ONCORHYNCHUS

Newsletter of the Alaska Chapter, American Fisheries Society

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In this issue:

Bleached and stained threespine stickleback from Middleton Island, Alaska demonstrate intrapopulation variation in lateral plate number. Photo by J. Colgren.

Threespine Stickleback — Small Stature Yields Rich Biological Data

Emily Lescak

The Cook Inlet region is home to countless freshwater, anadromous, and oceanic populations of threespine stickleback that have attracted the attention of an international group of biologists. After the glacial recession about 13,000 years ago, oceanic stickleback colonized newly available freshwater habitat in this region, giving rise to an adaptive radiation of freshwater populations with a diverse array of phenotypes. Biologists have been studying stickleback since the 18th century, when Linnaeus named them *Gasterosteus aculeatus,* meaning, "belly bone spined." Charles Darwin, in his 1871 text *The Descent of Man, and Selection in Relation to Sex,* described the polygamist mating strategy of stickleback and noted sexual dimorphism in nuptial coloration. Beginning in the 1940s, Niko Tinbergen and his students launched stickleback as a model for ethology and comparative biology. This and other work resulted in Tinbergen's receipt of the Nobel Prize in 1973. He was particularly drawn to the ease with which stickleback could be reared and observed in both natural and laboratory conditions. Since then, a rich body of work on stickleback morphology, behavior, evolution, genetic architecture, and physiology has been created, amounting to thousands of papers and a shelf full of books. These studies present stickleback as a widely used model organism to address long-standing questions in evolutionary biology. Several features particularly lend this species to be a prime model organism for study.

For example, independent stickleback populations show remarkable levels of adaptation to different environments. The distribution of stickleback across fresh, brackish, and marine waters throughout the northern hemisphere grants scientists the opportunity to study the relative impacts of geography and environment on the origin and maintenance of diversity in wild populations. A notable feature is the loss of external bony armor in freshwater populations that do not co-exist with vertebrate predators. Several other divergent phenotypes have been discovered in freshwater stickleback, such as heritable tolerance to colder temperatures (*Barrett et al. 2011*) and reduction in prolonged swimming capacity when compared to their oceanic counterparts (*Dalziel et al. 2011*).

Stickleback have also provided outstanding examples of parallel or convergent evolution. Throughout the stickleback's range, freshwater populations evolved stereotypical divergence

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The President's Corner

Mark Wipfli

Mark Wipfli, AFS Alaska Chapter President.

This past year went by so quickly it hardly felt like an entire year serving as President, as the Society transitions to a new President and Executive Committee (ExCom) officers this fall. I'd like to thank you all for allowing me to serve as President of our Chapter, and would like to further thank the other ExCom officers and Alaska AFS committee chairs and members for making my time as president a really enjoyable and fulfilling learning and growing experience. I must admit, it was a lot more fun and less work than I anticipated when I originally agreed to serve as an ExCom officer, sequentially moving from Vice President, to President-Elect, President, and Past President positions each year of my ExCom tenure. It's also been excellent learning more about how AFS functions, at the Chapter, Division, and National levels, and getting to better know the people involved at those levels within AFS.

One of the most satisfying (and certainly most time-consuming) parts of serving as eventual President is being in charge of planning the annual meeting, while serving as President-elect. You get to tailor the meeting to your liking, oversee meeting planning and preparation, select a meeting theme and plenary speakers, choose special sessions, decide location and venue, and choose whom to ask to be involved in the program planning and local arrangements committees. The key there is to: start planning early; involve people that are organized and have follow through; fill the meeting with engaging plenary speakers, interesting special sessions, and plenty of captivating tours; and, of course, plan ample socials with great food and beverages (i.e., good, plentiful beer). It actually is not all that much

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Threespine Stickleback, continued

from their oceanic ancestors with regard to characteristics such as lateral plate loss, pelvic girdle reduction, and opercle bone shape. The *Ectodysplasin* and *Pitx1* genes underlie lateral plate and pelvic girdle loss, respectively, in geographically disparate populations (*Colosimo et al. 2004*, *2005*; *Cresko et al. 2004*; *Chan et al. 2010*). Similarly, parallel pigmentation changes in independent freshwater populations have been mapped to the *Kit ligand* gene (*Miller et al. 2007*). Independent sympatric pairs of stickleback have also evolved parallel assortative mating strategies based on body size and male nuptial coloration (*Boughman et al. 2005*). Assortative mating describes a nonrandom process in which individuals with similar genotypes and/or phenotypes mate with one another more frequently than what would be expected under a random mating pattern.

