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## Conserving the Olympic Mudminnow



Olympic mudminnow in Hopkins Ditch wetland.

USFWS: R. Tabor

**Staff:**

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 Vince Bocci, Administrative Officer  
 Toni Scholder, Administrative Assistant  
 Mark Hack, IT Specialist  
 John Holmes, Fish Biologist  
 Jeff McLaren, Biological Technician  
 Scott Gronbach, Facilities Op Specialist  
 Jeff Poole, Water Treatment Plant Operator  
 Jim Lowell, Maintenance Worker

**Nutrition:**

Ann Gannam, Regional Nutritionist  
 Ron Twibell, Fish Nutritionist  
 Nathan Hyde, Biological Technician  
 James Barron, Biologist

**Conservation Genetics:**

Denise Hawkins, Regional Geneticist  
 Christian Smith, Conservation Geneticist  
 Pat DeHaan, Conservation Geneticist  
 Brice Adams, Biological Technician  
 Matt Smith, Fish Geneticist  
 Jennifer Von Bargaen, Lab Geneticist  
 Dan Bingham, Fish Geneticist

**Ecological Physiology:**

Chris Taylor, Regional Eco-Physiologist  
 Kyle Hanson, Fish Physiologist  
 Ben Kennedy, Fish Ecologist  
 Richard Glenn, Microbiologist  
 Will Simpson, Fish Ecologist  
 Kurt Steinke, Electronics Engineer

**Modeling and Management Decision Support:**

Doug Peterson, Senior Scientist

### Working Together to Inform Strategic Habitat Conservation Efforts for Native Species: Olympic Mudminnow

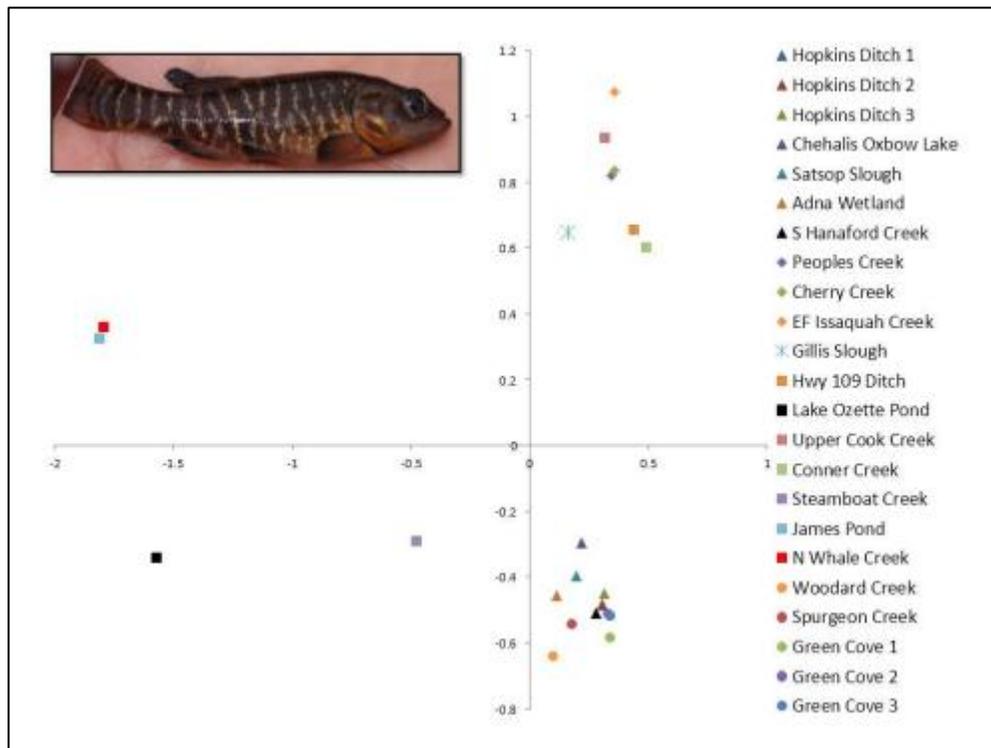
The Olympic mudminnow is the only fish species found only in Washington State. It inhabits wetland areas and streams in the Chehalis River Basin, Puget Sound, and along the Olympic Coast. Mudminnow habitat has declined significantly in recent years due to increasing urban sprawl and development. As a result, Olympic mudminnow are now considered a state sensitive species and a priority for conservation actions. In 2011, the FWS Washington FWO, Fishery Resources Division and AFTC's Conservation Genetics Program started a study of Olympic mudminnow. The main objectives of this study were to examine levels of genetic diversity of mudminnow populations and to determine the origins of eastern Puget Sound Olympic mudminnow populations. Biologists from FWS, National Park Service, the Quinault Indian Nation, Washington Department of Fish and Wildlife (WDFW), King County, and the Washington Department of Natural Resources worked cooperatively to collect over 1,000 Olympic mudminnow samples from 23 locations distributed throughout the species range for genetic analysis. We found nearly all collection sites represented a genetically distinct population with most populations having healthy levels of genetic diversity. Genetic relationships among these populations appear to have been largely influenced by: 1) the glacial history of western Washington; 2) the limited ability of the species to disperse; and 3) the species' history of isolation in coastal areas. *Continued on page 2.*

