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THE NEWSLETTER OF THE SKAGIT FISHERIES ENHANCEMENT GROUP

Dedicated to Restoring Wild Salmon for the Future Generations

Fall Planting Season Draws Hearty Volunteers

These past few months 194 volunteers helped us plant 4,210 plants at 3 riparian restoration projects and move our native plant nursery to its new home.

This fall we partnered with Whidbey-Camano Land Trust to restore native shrubs to their property at Dugualla Bay. We had our largest turnout (74 volunteers) in a long time, and were rewarded with sunny skies and abundant migratory waterfowl. At Deception Pass State Park, funds from Northwest Straits Foundation enabled us to begin restoring a portion of beachfront along Cornet Bay. More planting at this location will occur in spring 2013. We also partnered with Skagit County Parks to re-establish native trees and shrubs along the new channel at Howard Miller Steelhead Park. Many partners have helped with this project:

Skagit County Public Works completed stream construction/LWD and donated a railcar bridge for the new footbridge/park access route; Skagit Conservation District's Tom Slocum developed the channel design, and SCD provided \$8500 to cover some wetland plants and planting work last spring; LBR Logging provided construction of boardwalk framework and foundation; Whatcom County Corrections Crew constructed pedestrian bridge on east side and helped with site prep, erosion control; and the Washington Conservation Corps crew helped with boardwalk construction on west side of project.

Thanks so much to the following businesses who donated snacks for our volunteers: Skagit Food Co-op, Burlington Hagen, Mount Vernon

Calico Cupboard, and Sedro-Woolley Food Pavilion. Thank you also to the following volunteer groups who planted trees: Pioneer Center North, Island County Beach Watchers, Skagit County Beach Watchers, Oak Harbor Boys' and Girls' Club, Cub Scout Pack 4098 from Oak Harbor, Boy Scout Pack 4100 from Mount Vernon, Anacortes High School, Western Washington University's Learning Environment Action Discovery program, and the many individuals who joined our efforts to restore habitat for Skagit salmon. We could not have accomplished this without you!



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REDD: A female salmon uses her tail to dig a nest in the gravel. After she deposits her eggs the male fertilizes them. The female then covers the fertilized eggs and the resulting nest is called a redd.

MISSION

Our mission is to build partnerships that educate and engage the community in habitat restoration and watershed stewardship in order to enhance salmonid populations.

BOARD OF DIRECTORS

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BOARD MEETINGS

The SFEG Board meets the 4th Tuesday of each month at our office. The public is welcome to attend.

STAFF

Alison Studley, *Executive Director*
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Kristin Rine, *WA Conservation Corps Restoration Assistant*

CONTACT US

360.336.0172
sfeg@skagitfisheries.org
P.O. Box 2497
Mount Vernon, WA 98273

{ FROM THE PRESIDENT }



Another Move for SFEG

By **CHRIS KOWITZ**

Nearly a year ago, SFEG moved its office from the original riverside location to its current location on South Second Street in Mount Vernon. During that process, several alternate properties were considered due to the fact that the nursery could not be moved to the same location. After much deliberation it was decided to move the office and leave the nursery at its current location at the old Northern State Hospital Campus. However, earlier this year, Cascade Job Corps informed us that we needed to move our nursery by the end of the year. No one was particularly excited about moving thousands of potted plants, but moving the nursery at the end of the year when we have the fewest plants would be the best course of action. We could create a more modern nursery operation – upgrade the water system to reduce water consumption, expand the number of plants we could grow, control future costs and form a new partnership.

After a couple of meetings and a number of phone calls, a few of us met with Samish Indian Nation staff on

a piece of property they had recently acquired on Kelleher Road. The site was convenient and near a recently-completed restoration project on Thomas Creek - a nice bonus that volunteers could observe as they work to provide trees and shrubs for future restoration efforts. Both SFEG and Samish Indian Nation staff agreed that working together on this site would provide a mutual benefit for both groups and negotiations started soon thereafter. The SFEG Board executed a lease agreement with the Samish Indian Nation on October 23rd and preparations for yet another move began.

On December 2nd, staff and volunteers successfully moved over 4,000 plants from the old nursery to their new location. Construction will continue at the new site – a permanent road is being built, a water system will be installed and a perimeter fence will be erected. We are all excited about our new partnership with the Samish Tribe and to create a new, modern nursery that both groups can be proud of.