Extant freshwater populations founded following the last glaciation (~13,000 years ago) have provided insights into the drivers of divergence. Studies of recently derived populations showed that reproductive isolation results from combinations of selection against migrants, selection against hybrids, and assortative mating (*Hendry et al. 2009*). Oceanic individuals may be maladapted to life in fresh water due to decreased growth rates in fresh water (*Marchinko and Schluter 2007*) and increased predation by macroinvertebrates (*Marchinko 2009*). Oceanic individuals rapidly evolve reduced armor after colonizing fresh water, suggesting that this phenotype is also maladaptive in freshwater environments (*Bell et al. 2004*). On the other hand, freshwater stickleback exhibit reduced hatching success (*Marchinko and Schluter 2007*) and swimming performance (*Dalziel et al. 2011*) in salt water.

Studies of benthic-limnetic sympatric pairs have also found lower survival (*Vamosi and Schluter 2002*) and slower growth (*Hatfield and Schluter 1999*) in stickleback hybrids. While studies of oceanic-freshwater sympatric pairs have been limited, hybrids likely suffer similar fates based on observations that the two ecotypes remain phenotypically and genetically distinct (*Jones et al. 2006*).

Benthic and limnetic stickleback preferentially mate with their own ecotype, even if individuals

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The President's Corner, continued

work, and it's all very fun provided you plan ahead and involve the right people.

On that note, I'd like to encourage you to really think about, and seriously consider, serving as an ExCom officer or as a chair or member of one or more of our committees (*http://www.afs-alaska.org/about-us/committees*). It gives people that serve the opportunity to be more engaged, to the extent they'd like to be, in important matters that concern the state of Alaska, our natural resources, and fisheries issues germane to the reasons we as fisheries professionals are here doing what we're doing in the first place. A major benefit of a professional society is to bring together and share expertise across agencies, divisions, NGOs, and the general public. There's a huge feeling of satisfaction knowing your efforts are going towards something much, much larger and important, and that really has a positive influence on resource management, the training and education of budding fisheries professionals, and the future of natural resource conservation in Alaska. And, you get to meet and interact with lots of fun and interesting people, working together towards common goals!

So, I'd encourage you all to talk to past Presidents, ExCom members, and service other Chapter committee members on what it takes to be involved in service within our Chapter, and really consider getting involved. There are a lot of good reasons why becoming an officer in the Chapter is good for you, and good for the Chapter and its members, so check it out!

Threespine Stickleback, continued

originate from different lakes (*Rundle et al. 2000*), with assortative mating driven by size, color, and mating behavior (*Boughman et al. 2005*). Assortative mating predominates in oceanic-freshwater pairs, although more mating strategy variation is seen compared to benthic-limnetic pairs (*Furin et al. 2012*). In addition to these three mechanisms, geographic and temporal reproductive isolation also likely drive divergence (*Karve et al. 2008*).

One benefit of studying stickleback is the ability to readily obtain samples from wild populations. Emily Lescak collects specimens from Middleton Island, Alaska. Photo by V. Padula.

Recently derived populations can lend insight into the tempo of evolution. All fish in Loberg Lake, in the Matanuska-Susitna Valley of Alaska, were exterminated by the Alaska Department of Fish and Game in 1982 in an effort to kill stickleback prior to introducing sportfish; the perception at the time was that stickleback reduce the success of introductions. When the lake was sampled in 1990, stickleback resembling the ancestral oceanic form were found, suggesting that the lake had been re-colonized by a nearby anadromous population. By 2007, however, the lake was dominated by individuals with armor reduction, the typical phenotype of freshwater populations in the area. This case study demonstrates that armor loss can evolve in less than 20 years, or about 10 generations (*Aguirre and Bell 2012*).