# Conserving the Olympic Mudminnow....

Prior to this study, the origins of Olympic mudminnow populations in eastern Puget Sound (native populations vs. undocumented introductions) were unknown. Our data show that eastern Puget Sound populations represent undocumented introductions of mudminnow from an unknown site(s) on the southern Olympic Coast. This project provides critical information for Olympic mudminnow conservation planning and is a good example of how FWS staff work with many stakeholders to inform strategic habitat conservation efforts for native fish species.



Olympic Mudminnow habitat in Conner Creek on the Olympic Coast.  
USFWS: R. Tabor



FCA analysis showing the degree of similarity and differentiation among Olympic mudminnow collection sites. Each point on the graph represents a collection site and sites that cluster closer together are more genetically similar.

# Program Highlights....

## Nutrition

The Nutrition Program analyzed 19 feed samples for Fish Feed Quality Control in November and December. As part of the routine analyses, all feeds from the hatcheries were checked for rancidity. Ann Gannam wrote the feed memos and then contacted the feed mills when necessary. Feed ingredients for the Abernathy Dry Diet from the feed mill were analyzed and the Abernathy Dry Diet was formulated using the resulting data. This updated formula is used by the feed mill to produce the feed. In addition, the feeds used at AFTC were analyzed for proximate composition.

AFTC made feeds for three partners, West Virginia State University, Oregon State University and Idaho Department of Fish and Game (IDFG). The feeds are being used in studies evaluating alternative ingredients and salmonids, developing a surrogate spring Chinook and testing a feed for sockeye salmon, respectively.



Jeff Poole determining proper operation of the extruder for making feed.  
USFWS: J. Barron

## Nutrition cont....

Two feeding studies were completed, and terminal samples were collected, plasma, fecal, water and fish samples. One of the feeding trials is evaluating the use of algae in feed for steelhead. The second trial is concerned with testing low phosphorus feed for spring Chinook.



Nathan Hyde sampling spring Chinook at the end of the feeding trial.

USFWS: J. Barron



Spring Chinook from Willard NFH used in the low phosphorus feeding trial.

USFWS: J. Barron

## Program Highlights cont....

### Nutrition cont....

The Nutrition Program is a partner on a proposal to test the efficacy of dietary fluoride in reducing the mortality in salmon caused by bacterial kidney disease. Our partners are Martin Chen and Marcia House (Northwest Indian Fisheries Commission) and Mike Huff, Suquamish Tribe's Grover's Creek Hatchery. The proposal was submitted to the Northwest Indian Fisheries Commission as a FY14 Hatchery Reform Project.

Two manuscripts for North American Journal of Aquaculture and one for the Journal of the World Aquaculture Society were reviewed by the Nutrition program staff.

### Conservation Genetics

Christian Smith collected steelhead samples in collaboration with Coleman NFH and Red Bluff FWO that will be included in our assessment of readiness to smolt using gene expression assays.

Roger Peters and Megan Cook (Washington FWO) met with Pat DeHaan at AFTC to discuss genetic monitoring of bull trout in the Elwha River.

Jennifer Von Bargaen genotyped 2012 spring Chinook salmon broodstock samples from Warm Springs NFH and Round Butte Hatchery.

