U.S. Fish & Wildlife Service

Abernathy Fish Technology Center Newsletter

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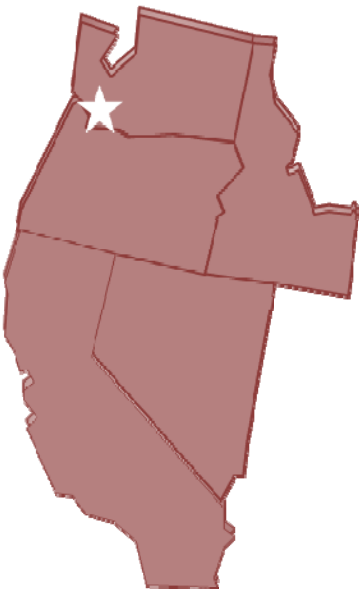
Welcome Back Scott!

Photo: FWS

Left to Right Judy Gordon, Center Director, Scott Gronbach, Facilities Operation Specialist, Patty Crandell, Deputy Director. Photo: FWS



It's been a few weeks short of a year, but finally Facilities Operations Specialist Scott Gronbach has returned to AFTC. As a Navy Reservist, Lt. Scott Gronbach was deployed oversees in active duty status. As part of the Joint Task Force at Guantánamo Bay, Cuba, Scott put his Collateral Safety Duty Officer skills to the test by instituting safety protocols, purchasing equipment, and establishing safety standards for some of the Base's facilities. Apparently Scott was also the envy of his peers when they found out that his civilian job is with the U.S. Fish and Wildlife Service (something about getting to "play with fish"). Scott is happy to be home and to have life return to normal. He was sorely missed not only for his technical skills, but also for the humor and friendship he brings to the AFTC family.

Welcome Back Scott!

145th Annual Meeting of the American Fisheries Society

The 145th Annual Meeting of the American Fisheries Society was held in Portland, OR, August 17-20, 2015. The meeting had ~3,200 participants from 32 countries attending the meeting and featured over 404 posters and 2,172 oral presentations. The Presentations were organized into 101 symposia and 36 contributed paper sessions that collectively addressed issues related to fisheries, aquatic habitats, and fisheries science. The meeting also featured 112 tradeshow booths and 9 continuing education courses and workshops.

Bill Brignon, Columbia River Fisheries Program Office and Christian Smith at FWS Booth at 2015 AFS. Photo: FWS

Twelve AFTC staff attended the meeting not include co-authorship and delivered the following presentations:

The Effect of Electrical Waveform Shape on the Mortality of Steelhead embryos and Larvae **- Will Simpson**

Effect of Ration size on Water quality and Culture Performance of Pacific Lamprey Ammocoetes *Entosphenus tridentatus* – **James Barron**

Abernathy Creel Steelhead: Population Genetics and reproductive Success at a Conservation Hatchery with Wild Broodstock Integration – **Brice Adams**

Influence of Demographic and Genetic Factors on Genetic Variation in Introduced Populations of Oregon Chub – **Pat DeHaan**

Ecological and Genetic Effects of a Conservation Hatchery on Natural-Origin Steelhead: Lessons from a Decade-Long Study on Abernathy Creek Washington – **Kyle Hanson**

Evaluation of Initial feeds for: Larval Lost River Suckers – ***Ron Twibell***

Genetic Comparison of Methods to Verify Fish Passage Through Remediated Culverts – **Doug Peterson**

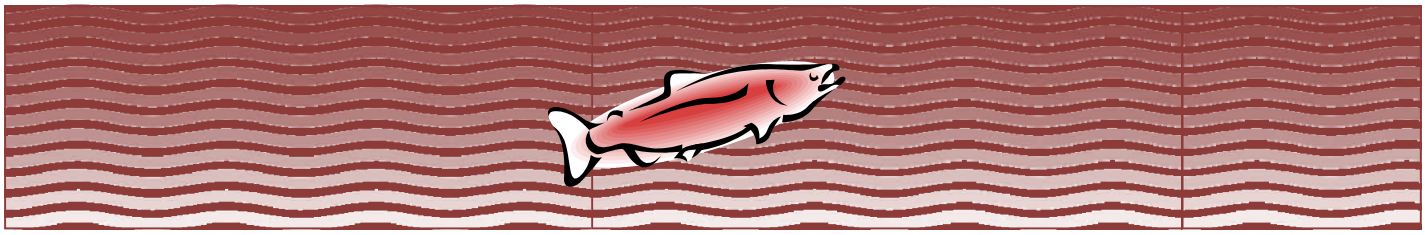
Genetic Evaluation of Sacramento River Winter-Run Chinook Salmon – **Christian Smith**

