University with a bachelor's degree in biology, moved to Bellingham and spent a year with WCC on the Washington State Department of Natural Resources Northwest trail crew. I am hoping to expand my resume this year with NSEA, continuing on my path to becoming a full-time conservationist.

Josh Assink

I'm back for another six months with NSEA and WCC. My hair is a bit longer – my passion for salmon even stronger. After a full year with this organization, I am grateful it will have me back to finish my AmeriCorps term. I'm excited to restore some major habitat with our amazing volunteers and hope to see you all out in the mud. Don't be afraid to say "hi." I, like many of you in Whatcom County, love beer, baseball and bikes.

NATIVE PLANT CORNER

Western Red Cedar a Boon to Salmon

By Katie Storrs
Habitat Restoration Coordinator

Western Red Cedar *(Thuja plicata)* is an evergreen, coniferous tree native to western North America. Its species name plicata derives from the Latin word "plicare," which means braided, referring to the pattern of its small leaves.

Native peoples of this area use Western Red Cedar in many ways. Its fibrous bark is used to weave baskets and ropes, as well as make clothing and hats. Its trunks are carved into canoes, tools or boards to build houses.

What do these trees have to do with salmon? Well, a lot! These trees are commonly found in riparian zones (the areas beside streams), providing excellent shade to keep the water cooler for salmon. Their expansive roots also hold the banks together to prevent erosion, which helps keep the water clear, allowing salmon to see and breathe well.

When a Western Red Cedar tree falls into the stream, it provides invaluable habitat for juvenile and adult salmon. The flow of water is forced downward, carving pools into the streambed. This creates deep, cold and safe places for tired spawning salmon to rest or juveniles to hide from perilous predators, such as larger fish and birds.

NSEA grows Western Red Cedar in its native plant nursery for restoration projects.

Welcome Katie Storrs, NSEA's New Habitat Restoration Coordinator!

Katie Storrs holds a bachelor's degree in environmental sciences from Western Washington University. She put her education to use serving as an environmental conservation volunteer in Paraguay from 2014-2016. A fan of water and the cooler Pacific Northwest weather, Katie is excited to be home and focus her efforts to restore salmon habitat. For fun, Katie likes to kayak, spend time in the parks, hike, salsa dance and practice speaking Spanish!

Katie Storrs, NSEA's new habitat restoration coordinator, sips tea.

NSEA 2017 Instream Season Update

By Darrell Gray
NSEA Project Manager

NSEA has had a productive and successful instream construction season in 2017! NSEA would like to thank all the amazing landowners we have had the pleasure to work with this summer and the project partners, donors and funders who made these projects possible.

We removed 12 fish passage barriers on various streams in Whatcom County improving fish access to over eight miles of upstream habitat. This involved the replacement of barrier culverts with bridges and the replacement of four barrier culverts with appropriately sized and installed culverts.

NSEA also installed large woody debris (LWD) at four project sites to reduce streambank erosion and improve instream habitat while working to establish a heathy and diverse riparian buffer.

Creek	Landowner	Project	Miles of upstream habitat opened	# of LWD structures installed	Funding	Primary partners
California Creek tributary	Nicholas, Steve	Removed barrier culvert / installed 30'x12' bridge	2.0		NRCS Environmental Quality Incentives Program	WDFW, Whatcom Conservation District
Dakota Creek	Hruthfiord, Don, Dave, and Steve	Removed 2 barrier culverts / installed 2-35x12' bridges, Replaced 1 barrier culvert with 25'x8' culvert	0.7		NRCS Environmental Quality Incentives Program	WDFW, Whatcom Conservation District
Deer Creek	DeGroot, Bill	Removed barrier culvert / installed 40x16' bridge	0.6		NRCS Environmental Quality Incentives Program	WDFW, Whatcom Conservation District
Fishtrap Creek	Ohligschlager, Dave and Amy	LWD placement		5	WDFW	WDFW
Fishtrap Creek	Wollmann, Martin and Dianna	LWD placement		3	Landowner	WDFW
Friday Creek tributary	Lutherwood Camp and Retreat Center	Replaced 3 barrier culverts with 25'x8' culverts, Replaced 1 barrier culvert with 30'x12' bridge	0.3		NRCS Environmental Quality Incentives Program	WDFW, Whatcom Conservation District
High Creek	Phy, Jim	Removed Barrier culvert / installed 50'x16'' bridge	3.1		SRFB Family Forest Fish Passage Program	WDFW
Innis Creek	Whatcom Land Trust	Removed barrier culvert / installed 70'x12' bridge	0.6		NRCS Environmental Quality Incentives Program	WDFW, Whatcom Conservation District
Silver Creek Tributary	Pomeroy, Jonnie and Jerry	Removed barrier culvert / installed 50'x14' bridge	1.3		NRCS Environmental Quality Incentives Program	WDFW, Whatcom Conservation District
Squalicum Creek	Clark, Chad	LWD placement		9	WDFW, WDOE	WDFW, WDOE, Strider Construction
Terrell Creek	Ellis, Darrell	LWD and spawning gravel placement		6	WDFW, Whatcom County BBWARM	WDFW
Totals			**8.6 miles**	**23 LWD**		