### Conservation Genetics cont....



Jennifer Von Bargaen prepping fin clips for extraction.  
USFWS: J. Gordon

Matt Smith and Denise Hawkins sampled coho juveniles from Eagle Creek NFH. These samples are part of a project designed to determine the population structure of natural origin coho salmon within the Clackamas River basin and to assess possible sources from which to create an integrated broodstock program for coho salmon at Eagle Creek NFH (should that decision be made).



Spawning coho at Eagle Creek NFH.  
USFWS

### Conservation Genetics cont....

Brice Adams completed genotyping Arctic grayling (*Thymallus arcticus*) samples that will be part of the genetic monitoring of Big Hole River and Red Rock Lakes Arctic grayling, a collaborative project with Doug Peterson (Modeling and Decision Support Program) and the Montana ES Field Office.



Brice Adams prepping samples for PCR amplification.  
USFWS

### Ecological Physiology

Kyle Hanson prepared the wet lab and selective breeding building to house eulachon for an experiment to determine the impact of sedimentation on egg development. The study is to be conducted in cooperation with the Cowlitz Indian Tribe. Kyle Hanson and Chris Taylor met with Craig Olds and Dalton Fry from the Cowlitz Indian Tribe regarding eulachon field and laboratory work.

### Ecological Physiology cont....

Kyle Hanson consulted with Mary Bayer at Warm Springs NFH about methods to manage stress in hatchery fish during tagging and other operations.

Kyle Hanson consulted with Paul Scheerer, Oregon Department of Fish and Wildlife (ODFW), about experimental methods to determine the swimming capabilities of endangered Warner suckers (*Catostomus warnerensis*).

Ben Kennedy, Will Simpson, Kyle Hanson, Richard Glenn and Chris Taylor implanted 1500 hatchery steelhead with passive integrated transponder (PIT) tags. These fish will be released as part of a large study that examines how hatchery steelhead from supplementation efforts interact with wild steelhead and how such releases may affect natural steelhead production.

Kurt Steinke, Will Simpson, and Chris Taylor consulted with Trout Unlimited and Nevada Department of Wildlife about the monitoring of Lahontan cutthroat trout in the Maggie Creek watershed, NV. PIT tag detection equipment installed on newly replaced road culverts will be used to track fish movement through ephemeral portions of the watershed.

Kurt Steinke and Chris Taylor have been talking with Laura Mahoney (Red Bluff FWO) about detecting movement of steelhead kelts out from a pond at Coleman NFH. Kurt is providing technical assistance.

Biologists from R2 Resource Consultants, Redmond, WA, visited AFTC to view some ATPase sampling and tour the facility.

### Ecological Physiology cont....

Kyle Hanson participated in Phase 1 Cohort 26 the Stepping Up to Leadership Program at the National Conservation Training Center (NCTC).

Will Simpson and Richard Glenn volunteered at Julia Butler Hanson Refuge for the Columbian White-tailed Deer one day to assist in the deer round up. The refuge has been rounding up deer to transplant them to the Ridgefield NWR in Ridgefield, WA. The round ups are being conducted to save the deer from an anticipated levee breach; the levee currently protects the refuge from the waters of the Columbia River.

### Modeling and Management Decision Support

Doug Peterson gave a webinar on use of Bayesian networks in climate vulnerability assessments to the US Forest Service Rocky Mountain Region and Clark Fork Coalition.

Doug Peterson attended a statistics and modeling course using the software package *R* that was held at NCTC.

Victoria O'Byrne began a major project to analyze historic changes in riparian vegetation in two watersheds in southwestern MT. The data she generates will be used to analyze whether changes in willow density correlates with trends in the genetic population status of Arctic grayling in the Big Hole River and Red Rock Lakes.

### Modeling and Management Decision Support cont....

Victoria O'Byrne visited the RO to attend the Pacific Region's monthly Geographic Information System (GIS) meeting. She also coordinated with David Drescher and Eric Bergey (NWRS) to digitize aerial photos for a cooperative study with the Conservation Genetics Program.

### Administration/Facilities

Patty Crandell had a meeting with Jana Grote at the RO to discuss a variety of topics including opportunities to share new scientific information and applications throughout the Fisheries Program.

Biological Technician Jeff McLaren has moved on after working four years at AFTC assisting with the Bonneville Power Administration (BPA) funded steelhead reproductive success project. Jeff primarily worked in the hatchery caring for Abernathy Creek steelhead although he also collected and spawned returning adults and helped sample juvenile fish in the field. You are missed, Jeff!