Effluent Management Using Low Phosphorus Feeds for Spring Chinook – **Ann Gannam**

Relative Influence of Release Age, Migration Behavior, Length, Weight, and Condition Factor on Downstream Migration Survival of Juvenile Hatchery Steelhead - **Ben Kennedy**

The Influence of Pleistocene Glaciations on the Genetic Population Structure of Bull Trout in the Skagit River, WA - **Matt Smith**

FWS Booth Co-organizers – Judy Gordon, Bill Gale (Mid-Columbia FRO), and Denise Hawkins (Washington FWO).



YCC Group at AFTC

The Julia Butler Hanson Refuge for the Columbia White-Tailed Deer hosts a Youth Conservation Corps (YCC) Group each summer. This year's YCC Group, composed of students from Cathlamet High School and their teacher, assisted AFTC with its ongoing efforts at installing garden beds to attract native pollinators. Maintenance Worker Jim Lowell prepared beds for planting. Once again the Watershed Gardens, a local nursery, supplied the native plants.

YCC Group at AFTC. Photo: FWS

Watershed Gardens employee Dixie Edwards talking about native plants to the YCC Group. Photo: FWS

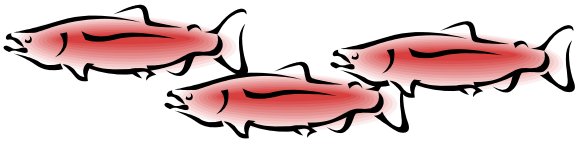
On August 7th the YCC Group visited AFTC for a tour of our facilities and to learn about the research conducted by the staff. They returned on August 11, received a presentation from Dixie Edwards (Watershed Gardens) on native plants and then planted ~400 native plants (red flowering current, huckleberry, huckleberry, sitka columbine, checkermallow, mock orange, and spirea) in three beds totaling ~380 sq. ft. As an added bonus the group also assisted AFTC by planted young native western red cedars. The beds planted by the YCC Group and the Girl Scouts are attracting native bees, butterflies, and birds. The local black-tailed deer seem to be enjoying the gardens too!

YCC group planting western red cedars. Photo: FWS

Cowlitz County Fair

The AFTC booth at the Cowlitz County Fair (July 22nd – July 26th) was set up and staffed by Ann Gannam. Informative materials about the life cycle of the Pacific salmon, invasive species, and pollinators were made available as well as educational coloring books with topics such as the wetlands, following Rachel Carson, and Pacific salmon. The booth won a first place award in the Education category.

AFTC booth at Cowlitz County Fair. Photo: FWS



AFTC Program Highlights

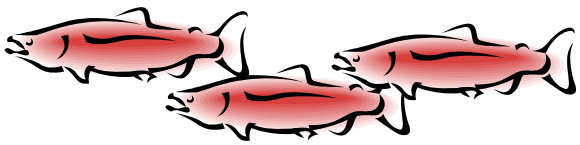
Physiology and Nutrition

Nine feeds were received from the hatcheries for fish feed quality control in July and August. As part of the routine analyses, all feeds from the NFHs were checked for rancidity. One feed from Hagerman NFH was found to have a high percentage of fine particles and crumbles of an inconsistent size range. Ann Gannam wrote the feed memos which are sent to the NFH and the feed mill.

The third in a series of recirculating flow studies was started in July. James Barron, Joelle Blais, Ron Twibell, Kelli Hawke, and Steve Dyer assisted in the stocking. Spring Chinook are being used in this study to look at the effects of rearing in circular flows on their physiology, growth, and body composition.