Terrell Creek

Large woody debris and gravel were added to this dredged reach of Terrell Creek to raise the level of the streambed and increase instream habitat diversity by creating deep pools, cover and improved spawning habitat for salmon.

High Creek before

High Creek after

Silver Creek before

Silver Creek after

Remembering Dave Barker

NSEA is sad to report that crew member and restoration / survey technician Dave Barker passed away on August 30, 2017, while reefnetting on Lummi Island. Dave and his wife Karen have been reefnetting on Lummi Island since the late 1970's. Our hearts go out to Karen and the rest of his family and friends. Karen said working at NSEA was one of the loves of Dave's life and we certainly loved having Dave with us all these years.

Dave started working with NSEA in 1999 after receiving an Environmental Technician degree from Skagit Community College. Dave worked with NSEA's original displaced natural resource worker crew doing much of NSEA's instream and riparian restoration projects to improve salmon habitat. Dave's attention to detail and calm manner made him the leader of our habitat assessment activities, crucial to NSEA's project prioritization and development. Dave's prior surveying experience made him invaluable to our fish passage evaluation activities, instream project design and monitoring.

Dave made many great friends in his 18 years here at NSEA. His constant good nature and patience made him an excellent teacher and mentor to numerous Washington Conservation Corps and AmeriCorps crewmembers over the years. Dave loved working at NSEA; walking all day, collecting data, and enjoying the beautiful outdoors. He had recently scaled back on his hours in semi-retirement but still worked a few days here and there over the past couple years doing survey work and instructing new staff in habitat assessment protocols.

Dave Barker, pictured here surveying along the North Fork of the Nooksack River.

We are definitely at a loss without his presence but feel grateful for the time he spent with us. Dave's legacy will not be forgotten. His time at NSEA is memorialized on the staff board in the community meeting room (18 times!) and is also carved into a stone at the five salmon sculpture.

Salmon Science Continued from page 3

salmon) in coastal areas. The aquaculture of AS was extended to other areas within its native range in Europe, eastern Canada and Maine.

The Norwegian industry developed the technology for the successful rearing of AS in marine cages and in the process developed strains of AS that are docile and grew especially well on formulated pellets. Thus, AS are more adaptable and cost-effective in net pen rearing than Chinook and coho that were used previously in salmon farms in the Puget Sound and B.C.

Thus, aquaculture of Chinook and coho shifted to the favored and essentially domesticated strains of AS.

Salmon aquaculture in Washington is considered a form of agriculture and the species used seems of little significance. A move to land-based, closed containment rearing of AS should be mandated by the state and marine net pens eliminated. However, closed containment is likely more expensive for the production and economics are always a major political factor in resource industries. It is incongruous that AS are allowed in Washington net pens but otherwise is regarded as an invasive species.

GMO Salmon

There is no approval or current plan to raise transgenic AS (the AquAdvantage salmon, a genetically modified organism, of AquaBounty Technologies, Mass.) in West Coast marine-based farms or land-based, closed containment farms.

The U.S. Food and Drug Administration approved the transgenic AS for human consumption in November 2015. Health Canada and the Canadian Food Inspection Agency approved its sale in Canada in May 2016, and it is now marketed in Canada.