Jeff McLaren

USFWS

## Program Highlights cont....

### Administration/Facilities cont....

Winter steelhead adult returns are being trapped through May for the BPA project "Natural Reproductive Success and Demographic Effects of Hatchery-Origin Steelhead in Abernathy Creek, WA". Totals at the end of February were 3 natural origin (released upstream), 11 hatchery origin (retained for broodstock), and 21 stray "out of basin" hatchery origin steelhead (euthanized).

The Ecological Physiology Program PIT tagged 1500 juvenile steelhead, part of the 10,800 juveniles to be released in April and May for the BPA steelhead project. PIT tags are placed in the abdominal cavity and retained for life, giving each fish a unique number that can be recorded as the fish pass antenna during migration.

Scott Gronbach completed a detail with RO staff at the Quinault NFH where he assisted in completing a Comprehensive Condition Assessment (CCA) of the facility.

Jeff Poole assisted the Nutrition Program in creating over 800 lbs. of special fish diets. Jim Lowell completed the rehabilitation of the fish ladder just in time for the arrival of our steelhead.

Over the past two months, the Facilities staff also installed a new energy efficient (and extremely bright) flood light onto the main laboratory building roof, completed the retrofit of a new flow meter for the domestic water system, and performed annual maintenance on the John Deere backhoe.

### Administration/Facilities cont....

Scott Gronbach attended the advanced acquisition management (PPM-302) course at the RO in order to keep his project management skillset up-to-date and also to satisfy the bi-annual contracting officer representative (COR) coursework requirement.

Jim Lowell finally got the green light to demolish the abandoned temperature control building. AFTC removed a rusty eye sore and was able to recycle more than 6 tons of copper, aluminum, and steel and reduce our carbon footprint.



Jim Lowell dismantling the temperature control building.  
USFWS: S. Gronbach



Temperature control building demolition complete.  
USFWS: S. Gronbach

## Administration/Facilities cont....

Speaking of recycling, AFTC once again participated in the Pacific Region annual electronics recycling event. Through this collaborative effort, employees were able to properly dispose of 100 lbs. of batteries, a dozen uninterruptible power supplies, broken TVs, and computer parts no longer serviceable from their homes and the office.



Recycling materials from the Temperature Control Bldg.  
USFWS: S. Gronbach

Safety topics at AFTC encompassed bad weather driving tips as well as asbestos awareness. The safety committee met for its quarterly meeting and focused their energies on the annual scrubbing of the AFTC's safety binder chapters. Finally, in response to the ergonomics awareness training, an expansive ergonomics assessment was conducted by the Washington State Department of Labor & Industries. Based on the findings of the free assessment, AFTC has begun to install and relocate ergonomic desks and chairs around station. More ergonomic products are expected to be acquired and used in the coming months in hopes of reducing employee hours lost due to previously unsafe working activities and postures. A special thank you goes out to Rick Goggins, Ergonomist, for establishing an ergonomics baseline and showing us a path to proper ergonomics around AFTC.

## Publications

### Ecological Physiology

Compton, M. and C.M. Taylor. 2013. Spatial scale effects on habitat associations of the Ashy Darter, *Etheostoma cinereum*, an imperiled fish in the southeast United States. *Ecology of Freshwater Fish*. doi: 10.1111/j.1600-0633.2012.00550.x

### Modeling and Management Decision Support

Roberts, J.J., K.D. Fausch, D.P. Peterson, and M.B. Hooten. 2013. Fragmentation and thermal risks from climate change interact to affect persistence of native trout in the Colorado River basin. *Global Change Biology*. DOI: 10.1111/gcb.12136



## *Inside Abernathy....*

This final installment of *Inside Abernathy* focuses on the Applied Research Program in Modeling and Management Decision Support (Program). The youngest Program at AFTC began in January 2011 with the arrival of Doug Peterson in the position of Senior Scientist/Program Head. Now with the addition of Victoria O'Byrne generating GIS mapping information and analyses, the Program conducts applied research to: 1) model changes in aquatic organism populations from landscape-level influences; 2) provide information and tools to managers for use in adaptive management strategies; and 3) provide technical expertise in population ecology and natural resource modeling.