A third Lost River sucker study was started in August. The treatments include six commercial diets and a sucker diet formulated by AFTC staff. Prior to initiating the study, the commercial feeds needed to be ground and sifted to the appropriate size. Previous efforts to culture Lost River suckers have indicated that the fish fail to thrive during the juvenile life stage and elevated mortality may occur. There is a strong possibility that these issues are related to nutritional deficiencies.

Richard Glenn completed a detail to Makah NFH as acting manager from July 27 to Aug 21, 2015. During this time, he worked with Makah NFH staff, Makah Tribal Fisheries leadership, and the Makah NFH Hatchery Evaluation Team to manage the facility during rearing of juvenile coho salmon and steelhead. This was a challenging detail as 2015 has been a year with record low precipitation, warm temperatures, and low river flows on the Tsoo-Yess River



Staff:

Administration & Facilities

Judy Gordon, Center Director
Patty Crandell, Deputy Director
Vince Bocci, Administrative Officer
Steve Dyer, Administrative Assistant
Mark Hack, IT Specialist
Scott Gronbach, Facilities Operations Specialist
Jeff Poole, Water Treatment Plant Operator
Jim Lowell, Maintenance Worker

Conservation Genetics

Christian Smith, Regional Geneticist & Program Head
Pat DeHaan, Conservation Geneticist
Matt Smith, Conservation Geneticist
Jennifer Von Bargen, Lab Geneticist
Brice Adams, Fish Geneticist
Mikki Brinkmeyer, Biological Science Technician
Kieslana Wing, Contractor

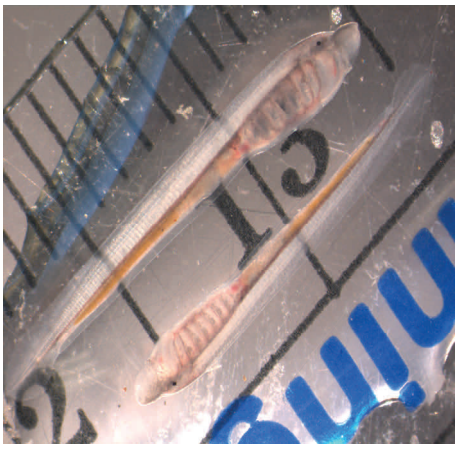
Physiology & Nutrition

Kyle Hanson, Regional Physiologist & Program Head
Richard Glenn, Microbiologist
John Holmes, Fish Biologist
Ann Gannam, Regional Nutritionist
Ron Twibell, Fish Nutritionist
James Barron, Fish Biologist
Kelli Hawke, Biological Science Technician

Quantitative Ecology & Technology

Doug Peterson, Senior Scientist & Program Head
Ben Kennedy, Fish Ecologist
Will Simpson, Fish Ecologist
Kurt Steinke, Electronics Engineer
Joelle Blais, Directorate Fellowship Program Intern

AFTC Program Highlights– continued



Pacific lamprey. Photo: FWS

As part of the lamprey early rearing and feed timing study, all fish were counted at the end of August. It appears that a bottleneck in survival occurs when young ammocoetes begin feeding. The study looked at the timing of first feeding. If feed is offered too soon, tank conditions may degrade, or fish could eat food before the digestive system is fully developed. If first food is offered too late, the rapidly developing larvae may perish or suffer developmental defects due to starvation. Over 2,000 lamprey ammocoetes are being reared, with survival exceeding 85% .

Conservation Genetics

Jennifer Von Bargen, Kieslana Wing, Mikki Brinkmeyer, Joelle Blais and Brice Adams conducted genetic sampling at Carson NFH during spring Chinook salmon spawning. The samples will be used in a collaborative effort between USFWS and the Columbia River Inter-Tribal Fish Commission to better understand migration of and fisheries targeting Columbia River Chinook salmon. Jennifer Von Bargen, Kieslana Wing, and Mikki Brinkmeyer conducted Rapid Response genetic analysis of 96 single nucleotide polymorphism (SNP) markers on 119 Chinook salmon trapped as potential broodstock for Livingston Stone National Fish Hatchery. Results were used to determine whether or not fish were Winter Run (Endangered) and which male-female pairs were least related.