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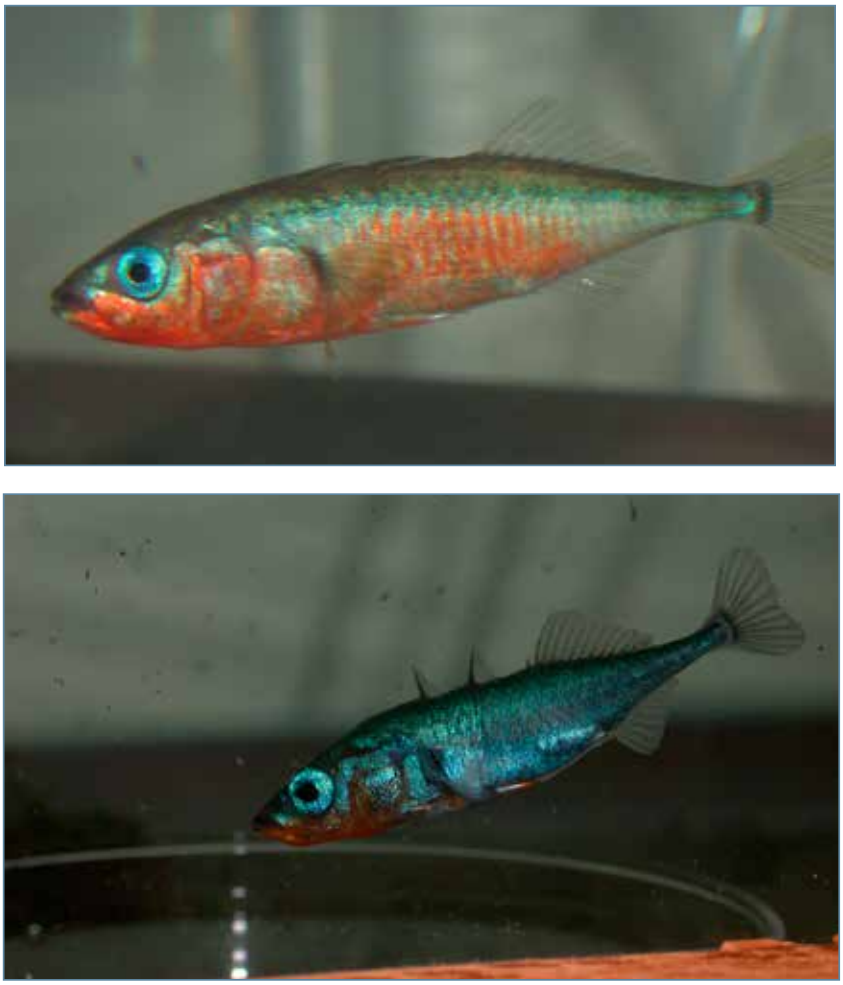
Threespine Stickleback, continued

Another example of contemporary evolution comes from islands in Prince William Sound and the Gulf of Alaska that were uplifted by the 1964 Alaska Earthquake. Resident freshwater populations now found on these marine terraces that were submerged prior to the earthquake are at the most about 50 years old. Within this short time period, freshwater populations diverged from the ancestral oceanic phenotype in a suite of morphological traits, demonstrating that traits related to body size and feeding can evolve with the same rapidity as traits associated with bony armor (*Gelmond et al. 2009*).



Another benefit of studying stickleback is the ease with which wild-caught individuals transition to lab conditions. The anadromous stickleback (top) is from Rabbit Slough and the freshwater stickleback (bottom) is from Loberg Lake. Both fish show stereotypical male nuptial coloration. Photos by C. Furin.

An extensive fossil record also provides a valuable chronology with which to study rates of morphological evolution. Our knowledge of armor structures in extant populations allows interpretation of variation in ossified structures in fossil stickleback. The fossil record is consistent with genetic data, suggesting that Atlantic stickleback diverged from Pacific populations within the past couple of million years. The fossil record also demonstrates that Pacific oceanic stickleback have been largely morphologically consistent over the last 10–20 million years, allowing them to be used as an ancestor surrogate for extant freshwater populations. Consistent with extant populations, fossils found in areas lacking fish predators also demonstrate reduced armor. Stratigraphic analysis of fossils from the Truckee Formation allows the rate of change over a period of thousands of years to be quantified for several bony features. These studies reveal that armor loss is an ancient phenomenon that can occur over short evolutionary time scales (*Bell 1994*).

A short generation time (1 to 2 years), small size (35–80 mm), and ease of laboratory rearing make stickleback well suited for both observational studies and manipulative experiments. Predation experiments in which stickleback were exposed to predatory fish, macroinvertebrates, and snakes revealed how these selective agents shape morphological variation. The short generation time of stickleback also allows for retrospective morphological analyses that lend insight into contemporary evolution and seasonal fluctuations in phenotypic distributions. For example, by carefully observing stickleback populations and environmental conditions in lakes on Haida Gwaii for a decade, Tom Reimchen was able to identify a suite of ecological features, such as predator abundance and water chemistry, that influence stickleback morphology (reviewed in *von Hippel 2010*).

Stickleback are also relatively easy to manipulate in the lab. Viable crosses can be produced using individuals originating from nearly any two populations found throughout their

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Threespine Stickleback, continued

distribution, which greatly facilitates genetic mapping approaches to identify loci underlying complex traits (*Peichel 2005*). Genetic mapping has revealed the genomic regions underlying a suite of complex traits in stickleback, including those responsible for armor, body shape and size, and pigmentation. Ease of genetic manipulation has allowed for complementation crosses and transgenic experiments that confirmed the role of the *Ectodysplasin* gene in lateral plate development (*Barrett 2010*).