Conserving populations of sensitive aquatic species often requires a better understanding of the human caused and natural factors that affect species abundance and distribution. Basic data are frequently lacking and/or existing data must be applied or generalized to address important management questions. We use complementary approaches to address these needs. First, in the absence of this basic data we attempt to fill the information need by estimating important landscape-level patterns in occurrence or population characteristics (aka *empirical modeling*). Second, given sufficient data and an appropriate conceptual or ecological framework, we can model processes for which basic data are lacking and evaluate different management strategies (aka *simulation modeling*).

Natural resource managers often face tradeoffs between competing objectives and/or considerable uncertainty in the potential outcome of a management decision. Decision support tools, though no substitute for professional expertise and experience, can help provide consistency and transparency when making difficult choices or evaluating complex problems. Such models can be very useful for repetitive decisions, and are capable of integrating different types of data. Many such tools are based on the probability of certain events, so uncertainties in both assumptions and outcomes can be explicitly depicted. This not only informs management but also highlights where additional research is needed.

Doug Peterson, Senior Scientist and Program Head

As Senior Scientist, Doug is the point of contact for the Pacific Region on providing tools for managers to use in decision making. Specifically, the decision support tools give managers information on the amount of "risk" associated with each management option. This allows managers to have additional information for use in adaptive management and informed decision making.

Victoria O'Byrne, GIS Technician

Victoria, a former Student Conservation Association intern, is a contract employee assisting with GIS data generation and analysis.

## Inside Abernathy cont....



Doug Peterson sampling trout in Lolo National Forest, MT.  
USFWS



Victoria O'Byrne scanning maps from the 1950's to use in an analysis examining habitat changes through time.  
USFWS: J. Gordon

Recent peer-reviewed publications (2011 to present). AFTC staff names are in bold italics.

**Peterson, D.P.**, S.J. Wenger, B.E. Rieman, and D. J. Isaak. 2013. Linking climate change and fish conservation efforts using spatially explicit decision support tools. *Fisheries* 38(3):112-127. DOI:10.1080/03632415.2013.769157

Roberts, J.J., K.D. Fausch, **D.P. Peterson**, and M.B. Hooten. 2013. Fragmentation and thermal risks from climate change interact to affect persistence of native trout in the Colorado River basin. *Global Change Biology*. DOI: 10.1111/gcb.12136

Muhlfeld, C.C, J.J. Giersch, F.R. Hauer, G.T. Pederson, G. Luikart, **D.P. Peterson**, C.C. Downs, and D.B. Fagre. 2011. Climate change links fate of glaciers and an endemic alpine invertebrate. *Climatic Change* 106:337-345 DOI 10.1007/s10584-011-0057-1

We hope you enjoyed the *Inside Abernathy* series over the past few issues. If you have questions about any of AFTC's Applied Research Programs please feel free to contact the appropriate Program Head who will be more than happy to assist you!

# Workshops, Conferences, and Meetings....

## **Nutrition:**

- Ann Gannam, Denise Hawkins and Patty Crandell attended the Yakama Nation/FWS coordination meeting where Ann presented the results of the lamprey feeding trial that was completed in December. This meeting provided an opportunity for staff from both groups to present on-going and new collaborative projects.
- Three members of the Nutrition Program attended the World Aquaculture Society meeting in Nashville, TN and Ann Gannam chaired a session, "Feeds and Feeding for Sustainable Hatchery Production". The titles of the three presentations given are as follows: "Effects of dietary guar gum on growth response, fecal stability and fecal phosphorus excretion in juvenile coho salmon *Oncorhynchus kisutch*", Ann Gannam. "Development of low phosphorus and low leaching feeds for spring Chinook salmon *Oncorhynchus tshawytscha*", Ron Twibell. "Experimental diets for intensive culture of Pacific lamprey (*Entosphenus tridentatus*) ammocoetes", James Barron.