Tagging Crew at Carson NFH. Photo: FWS

Kieslana Wing extracted DNA from 1,447 steelhead captured in Abernathy Creek, and genotyped 25 microsatellite loci across all samples. Analysis of these data will be used to compare reproductive success of hatchery-origin and natural-origin fish.

Pat DeHaan, Brice Adams, and Christian Smith traveled to Noxon, MT to meet with biologist from Avista Utilities and tour Lake Pend Oreille and the

Clark Fork River. They saw Avista's newly constructed fish handling facility on the Clark Fork River and spent a night electrofishing below Cabinet Gorge Dam where they captured one adult bull trout for rapid response analysis and upstream transport. They also spent two days electrofishing in tributaries to the Clark Fork River for westslope cutthroat trout and bull trout. The trip concluded with Pat and Brice attending the Clark Fork Aquatic Implementation Team (AIT) meeting to discuss ongoing genetics studies of westslope cutthroat trout and bull trout in the Clark Fork Basin. In July and August, Brice Adams, Kieslana Wing and Mikki Brinkmeyer conducted rapid response analysis on 18 bull trout across eight events as part of our collaboration with AVISTA.

Pat DeHaan traveled to Olympic National Park to tour the Elwha River and Lake Crescent with Park Service biologist Sam

Bull trout habitat in Elwha River. Photo: FWS.

Brenkman. Pat viewed the sites of the former Elwha and Glines Canyon Dams that were recently removed. The Abernathy Genetics Program has ongoing studies of bull trout and Dolly Varden in the Elwha River system.

Program Highlights— continued

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Quantitative Ecology and Technology

Joelle Blais worked on a experimental design and apparatus to test the interactive effects of temperature, electrofishing, and tagging effects on juvenile steelhead.

Water system used to hold juvenile steelhead trout exposed to different temperature regimes study conducted by Joelle Blais. Photo: D. Peterson

PIT tag transceiver powered by a lithium battery, a tablet computer for screen interface, and an antenna housed in PVC and fiberglass. The equipment was successfully used to search irrigation canals on the Umatil-

Close-up of PIT tag transceiver housed in waterproof case. Photo: FWS.

Publications

Barron, J.M., R.G. Twibell, H.A. Hill, K.C. Hanson and A.L. Gannam. 2015. Development of diets for the intensive culture of Pacific lamprey. Aquaculture Research. DOI:10.1111/are.12840

Gannam, A.L. 2015. Beta-Glucans. In Dietary Nutrients, Additives, and Fish Health, C.-S. Lee, C. Lim, D.M. Gatlin III and C.D. Webster, eds. John Wiley & Sons, Inc. Hoboken, N. J.

Program Highlights — continued

Will Simpson using new portable PIT tag transceiver unit. Photo: FWS

Administration

Members of the North Dakota Soy Bean Council visited AFTC to learn about our research in fish nutrition, specifically the feasibility of using soy to replace fish meal.

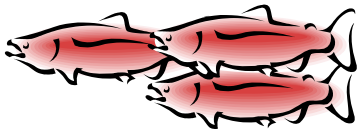
July Safety training on Personal Floatation Devices and their uses and was led by Doug Peterson.

August Safety Training on Hazardous Communications and was led by Ron Twibell.

Judy Gordon and Patty Crandell participated in the Pacific Region Fisheries Project Leader Teleconferences for July and August.

