U.S. Fish & Wildlife Service

Abernathy Fish Technology Center Newsletter

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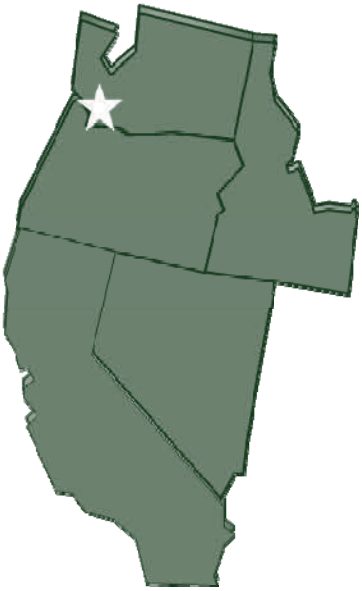


Serving the Pacific and Pacific Southwest Regions

Our Recovery Champion: Pat DeHaan

Photo: FWS

Photo: FWS

AFTC's very own Pat DeHaan received the prestigious USFWS Recovery Champion Award— Pacific Region as a member of the inter-agency Oregon Chub Recovery Team. Pat was responsible as for the genetics work on Oregon chub which was a critical component of the delisting decision. Congratulations Pat!

For more information: http://www.fws.gov/Endangered/what-we-do/recovery-champions/index.html.

Girl Scout Troop Installs Pollinator Garden!

Working with Girl Scout Troop #44208 from Castle Rock/Toutle, WA, staff at AFTC have been able to plant a garden to attract native pollinators. Troop Leader JoAnn Ehrmantrout and her co-leaders Shannon Kannas and Beth Kuhlman and parent volunteers Leslie Williamson and Jennie Heimann, along with Center Director Judy Gordon, were able to coordinate their efforts to give the girls some insights into native pollinators and the roles they play, provide a fun outdoor experience, while lending a helping hand to AFTC. AFTC's contribution consisted of locating a site (outside of our Main Office), having Maintenance Worker Jim Lowell prepare it for planting, finding a local nursery (Watershed Garden Works) to supply the native plants, and bringing the plants to AFTC. On Wednesday June 10, the leaders and parent volunteers drove the scouts to AFTC. The scouts in attendance were Bella Kannas, Christine Kannas, Jacob Kannas, Natalie Heimann, Abby Williamson, Samatha Ehrmantrout, Sophia Kuhlmann, Ella Kuhlman, and Charlie Kuhlmann (yes we even had two boy scouts!). After a brief discussion of pollinators and the types of plants they would be planting, and a generous application of sun block, the kids were ready to get to work. They started by compacting the newly applied top soil, then using a predetermined garden design for the 40'x 9' area, the Troop put the plants in position for planting. While part of the group placed the final plants, the rest starting digging holes and planting. Two and half hours later ~205 native plants (red flowering current, huckleberry, blue camas, sitka columbine, etc.) had been planted! Everyone had a great time helping to conserve native species. The nursery even took the empty pots back to use again. The Troop plans to provide AFTC with a bee box to install near the garden for native bees to colonize and to return next year to see how the garden is doing.

Girl Scout Troop #44208 from Castle Rock/Toutle, WA planting the pollinator garden. Photo: FWS.

Tired but successful young conservationists! Photo: FWS.

The first pollinator arrives: a tiger swallowtail butterfly. Photo: FWS.

Dr. Peterson Goes to Laos and Cambodia

Left to right: Mr. Hartmut Tolle (Xayaburi Power - Technical Coordinator), Mr. Doungkham Singhanouvong (LARRec), Kulthida Techasarin (SIM –Program Regional Coordinator), Dr. Stephen Walsh (USGS), Dr. Doug Peterson, and Dr. Michael Raeder (Xayaburi Power - Assistant Managing Director). Photo: Laos News Agency (KPL).

Doug Peterson spent two weeks in Cambodia and Laos in DOI's International Technical Assistance Program (ITAP), to help implement the Smart Infrastracture for the Mekong (SIM) initiative. The trip's purpose was to provide technical assistance to the Lao Living Aquatic Resources Research Center (LARReC), a government agency focused on fisheries and aquaculture research. LARReC sought help identifying knowledge gaps and in crafting a long-term research agenda to inform future sustainable hydropower development and fish harvest, including fish passage. In the ITAP program, three groups of two scientists in different topic areas (Fish Migration, Fish Ecology, and Fish Genetics) each visit Laos and meet with national ministries, provincial offices, universities and non-governmental organizations to evaluate existing research capacity and on-going projects in these fields. Doug and Dr. Steve Walsh (USGS) comprised the Fish Ecology team.

For more information visit:

Lao News Agency: http://kpl.gov.la/En/Detail.aspx?id=4210

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

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

Reports

DeHaan, P., B. Adams, J. Von Bargen, and K. Wing. 2015. Genetic analysis of native salmonids from the Lake Pend Oreille and Clark Fork River system, Idaho and Montana. AFTC Final Report CY2014.