Based on the extensive record of monitoring of unique populations and the relative ease of manipulation, an outstanding set of genomic tools has been developed that have launched stickleback research into the genomic era. The Kingsley Lab, in conjunction with the Broad Institute, created a reference genome, which greatly facilitates mapping of traits and identification of genomic regions under selection in divergent populations of threespine stickleback. Single nucleotide polymorphism arrays, along with reduced representation and whole genome sequencing, are powerful tools for studying the genetic architecture underlying parallel evolution and identifying genomic regions under selection in adaptation to fresh water. These studies have revealed a parallel genomic basis to parallel phenotypic evolution, and identified a number of new genomic regions underlying adaptation to fresh water, including genes responsible for osmoregulation and bone development (*Hohenlohe et al. 2010*). We have also begun to understand the genetic architecture underlying rapid phenotypic diversification. It appears that freshwater phenotypes are able to evolve from standing genetic variation in the ancestral stock, and inversions and linkage disequilibrium permit rapid fixation of a suite of freshwater genotypes (*Hohenlohe et al. 2012*; *Jones et al. 2012*).

Stickleback have been used to address a variety of evolutionary questions concerning reproductive barriers, the influences of selective agents on morphological variation, and the tempo of evolution. Where do we go from here? Stickleback are now poised to extend their modeling career into biomedical research. A fundamental problem in this field concerns identifying the genomic regions underlying complex traits since many disease phenotypes, such as Alzheimer's, have both heritable and environmental components. Developmental biologists and geneticists have demonstrated that many complex phenotypes in stickleback have conserved genetic functions across vertebrate taxa. For example, the gene *Pitx1*, which is responsible for pelvic girdle development in stickleback, also underlies hindlimb development in mammals (*Chan et al. 2010*), and the *Kit Ligand* gene is responsible for pigmentation in stickleback as well as humans (*Miller et al. 2007*). Determination of genomic regions underlying additional complex phenotypes, such as craniofacial morphology, will undoubtedly lend insight into the developmental pathways underlying complex phenotypes in humans and other vertebrates.

Emily is a Ph.D. Candidate in Fisheries at the University of Alaska Fairbanks. She is studying rapid phenotypic and genomic evolution in threespine stickleback populations from Prince William Sound and the Gulf of Alaska.

Share Your Alaska Fish Photos

Help celebrate Alaska's fish and build awareness about their conservation by sharing your fish photos! The U.S. Fish and Wildlife Service is now accepting submissions for its "Fish From Your Point of View" Alaska collection! We need your help taking great photos that can be used in educational materials to celebrate the diversity of Alaska's native fishes, their seasonal movements and behavior, and their importance to people and ecosystems in Alaska and beyond. The photo submission themes include "Fish Doing Fishy Things; What a Girl (Fish) Wants; Fish for the Future; and Unique Alaska."

Octopus watch.

Visit our "Fish From Your Point of View" webpage for details: *http://alaska.fws.gov/fisheries/fish/contest_photo.htm* or contact Katrina Mueller (*katrina_mueller@fws.gov*, phone 786-3637).

Lee Alverson Memorial Fund

Lee Alverson.

Dayton Lee Alverson passed away in January 2012. Lee was highly respected as a scientist and policymaker throughout the West Coast, nationally, and internationally. He played a formative role in the development of U.S. fisheries and ocean policy in the twentieth century, and was recognized by industry, academia, and government for his scientific contributions and as an effective and insightful leader.

Born in San Diego in 1924, Lee spent his early years on the West Coast and in Hawaii, served in the Navy during World War II, and subsequently studied at San Diego State before transferring to the University of Washington (UW) in 1947. His early career included the Oregon Fish and Game Department, the U.S. Bureau of Commercial Fisheries (BCF), and the Washington Department of Fisheries (WDF). Lee returned to the BCF in 1958, completed his Ph.D. at the UW in 1967, and then assumed greater leadership roles including as the BCF's Director of Science Programs in Washington, D.C. and later as the bureau director. At a time of remarkable change in U.S. fisheries policy, Lee played a leading role in establishing the National Oceanic and Atmospheric Administration (NOAA) and reconfiguring the BCF as the National Marine Fisheries Service (NMFS). He then returned to Seattle as the first director of the NMFS Northwest and Alaska Fisheries Center, and then was a U.S. delegate during the United Nations Convention on the Law of the Sea (UNCLOS) process. He worked closely with Senator Magnusson, industry representatives, academics, and other national leaders to develop the concept of regional fisheries management and to draft the Fisheries Conservation and Management Act that forwarded domestication of U.S. fisheries and established the federal fishery management councils. Lee served on the Statistical and Scientific Committees for the Pacific Council and the North Pacific Council for the remainder of his tenure with NMFS. Retiring from federal service in 1980, Lee co-founded Natural Resources Consultants (NRC), working with industry, government, and NGOs on regional to international scales. In particular, he helped many foreign governments draft fisheries management and conservation legislation. In 2008, Lee wrote *Race to the Sea: The Autobiography of a Marine Biologist,* which catalogued his life and the evolution of fisheries science and management over the course of his career.