Educating Students of All Ages

By ALI ANDREWS

We've been very busy this fall with SFEG education programs. Our biggest program is Junior Stream Stewards (JSS), where we teach 610 7th and 8th graders throughout Skagit County how to be good stewards of their watersheds. We go to five different schools, to teach a new lesson to 21 classes each month. Some highlights from this program include in October doing 21 salmon dissections in the classroom. During the month we had several volunteer 'dissection artists' including Kurt Buchanan, Chris Brown, and Bob Warinner. November was another busy month, taking four different schools on watershed tours near their school including Samish River, Lorenzan Creek, and Bulson-Fisher Creek watersheds, as well as doing 'virtual tours' with 11 classes. Thank you volunteers that helped with the watershed tours including Maggie Long, AmeriCorps intern from our sister organization NSEA, and her environmental education intern Alana DiMarco, as well as SFEG Board Member Jim Johnson, Mike Brondi from North Cascades National Park, and Andrea Doll from Beach Watchers. Nicole Hopper from Taylor Shellfish is leading oyster dissection to teach JSS students about bivalves' ability to improve water quality.



In November SFEG partnered with Skagit Land Trust on a classroom presentation and field trip with Emerson Alternative High School. Students viewed spawning coho salmon at Ennis Creek and then ventured to Pomona Grange on Friday Creek for a native plant walk and ivy pull. In December these students toured the Marblemount Hatchery. During our last tree planting at Howard Miller Steelhead Park we helped boys from Scout Troop #4100 of Mount Vernon to earn their Environmental Badge while planting trees at our restoration site.

In December we'll be starting Salmon in the Classroom with Jefferson and Lincoln Elementary Schools teaching them about the salmon lifecycle, taking them to the Marblemount Hatchery for a tour, and setting up fish tanks in their classrooms for students to raise salmon eggs. If you would like to get involved volunteering with our education programs please contact Lucy DeGrace or Ali Andrews at 360-336-0172.

SFEG's New AmeriCorps Volunteers

We were sorry to say goodbye to WCC intern Casey Costello and WSC intern Katie Lutz over the summer. We enjoyed working with them and wish them well in their subsequent adventures! We're happy to welcome Kristin Rine and Ali Andrews for the 2012-13 AmeriCorps term.



Hello all! I'm **KRISTIN RINE**, the Washington Conservation Corps (WCC) Restoration Assistant. Although my current term of service started in October, I have been lucky enough to work with SFEG since June. I grew up a few hours south in Puyallup, WA and have made Bellingham my home ever since, attending Western Washington University, where I majored in Biology. Originally my career goals were focused on teaching science; however, shortly after obtaining my Washington State teaching certificate, I realized that my passion lies out in the field where I can make direct contributions to improving our local ecosystems. After working with Sound Salmon Solutions (the Snohomish-area RFEG) last spring, I was fortunate enough to transfer to SFEG! Contributing to restoration projects and working with community volunteers to improve salmon habitat over the

CONTINUED ON PAGE 7



Sockeye &

By **DAVID BEATTY**

Among the Pacific salmon, the sockeye (aka the red), *Oncorhynchus nerka*, may have the greatest diversity of life history patterns and is the third most abundant after pink and chum. Within the races of anadromous (sea-run) sockeye, there are lacustrine (found in lakes) stocks and riverine stocks. Also, there are the lake and reservoir resident sockeye known as kokanee and, occasionally, smaller recent descendants, usually males, of sea-run sockeye known as “residuals”. The latter do not migrate to the ocean. “Residualism” also occurs in coho and Chinook, but not in chum and pink salmon. Reproductive success of “residuals” is not well documented for any species. Kokanee (little redfish) are smaller versions of sockeye and the life cycle is similar to that of sockeye except for the absence of the migratory behavior for an ocean phase. At sexual maturity, both forms exhibit an intense reddening of the body (especially in males) and males have hooked jaws and a moderate dorsal hump (much less developed than in male pink salmon). Kokanee are polyphyletic; i.e., they originated independently many times from parental stocks of lacustrine sockeye. Consequently, the native kokanee in a lake are more closely related to the native sockeye (their ancestral stock) of that lake than they are to the