Smith, C. T., J. Von Bargen, and K. Wing. 2015. Genetic assignment to run of steelhead smolts captured in the Bull Run River. AFTC Final Report FY2015.

Smith, C. T., and J. Von Bargen 2015. Population structure of coastal cutthroat trout from Tryon Creek, OR. AFTC Final Report FY2015.

Smith, M., and J. Von Bargen 2015. Investigation of the relative reproductive success of hatchery and wild steelhead in the Deschutes River Basin. AFTC Final Report CY2015.

AFTC Program Highlights

Physiology and Nutrition

Twelve feeds were received from the hatcheries in May and June for fish feed quality control. As part of the routine analyses, all feeds from the hatcheries were checked for rancidity. Ann Gannam wrote the feed memos and contacted the feed mills if necessary.

The third and final release of broodyear 2014 steelhead smolts into Abernathy Creek took place on May 12th. Prior to release, Richard Glenn and Kyle Hanson collected gill samples from smolts to determine their seawater preparedness. The final tally for the year total release was 14,500 smolts.

This year's adult steelhead returns ended in May with the last capture of an adult occurring on May 13th. The total run consisted of 73 natural-origin, 162 hatchery origin, and 26 out-of-basin stray hatchery steelhead. Fifty natural-origin and 20 hatchery-origin were released upstream to spawn naturally. Twenty three natural-origin adults and 69 hatchery-origin adults were used for the hatchery broodstock to produce an estimated 18,400 smolts for release in Spring 2016. This also concluded the collection of blood, ovarian fluid, and eggs during spawning.

Lamprey PIT tagging. Photo: FWS.

James Barron, Kelli Hawke, and Kyle Hanson started a lamprey tagging study on May 6th. Lamprey ammocoetes were tagged with visible implant elastomer, coded wire tags, or a passive integrated transponder. Survival and growth will be monitored for the next six months to determine the impacts of each tag type. Additional lamprey work continues with preparations for another feeding trial. The upcoming lamprey feeding trial is in collaboration with the Yakama Nation, NOAA and the Umatilla Tribe with funding from the Chelan PUD.

Sample collection and analysis for the recirculating aquaculture system (RAS) study with juvenile coho was wrapped up in May. Richard Glenn and James Barron analyzed plasma samples for sodium, potassium, chloride, phosphorus, glucose and cholesterol concentrations. Richard Glenn also analyzed gill biopsies to determine if RAS systems impact smoltification rates.

Richard Glenn updated the AFTC Chemical Inventory Database to increase user friendliness and accessibility.

Richard Glenn assisted Will Simpson in constructing egg/fry holders and electric shocking of eggs and fry for a project testing electrical methods for removing carp from Malheur National Wildlife Refuge.

Ron Twibell setting up tanks for sunburn feeding trial. Photo: FWS.

Work is underway in preparation for the sunburn/steatitis feeding trial. Ron Twibell, as lead on this project, has done all the early preparatory work for the study including feed testing and preparation as well as assisting with tank setup. James Barron designed and initiated the construction of the tank and lighting system .

AFTC Program Highlights— continued

Conservation Genetics

Jennifer Von Bargen conducted Rapid Response genetic analysis of 96 single nucleotide polymorphism (SNP) markers on 105 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.

Genetics staff members assisted our partners at Pacificorp in sampling bull trout from the Lewis River, WA. Brice Adams conducted Rapid Response genetic analysis of 12 microsatellite markers on samples from the 14 captured bull trout. The results of this work were used by Pacificorp to inform fish passage decisions. Brice performed a similar analysis on 10 bull trout captured by Avista Power in the Calrk Fork River, MT. Again, results were used to inform fish passage decisions.

Kieslana Wing and Jennifer Von Bargen analyzed 96 SNP markers in 152 Chinook salmon smolts captured in the American River, CA. The genetic results are being used to evaluate the accuracy of length-at-date methods for assigning fish to population.

The genetics program hosted Dr. Todd Seamons, a geneticist from Washington Department of Fish and Wildlife, for a lunch-time seminar at AFTC. Dr. Seamons presented results of his research on the use of trans-generational genetic mark-recapture (tGMR) models in estimating fish abundance. AFTC staff enjoyed lunch and an illuminating discussion.

Quantitative Ecology and Technology

In May and June, Will Simpson, Kurt Steinke, and Doug Peterson completed a field experiment on the effects of electrofishing on carp eggs and embryos at Malheur National Wildlife Refuge. They spawned wild-caught carp, reared the embryos in a mobile lab, and tested the effect of different electrical waveforms and voltage gradients on survival of developing embryos from spawning to hatching. Results will be used to determine the efficacy of using electrofishing that targets eggs and embryos as a control method for common carp in Malheur Lake.