## **Conservation Genetics:**

- Dan Bingham met with Mike Hudson of Columbia River FPO to discuss the genetic objectives for our Imnaha bull trout collaborative project. We will analyze 16 microsatellite loci to describe the genetic population structure of the Imnaha River Core Area and estimate population size within tributaries. This information will be useful in refining management practices and help to guide conservation efforts.
- Denise Hawkins attended the Asian Carp Regional Coordinating Committee (ACRCC) meeting in Chicago, IL. The objective of the meeting was to facilitate open discussion about the science and application of environmental DNA (eDNA) and to collaboratively review lessons learned and identify "paths forward" in regards to eDNA monitoring of invasive asian carp and associated "eDNA Calibration" (eCALS) studies funded by the ACRCC. Discussions included ways to maximize the usefulness of eDNA technology in aiding asian carp control efforts and to more effectively communicate eDNA data and implications.
- Pat DeHaan and Denise Hawkins began discussions with Judy Neibauer (FWS Central WA Field Office) and Mo Small (WDFW) to hold a meeting at the Washington FWO to present the results of two bull trout genetics studies.
- Pat DeHaan, Jennifer Von Bargaen, and Denise Hawkins met with the ODFW Native Fish Group to discuss our current Great Basin redband trout project and several collaborative project ideas.
- Christian Smith met with the Columbia River Inter-Tribal Fish Commission, IDFG and NOAA Fisheries to assist with design of a shared database for genetic information.
- Several AFTC Conservation Genetics Program staff met with WDFW geneticists to discuss methods of calculating relative reproductive success and the use of single nucleotide polymorphism markers (SNPs) in pedigree reconstruction.
- Dan Bingham attended the annual meeting of the Oregon Chapter of the American Fisheries Society (ORAFS) held in Bend, OR and gave a presentation titled: "Loss of Genetic Integrity in Hatchery Steelhead Despite Regular Wild Integration".
- Denise Hawkins, Matt Smith, and Dan Bingham attended the annual Baker Native Char Consultation meeting held at the Washington FWO and hosted by Nathanael Overman (Puget Sound Energy). The objective of the meeting was to summarize the Fish Connectivity Implementation Plan (FCIP), review results of 2012 activities, and confirm activities and approach toward implementation of the FCIP in 2013.

# Workshops, Conferences, and Meetings....

## **Conservation Genetics cont:**

- Pat DeHaan attended the annual desert fishes meeting and presented a summary of the Warner sucker genetic work completed this past year. The Warner sucker (*Catostomus warnerensis*) is endemic to the Warner Valley, an endorheic subbasin of the Great Basin in southeastern Oregon and northwestern Nevada. An endorheic basin is a closed drainage basin that retains water and allows no outflow to other external bodies of water, such as rivers or oceans, but converges instead into lakes or swamps, permanent or seasonal that equilibrate through evaporation. The species is currently listed as threatened under the Endangered Species Act.

## **Ecological Physiology:**

- Kurt Steinke and Chris Taylor met with Pat Monk (Mid Columbia River FRO) and Arden Thomas and Richard Corkins (Bureau of Reclamation, BOR, Yakima Field Office) about quantifying bull trout fish passage across a fish ladder at Clear Lake Dam in Yakima County, WA.
- Will Simpson and Chris Taylor met with Chet Sater (BOR) to discuss providing an appraisal of the current monitoring and evaluation program for the Umatilla Project.
- Ben Kennedy presented a poster titled "Migration dynamics of released hatchery steelhead smolts influence ecological and genetic risks" at the annual ORAFS meeting in Bend, OR. Ben was also credited in a short video produced by Freshwaters Illustrated that was shown at ORAFS titled "Getting attached: understanding the plight of Pacific lamprey." The video can be seen via the following link: <http://vimeo.com/53885581>

## **Administration/Facilities:**

- Patty Crandell attended two Regional Climate Board meetings, one by phone and one in the RO. She provided comments to the group about SNAP, a process for reviewing science proposals to ensure communication across Programs.
- Ann Gannam and Patty Crandell attended the Columbia River Gorge NFHC Hatchery Evaluation Team (HET) meeting. Many interesting research related topics were discussed such as: possible residualizing or delayed fish after releases, a possible problem with the creation of mini jack or precocious salmon and methods for solving the problem, and the advantages of holding off on first feeding. Staff from all of the Gorge NFHs and the Columbia River FPO participated.
- Patty Crandell participated in over four different discussions with Bill Gale from the Mid-Columbia River FRO about finalizing the Winthrop NFH vulnerability assessment report.
- Patty Crandell participated in two Pacific Region Fisheries Program calls.
- Patty Crandell participated in a Fish Technology Center conference call. Agenda items included: expanding eDNA analysis capacity w/in the Fisheries Program (with Craig Martin, Aquatic Invasive Species, WO), participation with Journal of Fish & Wildlife Management (editorial duties), and the FTC Annual Meeting.
- Judy Gordon attended the Quilcene NFH co-managers' meeting at the Olympic National Forest office in Quilcene, WA.
- Judy Gordon attended the North Pacific LCC Science/TEK Subcommittee Meeting via teleconference.