native kokanee in another watershed. Lacustrine sockeye spawn in streams above or below lakes and after emergence from the gravel, the fry migrate into the lake where they form schools (different from the territorial behavior of juvenile Chinook and coho while resident in freshwater). Sockeye may also spawn along a lakeshore providing there is suitable gravel and sufficient ground water upwelling through the gravel. Within a lake system, there may be stream and lakeshore spawners. Juveniles remain in the lake for one or more years before becoming smolts that migrate to the ocean. If adults are to return to spawn where they originated, lacustrine sockeye require the most precise homing mechanisms among all the species of Pacific salmon. Riverine sockeye spawn in streams and are not dependent on a lake for juvenile rearing. Instead, the juveniles may remain in the stream for a year or more (“stream-type”); or they may outmigrate after a few months or shortly after emergence from the gravel (“ocean-type”). Similar to lacustrine sockeye, kokanee spawn in tributary streams or along the lake shore. When sockeye and kokanee coexist, they do not interbreed. Riverine kokanee do not occur.

Within a population of spawning sockeye, it is common to have a predominant age class. For example, four years (one year in freshwater followed by

two ocean winters) is the predominant age class in the Fraser River system. This is exhibited by the highly known Adams River sockeye run that peaks on a four year cycle. In North America, sockeye occur from the Columbia River watershed northward to the Kuskokwim River in Alaska. The major populations now center in British Columbia’s Fraser River and Skeena River watersheds; and in the Copper River and Bristol Bay watersheds in Alaska, the latter producing over 50% of North America’s sockeye.

Locally, a native stock of sockeye originated in Baker Lake before completion of the lower dam in 1925 and the upper dam in 1959 on the Baker River. Puget Sound Energy’s mitigation for the dams requires specific actions and facilities that have recently been expanded and modernized. Adult sockeye are trapped in the Baker River below the lower dam and trucked 1) to Baker Lake for natural spawning primarily in the Baker River at the lake’s upper end; 2) to ponds constructed with artificial spawning beds containing pipes to distribute ground water through the spawning gravel; and 3) to holding ponds for hatchery production. Fry produced (capacity for 14 million) at the hatchery and at the artificial spawning beds are transported to Baker Lake and Lake Shannon where they spend a year



Kokanee

feeding on zooplankton and growing. At the age of just over a year, the juveniles, including those produced from adults trucked to Baker Lake, begin the process of becoming smolts and migrate toward the dams. To prevent the mortality that would occur if the smolts went through the dams' turbines, smolts are trapped at the dams and trucked to the lower Baker River for outmigration to the ocean. Small numbers (a few hundred or less) of spawning riverine sockeye occur in the Nooksack and the Skagit Rivers. Spawning of Lake Washington sockeye is centered in the Cedar River with supplementation from a recently modernized hatchery (capacity for 34 million fry) just below the Landsburg Dam (protects Seattle's drinking water by preventing salmon from passing the dam). The hatchery is mitigation for Seattle Public Utilities' dam.

The Columbia River watershed ceased to be a major sockeye nursery when the Grand Coulee Dam was built in the 1930s, and it totally blocked fish passage by 1938. Before that, the Lower and Upper Arrow Lakes, expanded part of the river in British Columbia, were producers of large numbers of sockeye. Lake Wenatchee (Wenatchee River) continues to generate sockeye and so does Osoyoos Lake (Okanagan River) in British Columbia. The near extirpation of sockeye from Redfish Lake in Idaho

coincided with the construction of the four lower dams on the Columbia River and four dams on the lower Snake River. To increase its numbers, the "endangered" Snake River sockeye is produced in a brood stocking program.

On the Olympic Peninsula, the sockeye of Ozette Lake are ESA listed as "threatened". The production of sockeye in the watersheds of the Fraser River and Thompson River in comparison to that in watersheds of the Columbia River and Snake River is a testament to the impact of dams in the latter two. There are no dams in the Fraser River and Thompson River mainstems.

In Asia, spawning sockeye occur from the Anadyr River in Russia southward along the coast to the southern tip of the Kamchatka Peninsula; along the Northwest coast of the Sea of Okhotsk; and in the Kuril Islands.

Native kokanee occur in Lake Whatcom where a state hatchery on Brannian Creek supplies eggs and juveniles for stocking lakes throughout the West and elsewhere; and in Lake Samish where there may have been a native stock. Sockeye do not occur in either lake. However, there is migratory connectivity between the ocean and Lake Samish via Friday Creek and the Samish River. It seems likely that Lake Whatcom, at an earlier time, also had a connection to the Samish River. Kokanee have been successfully introduced into lakes throughout temperate regions

of the world. Transplanting sockeye has had limited success and then only within the species' natural range. This is also generally true for the other Pacific salmon species, indicating that anadromy is difficult to establish. After entering the ocean, sockeye undergo extensive migrations in the North Pacific Ocean comparable to those of chum and pink salmon and these three species may overlap with their Asian cousins. Ocean sockeye feed on a diet rich in large zooplankton (crustaceans, pteropods and fish larvae) that imparts the desirable red color and oil content to the most valuable species in the commercial salmon fishery.