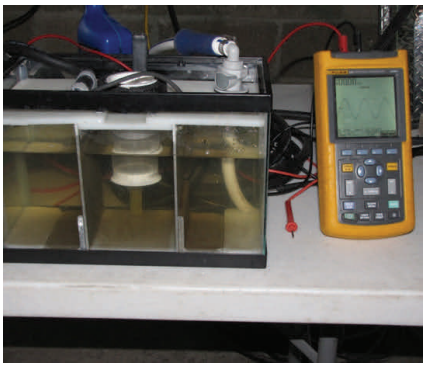
Joëlle Blais arrived at Abernathy to complete an 11-week internship in the USFWS Directorate Fellows Program. Ms. Blais, an University of Washington (UW) Aquatic and Fishery Sciences undergraduate, will work on the steelhead reproductive success study and complete a small independent research project. Please join us in welcoming Joëlle!

Administration

Judy Gordon, Patty Crandell, and Vince Bocci conducted interviews for AFTC's Administrative Assistant position. Working with Brian Lawler, Pacific Region Regional Recruiter, and Debra Lewis, Veterans Supported employment Specialist with the Veterans Administration, the AFTC staff was able to conduct a series of interviews for this Veterans Recruitment Authority appointment.

Collecting eggs from a wild-caught female common carp. Photo: FWS.

Will Simpson counting carp embryos. Photo: FWS.



Egg basket holding carp embryos placed between electrodes in test chamber. Oscilloscope at right measures the strength of the electrical current, AC in this instance. Photo: FWS

Publications

Glenn, R.A., P.W. Taylor, E.H. Pelton, S.K. Gutenberger, M.A. Ahrens, L.M. Marchant, and K.C. Hanson. 2015. Genetic evidence of vertical transmission and cycling of *Yersinia ruckeri* in hatchery-origin fall Chinook salmon *Oncorhynchus tshawytscha*. Journal of Fish and Wildlife Management 6: 44-54.

Program Highlights — continued

Jeff Poole worked with contractors to replace a cracked creek water line valve in the lower bank of raceways. The replacement butterfly valve will provide greater flexibility in water use.

Working with Jennifer Von Bargen, Jim Lowell created braces to address safety concerns in the Genetics Sample Hazardous Materials Building.

New shelving braces secure shelving in the Genetics Haz Mat Building. Photo: FWS.

Patty Crandell continued work with Mara Zimmerman, Washington Dept. of Fish and wildlife – Research Division to put together a joint workshop to discuss both agencies research efforts in the Abernathy/Mill/Germany Creeks, a state designed Intensively Monitored Watershed.

Judy Gordon and Patty Crandell participated in Pacific Region Fisheries Resources May and June Project Leaders conference calls.

Vince Bocci attended the annual Administrative Workshop, hosted by the Pacific Region's Budget and Administration Program in the Regional Office.

Mark Hack volunteered and participated in the judging of senior

Mark Hack judging senior presentations at Mark Morris High School. Photo: Kier Hack.

presentations at Mark Morris High School, Longview, WA. These oral presentations are a requirement of all seniors before graduation.

May Safety Training on CPR/First Aid, organized by Patty Crandell, was provided by Howard Gearns of the Washington Fish and Wildlife Office.

June Safety Training on Heat Stroke/Heat Exhaustion was provided by Vince Bocci.

Niko Hawke, son of Biological Technician Kelli Hawke, volunteered to assist with the removal of bark dust which had become infested with carpenter ants.

Judy Gordon participated in a conference call for the Science/ Traditional Ecological Knowledge Subcommittee of the North Pacific LCC on June 8.

Judy Gordon and the other FTC Directors participated in conference calls to meet the new HQ FTC Coordinator, Joel Bader, and to participate in a data call for the July 2015 Assistant Regional Directors – Fisheries meeting.

Twenty-two members of Mt Hood Community College's Aquatic Wildlife course, and their instructor Amy Eckstrom, visited AFTC for a site visit as part of their syllabus covering monitoring and marking techniques.

Meetings and Conferences

- Christian Smith presented the genetic profile of coho salmon at our National Fish Hatcheries at the 2015 Pacific County Marine Science Conference in Long Beach, WA.
- Christian Smith participated in the Columbia River Gorge NFH Complex Hatchery Evaluation Team Meeting.
- Christian Smith, Jennifer Von Bargen and Kieslana Wing participated in the Interagency Ecological Program (IEP) meeting to present conservation genetics research on Sacramento River Chinook salmon being done at AFTC.
- 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.
- Doug Peterson attended a webinar briefing on the Climate Registry for the Assessment of Vulnerability (CRAVe) system. The on-line system is intended to provide a clearinghouse of information about climate vulnerability assessments conducted for both natural and built systems.