Current production occurs in closed containment facilities in Panama from transgenic eggs produced in a Prince Edward Island hatchery. AquaBounty is anticipating land-based, closed containment production in eastern Canada and at a U.S. Midwest site by 2019 once permits are granted in each country. Currently, the issue of labeling the transgenic salmon keeps it out of the U.S. market.

The transgenic AS, which grows faster, carries a heritable gene construct from Chinook salmon and an ocean pout for ongoing release of Chinook growth hormone throughout the year, thus the rapid growth rate. Escape of the transgenic AS into the AS's natural range has the potential for producing hybrid AS progeny carrying the transgene to future wild populations. This is not an issue on the West Coast, unless the transgenic AS is ever approved for production in West Coast waters, escaped and had an impact on PS beyond that of non-transgenic AS.

For other pertinent information, visit www.dnr.wa.gov/atlanticsalmon.

For a NOAA Fisheries report on the threat of AS to ESA-listed Chinook and chum salmon, visit https://tinyurl.com/yald3ga6.

For further details on transgenic AS, see https://tinyurl.com/hppfcys.

Opinions expressed in this article are those of the author and are not NSEA's.

You Make the Salmon Recovery Possible!

Your contributions make the work we do possible.
Please consider donating, its easy!

- By phone, call (360) 715-0283
- Online, at www.n-sea.org/take-action/
- By mail, complete the form below and return to NSEA, 3057 East Bakerview Rd., Bellingham, WA 98226

NSEA respects the earth's natural resources. We will do our best to not clutter your inbox or mail box unnecessarily.

Name: _____ Phone: _____
Address: _____
Email: _____
I would like to contribute $_____
I would like my donation used for:
❑ Habitat Restoration ❑ Education ❑ Endowment
❑ Please use my donation for NSEA's greatest current need

Payment Details
❑ Cash Enclosed ❑ Check Enclosed (Payable to NSEA)
Please charge: ❑ Visa ❑ Mastercard ❑ Discover
Card Number:_____
Expiration: _____ Code: _____

THANK YOU!
All donations are 100% tax deductible.
The Nooksack Salmon Enhancement Association respects your privacy and will not sell, trade, or share your personal information. Ever.

NSEA Mission Statement

Nooksack Salmon Enhancement Association strives to recover salmon by engaging our community in restoration, education and stewardship.

NSEA is an independent nonprofit organization (501c3) and is one of fourteen Regional Fisheries Enhancement Groups (RFEGs) in Washington State. 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.

Nooksack River Stewards Set All-Time Record

NSEA hosted its second annual Fish-Tival at Silver Lake Park in Maple Falls.

By Annitra Peck
Program Director

The Nooksack River Stewards Program has been working to educate visitors about salmon of the upper North Fork Nooksack River and Mt. Baker-Snoqualmie National Forest each summer since 2005.

Through funding from and partnership with the U.S. Forest Service, NSEA staff and volunteers are stationed at the Glacier Public Service Station on weekends from June to September with information about salmon, fishing regulations and stream ethics. Additionally, numerous events are hosted throughout the summer, including interpretive river walks, salmon story nights, rafting talks, festivals and salmon sighting opportunities.

The goals of the program have shifted from general outreach and field presence, to creating a community of stewardship that models choice behavior for visitors. Recent efforts have been focused on involving and celebrating salmon and healthy salmon habitat with the local community through family-friendly events.

We have seen a shift by all the communities along Hwy. 542 through their growing involvement at various community events hosted by NSEA. Many of these are located at area businesses and parks in partnership, built on feedback from the previous summer.

Although the majority of contacts through the program are made with visitors at the outreach booth, events in and around Glacier, WA, have been warmly embraced by the community. In fact, we hit an all-time record this season with 3,726 contacts!

If you missed our Nooksack River Stewards events, look for us next summer. In the meantime, we're offering salmon sighting events in November and work parties through December. NSEA staff and volunteers hope to see you at a creek soon!

Program Stats

Activity	2016 # contacts	2017 # contacts
River Rafting Talks	135	306
Outreach Booth	1,825	3,010
Interpretive River Walks	204	146
10 Community Events	177	264
Total	2,341	3,726

Salish Stories are read aloud around the campfire at Chair 9.

2017 Nooksack River Steward volunteers.