For those readers desiring additional information on Pacific salmon, I can recommend the following books. 1) Behnke, R. J. 1992. *Trout and salmon of North America*. The Free Press, New York. 2) Groot, C. and L. Margolis, eds. 1991. *Pacific salmon life histories*. University of British Columbia Press, Vancouver.



DAVE BEATTY - Professor Emeritus of Zoology, University of Alberta. Dave, a fish biologist, has been

a volunteer in the Regional Fisheries Enhancement Program since 1993. He served for 11 years on SFEG's Board (7 years as president) and currently serves on NSEA's Board as Secretary.



JESSICA NEWLEY

Climate Change and Skagit Salmon

Notes from the Skagit Climate Science Consortium Workshop

By **KRISTIN RINE**

ADAPTED FROM NOTES BY **BRUCE FREET**

If you were to ask people on the street what they know about current climate science, most would probably spout off a few points about the wide-ranging, global implications that seem to have little relevance to our daily lives and work in Skagit Valley. Local scientists, however, can tell us a surprising amount about how climate change is influencing the Skagit watershed -- especially when it comes to salmon.

A recent workshop on Climate Change and Skagit Salmon Habitats and Populations offered the unique opportunity for local community members and watershed professionals, including SFEG staff and board, to hear presentations by researchers who have been hard at work along our mighty river. The event was hosted by both the Skagit Climate Science Consortium and the Skagit Watershed Council, and was intended to improve understanding of how climate change is projected to affect salmon populations of the Skagit River, and also to provide guidance to practitioners in developing strategies that support salmon recovery in the basin.

The following are some of the main points from the workshop that are especially relevant to SFEG's work in salmon habitat restoration:

- **Changing precipitation patterns will lead to extremes in river flows (floods and droughts), which are projected to increase.** By 2040, 100-year flood events will likely increase by 23%. If flows are too high, juvenile salmon and redds can get swept downstream. When flows are low during the summer, drying can disconnect rearing and spawning habitat for salmon and water temperatures can climb to dangerous levels.
- **Retreating glaciers, decreased snowpack, and increased fire frequency will contribute to a higher sediment transport in streams and rivers.** A higher sediment load can reduce a river's floodwater capacity, and can also scour and bury salmon redds. The Skagit River is a major sediment contributor to Puget Sound, and scientists project that in the future it will carry three-times its historic amounts.
- **During dry periods, Skagit tributaries that are fed by glaciers and groundwater are more resilient to water temperature extremes than are rainfall-dependent tributaries.** The glacier- and groundwater-fed tributaries have therefore been identified as priorities for salmon habitat protection and restoration because of their abilities to act as cold-water refuges.
- **Salmon species will vary in their responses to climate change.** Since different species have natural variations in survival and reproduction strategies and in the timing of their life cycle stages, some will be more sensitive than others. Chinook salmon, which have a longer freshwater residency (2 to 3 years) than other species, will be more impacted by extremes in flows and human activities that constrain floodplains.

Although the information presented at the workshop does not generally inspire cheerfulness and optimism, it underscores the importance of developing restoration agendas within the Skagit watershed. SFEG and its partnering organizations continue to implement habitat restoration projects that will help to mitigate threats posed by climate change. Restoration activities such as off-channel habitat creation of the Edgewater Slough and instream woody debris placement in Finney Creek have already played a valuable role in forming slower, cooler pool refuges for rearing salmon. There is still an enormous amount of work to be done to protect wild salmon populations in the Skagit watershed, but efforts by local scientists, watershed practitioners, and community volunteers make it seem that much more possible!



AmeriCorps Volunteers

CONTINUED FROM PAGE 3

past six months has been very enjoyable and enlightening. I look forward to the coming year, when I can continue to work with all of you to put Skagit Fisheries' goals and values into action!