## Employee Spotlight....



Mark Hack  
IT Specialist  
Administration

Mark is a third generation SW WA resident growing up in Longview, Toledo and Morton. His grandfather was a Canadian who moved to the area and worked as a logger for Long Bell, helping build the town of Ryderwood. His father and brother were also loggers in the area. Watching his father logging gave Mark a perspective on the outdoors that has guided his interest in wanting to work in some way in protecting the outdoors. He graduated with a B.S. in Fisheries from University of Washington.

After graduation, Mark did a brief stint as an observer for NOAA Fisheries on a Japanese trawler and a couple of summers doing creel survey work for the Snohomish County PUD at Spada Lake off of Steven's Pass Highway. He began at working at AFTC when it was still called Abernathy SCTC (Salmon Culture Technology Center) in 1987, as a part-time temporary intermittent Animal Caretaker, later called a Biological Technician. In 1993, he went to work for the State of Washington on the Mid-Columbia Predator Index Study. He returned to AFTC as a temporary Biological Technician rearing sturgeon. While working as a BioTech, Mark began taking computer classes at Lower Columbia College which led to him becoming a Computer Specialist and later an IT Specialist at AFTC.

Mark has six children, two from a previous marriage who live with their mother in Houston, TX. He and his wife have three boys and one girl ranging in age from 2 to 16 years which makes for a boisterous home. His wife, Arlene, is from the Philippines and cooks lots of good food, which does nothing for maintaining his waist-line.

Mark likes to camp, hike, cross-country ski, fly fish, sail, and canoe. He enjoys teaching his family about the outdoors and says it is fun to see their excitement learning new activities which are totally foreign to someone growing up in the Philippines.

# Lunchtime Morale Boosters....

## National Pie Day

Did you know that January 23<sup>rd</sup> is National Pie Day? Here at AFTC we took time during lunch to celebrate this auspicious occasion with the sampling of fourteen different homemade dessert pies. The list of pies was impressive: Raspberry Sour Cream, Black Forest Cherry, Pumpkin, Apple, Pear-Cherry, Lemon Truffle, Bare Bottom, Banana Cream, Blackberry, Blueberry Cream, Peanut Butter-Chocolate, Haupia, Apple-Cranberry, and a Fresh Fruit Tart. The Haupia pie is a coconut-milk based, Hawaiian pie using Hawaiian sweet potatoes. It was a beautiful purple color inside and very tasty. All the cooks did a fantastic job with their pies and we are looking forward to next year's celebration of savory pies!



James Barron positions himself for ample sampling of pies. USFWS

## National Chili Day

After the success of AFTC's National Pie Day Celebration we decided to continue with the lunch time celebration of food related holidays with National Chili Day on February 28<sup>th</sup>. There were three different types of chili (the stew not the pepper) for lunch: chili con carne, chili verde, and vegetarian. Of course there were the usual "fixings" to go with chili, corn bread, chopped onions, chopped green pepper, cilantro, shredded cheese, jalapenos and black olives. Of course it being AFTC there were desserts: cake and brownies. The food was fantastic and thoroughly enjoyed by all.

Next up National Barbeque Month in May. Who knew that there could be so many opportunities to celebrate national food related holidays?



James Barron, Chris Taylor, and Jeff Poole taking eating chili seriously. USFWS



Chili "fixins". USFWS

## Longview, WA Parks and Recreation-After School Program

The after school program were held at Columbia Valley Gardens and St. Helens Elementary. James Barron introduced the kids to Pacific lamprey by explaining their life cycle and showing them an adult lamprey model and a live lamprey ammocoete. Nathan Hyde went over biology of the Pacific salmon. Brice Adams explained how salmon find their way home from the ocean before the children partook in the “smell your way home” activity, where they used their noses to play the role of salmon returning to their respective tributaries within the Columbia River basin.



Photos: USFWS

## Longview Forestry Days

Chris Taylor taught a stream ecology class for 4<sup>th</sup> and 5<sup>th</sup> graders at Forestry Days which took place at the Wake-Robin Outdoor Center in Longview, WA. The students rotated through a variety of outdoor classes/studies to learn more about the natural history of their region.