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

Watermark: Adult winter steelhead. Photo credit: J. Strickland

Ongoing Projects—continued

Range-wide conservation and monitoring tools for bull trout: a method for determining threats and monitoring outcomes of conservation actions. *Management Need*: Evaluate the influence of sample size and spatial distribution of sample sites on estimates of genetic diversity in ESA listed populations. *Partner*: Oregon Department of Fish and Wildlife.

Investigation of the Relative Reproductive Success of Hatchery and Wild Steelhead in the Deschutes Basin. *Management Need*: Evaluate impacts of stray hatchery fish on naturally spawning populations of steelhead. *Partner*: Oregon Department of Fish and Wildlife.

Genetic characterization of salmonids colonizing restored streams in Portland, OR. *Management Need*: Determine the species and population of origin of salmonids captured in urban streams. *Partner*: Columbia River Fisheries Program Office.

Use of restriction-associated DNA sequence data for single nucleotide polymorphism detection in listed Devil's Hole pupfish. *Management Need*: Develop genetic markers to monitor genetic diversity of a listed population held in refugia. *Partners*: Sacramento FWO; University of California, Davis.

Population genetic structure of Spalding's catchfly: a terrestrial plant. *Management Need*: Develop genetic markers and monitor genetic diversity of populations to identify management units and inform conservation planning. *Partners*: Idaho FWO; University of Montana.

Genetic needs assessment for endangered Lost River and shortnose suckers of the Klamath River Basin, OR. *Management Need*: Develop genetic markers to monitor genetic diversity of listed populations. *Partners:* Klamath Falls FWO; U.S. Geological Survey.

Rapid response genetic analysis of threatened bull trout collected below dams in the Clark Fork River, MT. *Management Need***:** Provide data to inform upstream fish passage decisions for listed bull trout. *Partners*: Avista Corporation; Confederated Salish Kootenai Tribes; Idaho Fish and Game; Kalispel Tribe of Indians; Montana Fish Wildlife & Parks; Montana Ecological Services Field Office; Pend Oreille Public Utility District; Pennsylvania Power & Light, MT.

Genetic identification of endangered winter-run Chinook salmon in the Sacramento River, CA. *Management Need*: Rapid response broodstock identification for spawning of listed species. *Partners*: Livingston Stone NFH; Red Bluff FWO; NOAA Fisheries.

Strategic modeling of bull trout conservation actions in the lower Clark Fork River, MT. *Management Need*: Determine impacts of hydroelectric facilities on listed bull trout populations and prioritize conservation actions. *Partners*: Avista Corporation; Montana Fish Wildlife & Parks; Montana Ecological Services Field Office; Idaho Fish and Game.

Movement patterns of Oregon chub. *Management Need*: Determine movement patterns and gene flow among populations of a recently delisted species using genetic data. *Partners*: Oregon Department of Fish & Wildlife, U.S. Army Corps of Engineers.

Genetic assessment of steelhead smolts captured in the Bull Run River. *Management Need*: etermine whether steelhead smolts captured in the Bull Run River are Winter Run (ESA-listed) or Summer Run (unlisted). *Partner*: City of Portland.

Rapid response genetic analysis of threatened bull trout collected in the Lewis River, WA. *Management Need*: Provide data to inform upstream fish passage decisions for listed bull trout. *Partner*: PacifiCorp Energy.

Photo: FWS.

Two bull trout captured in the Lewis River, WA.

Projects—continued

Genetic run assignment of juvenile Chinook salmon from the American River. *Management Need*: Assess accuracy of length-at-date method for distinguishing Spring run (ESA-listed) from Fall run (unlisted) Chinook salmon smolts. *Partner*: Pacific Southwest Regional Office.

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 reducing biologist time spent in design and troubleshooting. *Partners*: NOAA Fisheries, USFWS Green Bay FWCO.

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

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.

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.

New Faces at AFTC

Photo: FWS.

Joëlle Blais is AFTC's Director's Fellowship Program Intern. A current undergraduate at the University of Washington, she is majoring in Aquatic and Fishery Sciences with minors in marine biology and quantitative sciences. She has interned at Plas Newydd Farm and volunteered at the Seattle Aquarium, Wallace River hatchery, and in Tom Quinn's and Steven Robert's UW labs. When she is not learning about salmonids, Joelle likes to play her trumpet in the Husky Marching Band and enjoys watching football and fishing. Welcome Joëlle!

Photo: FWS.

Steve Dyer, is AFTC's new Administrative Assistant. Born in Milan, TN, Steve has 27 years of military experience: 12 years Active Duty and 15 Years in the Reserves. He comes to AFTC from a position in Veterans Affairs in Vancouver, WA. This proud father of five and grandfather of two enjoys hunting (bird, deer, and elk), fishing, and gardening. Welcome Steve!