Hello! My name is **ALLISON ANDREWS**, but in the office they call me Ali. I am the new Washington Service Corps (WSC) Outreach Assistant. I started in September and have loved it so far. Since I began I have been teaching Junior Stream Stewards, and helping with events such as Skagit River Salmon Festival and the Samish Watershed Tour. I have also gotten a taste of field work doing some vegetation monitoring and spawner surveys. I am originally from southern Washington near Vancouver, and moved to Bellingham in 2008 to attend Western Washington University. I received my B. A. in Environmental Studies and Economics in spring 2011 through Huxley College. After graduating I interned with Nooksack Salmon Enhancement Association as an Environmental Education Intern during fall 2011. The following spring I worked at YMCA Camp Orkila on Orcas Island as an Outdoor Environmental Educator. I look forward to the coming year and hope I get a chance to meet you all!



SFEG IS A MEMBERSHIP BASED ORGANIZATION

If you are enjoying reading this newsletter, perhaps its time that you became a member! Your membership dollars are critical to support the operation of SFEG (including producing this newsletter), allowing us to develop new projects with landowners, providing education programs to kids throughout our watersheds, and collecting monitoring data regarding restoration project sites to document successes.

{ MEMBERSHIP INFORMATION }

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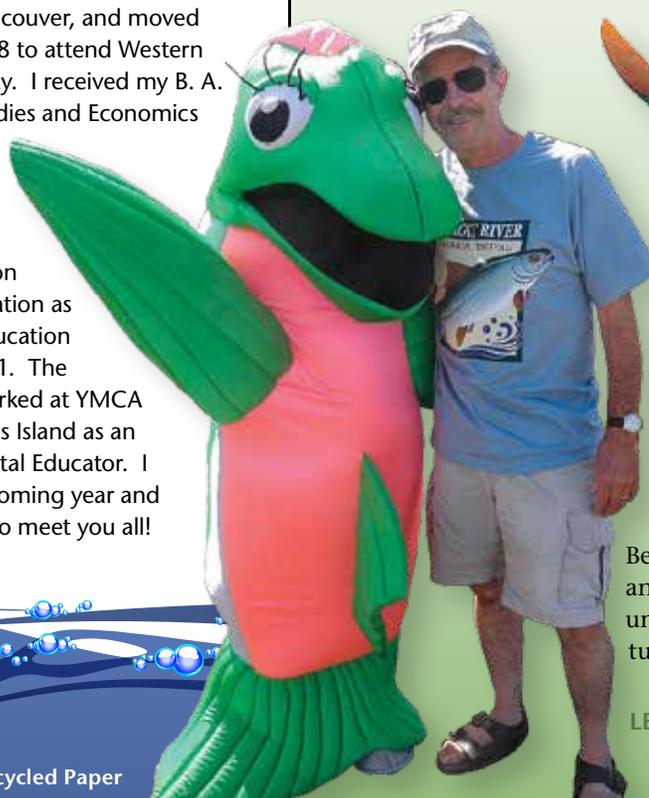
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Don't Miss Skagit River Salmon Festival 2013!

On September 15, 2012 SFEG and many partnering agencies and organizations hosted the first-ever Skagit River Salmon Festival at Mount Vernon's Edgewater Park. With just under 3,000 people in attendance, we counted it a success! Beautiful weather, delicious food, educational activities, and fun music made it a great event. Plans are already underway to do it again in September 2013 - stay tuned to www.skagitriverfest.org for details!

LEFT: Frances Fish with Jim Johnson



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Events Calendar AND Volunteer Opportunities

Guided Hatchery Tours

Through Jan 27 (Saturdays & Sundays),
 10am-2pm

Trained volunteers will offer tours of the Marblemount Fish Hatchery. See the incubation room, learn about hatchery operations, and maybe even see spawning and hatching salmon and feasting bald eagles! For more info call the SFEG office at 360-336-0172. To check on Marblemount road conditions call the hatchery at (360) 873-4241.

Spring Planting

March–April (Saturdays), 10am-1pm

Spring Planting Parties; Each Saturday in March and into April, 10am-1pm at various locations throughout the Skagit Watershed. Check your mail or our website in February for details.

FEBRUARY 28, 2013

SFEG ANNUAL MEETING

**MOUNT VERNON
 HILLCREST LODGE**

Once again this year we'll provide a tasty grilled salmon buffet dinner, present volunteer and partnership awards, and hear informative presentations on local salmon recovery. This year our fundraiser will feature a raffle of goods and services including a day of skiing at Mount Baker, gear for outdoor sports, and a basket of locally produced edibles!

Look for an invitation in your mail (or email) in early January.

We hope to see you there!