As part of the Pacific Region's Fish Health Center Reorganization Workgroup, led by ARD Roy Elicker, Judy Gordon participated in group meetings to determine how to proceed with centralization of Regional Fish Health laboratory functions

Judy Gordon represented AFTC during a Makah NFH Hatchery



Meetings and Conferences

- Patty Crandell met with Dixie Edwards from Watershed Garden Works to discuss native plants on AFTC property and opportunities for cooperation and restoration.
- Ann Gannam, Ron Twibell, and James Barron met with Michael and Matilde Enrue from Lopino Foods, Inc., to discuss the use of lupin meal in fish feeds.
- Multiple Abernathy staff members attended the Washing Department of Fish & Wildlife/AFTC meeting in Vancouver, WA in July. The focus of the meeting was to foster collaboration between groups conducting research and habitat restoration on Abernathy Creek. *See description below*.
- Richard Glenn, Christian Smith, and Kyle Hanson participated in the Makah NFH Hatchery Evaluation Team Meeting in July.
- Will Simpson provided advice and assistance to ODFW on maintaining databases for remote PIT tag detection sites.

Inaugural Mill, Abernathy, and Germany Creeks Watersheds WDFW/AFTC Workshop

Judy Gordon, Patty Crandell, Kyle Hanson, Christian Smith, Doug Peterson, Brice Adams, Ron Twibell, and Ben Kennedy attended the first annual *Research in the Mill, Abernathy, and Germany Creeks Watersheds Workshop*. Co-hosted by AFTC and Washington Dept. of Fish and Wildlife's (WDFW) Region 5, the workshop's goal was to exchange information on current fish and habitat research in the Mill, Abernathy, and Germany Creeks watersheds; increase efficiency in data sharing and collection efforts; and discuss potential future research. The workshop emphasized participation from WDFW and AFTC staffs with a natural progression to additional participation from other agency stakeholders, i.e. Lower Columbia Fish Recovery Board, at future workshops. Held at the WDFW offices in Vancouver, WA, WDFW staff included Cindy LeFleur (Region 5 Fish Program Manager), Tom Buehrens, Mara Zimmerman, Ken Warheit, Bryce Glaser, Trevor Johnson, and Matthew Sturza. Also in attendance were Karen Adams, Lower Columbia Fish Recovery Board, and Bill Ehinger, Washington Dept. of Ecology, Environmental Assessments Program.

Ongoing Projects

Water Velocity Effects on Salmon as Reared in Recirculating Systems. *Management Need:* Determine the effects of water velocity on composition, growth, condition, and performance of juvenile PNW salmon as applied to recirculating systems in support of hatcheries in the Pacific Region considering the use of recirculating systems. *Partners:* Pacific Region National Fish Hatcheries, Fishery Resources Program via Fisheries Operations and Need System (FONS).

Diet development for Lost River and short nose suckers in the Klamath River Basin. *Management Need*: Determine dietary needs of listed populations to assist in recovery. *Partners*: Klamath Tribes, Klamath Falls FWO, California/Nevada FHC.

Development of diets and rearing techniques for the culture of Pacific lamprey, *Entosphenus tridentatus*. *Management Need*: Assist Tribal partners in developing methods for the artificial propagation of Pacific lamprey, a species of concern. *Partners*: Yakama Nation; Fishery Resources Program via FONS.

Assessing the effects of multiple tagging methods on Pacific lamprey ammocoetes. *Management Need*: Assist Tribal partners in developing methods for the monitoring and evaluation of this species of concern. *Partners*: Yakama Nation; Fishery Resources Program via FONS.

The physiological response of white sturgeon to handling stress in captivity. *Management Need*: Determine if the stress from catch and release angling is detrimental to survival of white sturgeon, a species of concern. *Partners*: Dalhousie University; Carleton University.

Pacific Region's Fish Feed Quality Control (FFQC) Program. *Management Need*: The FFQC Program, the only one of its kind in the FWS, provides quarterly monitoring of the quality of the commercially produced fish feeds used at Pacific and Pacific Southwest Regions' NFHs. Information is compiled on an annual basis and used in the development of the Pacific Region fish feed contract. *Partners:* Pacific and Pacific Southwest Region's NFHs, Oregon, Washington, Idaho, and Tribal fish hatcheries.

Effects of dietary lipid source and ultraviolet radiation on sunburn and steatitis in Steelhead, *Oncorhynchus mykiss*. *Management Need:* Provide information regarding the potential relationship between fish nutrition and sunburn in steelhead. *Partners*: Pacific Region National Fish Hatcheries

Evaluation of the thermal exposure of adult Chinook salmon during the migration to Warm Springs National Fish Hatchery. *Management Need:* Determine if Chinook salmon migrating to Warm Springs National Fish Hatchery experience thermal stress. *Partners*: Warm Springs National Fish Hatchery, Lower Columbia Fish Health Center, Confederated Tribes of Warm Springs.

Natural reproductive success and demographic effects of hatchery-origin steelhead in Abernathy Creek, WA. *Management Need*: Provide information to help managers minimize differences between NOR and HOR fish. *Partners*: Bonneville Power Administration; Washington Department of Fish and Wildlife.

Climate change vulnerability assessments of Pacific Region National Fish Hatcheries. *Management Need:* An understanding of the anticipated habitat changes under different climate change scenarios provides managers with information to proactively respond to these conditions and their impact on NFHs. *Partners*: Pacific Region NFHs; Mid-Columbia River FRO; Fishery Resources Program via FONS.

Development of genetic markers associated with smoltification in steelhead and salmon. *Management Need*: Identify genetic markers associated with downstream migration to provide managers with information to proactively manage early onset smolting levels. *Partners*: Fishery Resources Program via FONS.

Fish Suppression of common carp in Malheur Lake using electrofishing to target eggs and embryos. Management Need: Determine the feasibility of using electrofishing to kill eggs and embryos for control of invasive common carp in Malheur Lake. Partner: Malheur NWR.

Antenna design for the Biomark IS1001 PIT tag reader. Management Need: Provide expert level engineering and technical assistance to partners monitoring species of interest using new technologies while re-

Watermark: Sturgeon. Photo credit: J. Strickland

Ongoing Projects—continued

ducing biologist time spent in design and troubleshooting. Partner: NOAA Fisheries, USFWS Green Bay.

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Entrainment and bypass of ESA-listed salmon at irrigation diversions on the Umatilla River. Management need: Determine what environmental factors influence the magnitude of fish entrainment into irrigation canals and if captured fish are successfully screened and returned to the Umatilla River using PIT tag technology. Partner: Bureau of Reclamation

Aquatic organism passage (AOP) at remediated stream road crossings. Management Need: Assess the efficacy of genetic, direct capture, and remote sensing methods to verify fish passage through remediated culverts. Partners: US Forest Service, Trout Unlimited.

Mekong River fish ecology and sustainable development. Management Need: Assess the scientific capacity and data needs for resource managers in Laos and Cambodia to address hydroelectric development on the mainstem Mekong River. Partners: USGS, US DOI International Technical Assistance Program (ITAP)

Effectiveness of transitioning to a locally-sourced steelhead broodstock at Winthrop National Fish Hatchery. Management Need: Determine if hatchery improvement programs and actions are achieving the expected biological performance objectives. Partners: USFWS Mid-Columbia FRO and NOAA Fisheries.

Stress response of juvenile steelhead salmon to electrofishing and tagging under different thermal regimes. Management need: To understand how fish respond to capture and handling under conditions experienced in late summer. Partners: USFWS Directorate Fellows Program.

Evaluation of the spatial and temporal distribution of juvenile Chinook Salmon in the Entiat River. Management Need: Use genetic data to improve our understanding of the distribution of spring and summer run Chinook Salmon juveniles and thus improve our ability to prioritize restoration projects targeting spring Chinook Salmon recovery. Partners: USFWS Mid-Columbia FRO.

New Faces at AFTC

Mikki genetics sampling at Carson NFH. Photo: FWS.

Welcome Mikki Brinkmeyer. She received a BS in Biology from the University of Idaho in 2014. As an undergraduate student she assisted various research projects focused on conservation genetics, and evolutionary ecology. In 2013, she conducted an undergraduate research project in Southern Ecuador to evaluate the ability to obtain high-quality DNA from fecal material collected from roost sites of the false vampire bat. In the past year, she has worked as a genetic technician at the University of Idaho and Washington State University, and as a biological field technician for Boise State University. Outside of work, she enjoys running, swimming, reading and being in the outdoors.