In honor of Lee Alverson, family and friends have established the Lee Alverson Memorial Fund at the University of Washington. This fund will serve as a lasting memory of Lee's contributions to the science and management of North Pacific fisheries. With a target goal of $250,000, the fund will provide annual scholarship(s) to graduate students from the Schools of Marine and Environmental Affairs and Aquatic and Fishery Sciences. Recipients must have an approved thesis topics relating to the science and management of fisheries in the North Pacific. For additional information on contributing to the fund, go to *http://giving.uw.edu/alverson* or contact Daniel Webb at the UW College of the Environment (*dcwebb@uw.edu*; ph: 206-221-4573).

Unalaska Agent Shares Aleutian Videos on YouTube

Scene from video posted on UTube by Reid Brewer. Photo from UAF.

To encourage interest in the Aleutian Islands and develop stewardship and collaborations, Reid Brewer, former Alaska Sea Grant Marine Advisory agent in Dutch Harbor, began posting short videos on YouTube in 2010 representing several research projects. The eight videos, which are mostly underwater and range from 26 seconds to one minute and 15 seconds, include: red king crab in Unalaska; a king crab ball in Dutch Harbor; gumboot chiton spawning in Kiska; a new species of kelp called golden V; fur seals on Bogoslof Island; Atka mackerel near Seguam Island; a Pacific giant octopus near Atka; and a green sea urchin barren. The clips may be viewed at *http://www.youtube.com/user/Dofleini1*.

St. Lawrence Island ShoreZone Aerial Imaging Completed

Darren Stewart

In July 2013, with funding from the Oil Spill Recovery Institute in Cordova and the Alaska Division of Geological and Geophysical Surveys in Fairbanks, the ShoreZone survey team completed a photo inventory and videography of the St. Lawrence Island coastline. The survey team included geo-morphologist John Harper, biologist Mary Morris, and their pilot. Hampered by inclement weather, low-lying fog, a narrow tide window, and a run-in with high flying seabirds, the team still imaged 85% of the ~1,100 km of coast; notable was over 7 hours of flight time, covering 411 km on July 26. More information is available in a press article at *http://www.alaskadispatch.com/article/20130804/monumental-effort-map-alaska-shorelines-nearing-completion*. The completion of this survey brings the total ShoreZone coverage in Alaska to ~80% fully imaged and ~75% mapped and uploaded to the web.

Photo near Kineeghit Point, ~10 km west of Savoonga along the north shore of St Lawrence Island. Photo by Mary Morris, ShoreZone.

In conjunction with the greater ShoreZone effort in other parts of the Pacific Northwest (Washington, Oregon, and British Columbia) the total coastline now imaged and mapped using the ShoreZone protocol exceeds 102,000 km and is growing! ShoreZone is a mapping and classification system that specializes in the collection and interpretation of low-altitude aerial imagery of the coastal environment. The project objective is to produce an integrated, searchable inventory of geomorphic and biological features of the intertidal and nearshore zones which can be used as tools for science, education, management, and environmental hazard planning. The ShoreZone mapping system provides a spatial framework for coastal habitat assessment on local and regional scales. Visit *www.ShoreZone.org* for more information. The full ShoreZone imagery/mapping database can be found at: *http://mapping.fakr.noaa.gov/szflex/*.

Marine Debris Removal Grants

The NOAA Marine Debris Program is a national grant program providing funds to catalyze the implementation of locally-driven, community-based marine debris prevention, assessment, and removal projects that benefit coastal habitat, waterways, and NOAA trust resources.

Funding is, in part, administered through a grant competition by the NOAA Restoration Center's Community-based Restoration Program. Projects funded through this program have strong on-the-ground habitat restoration components involving the removal of marine debris, including derelict fishing gear. Projects also benefit coastal communities and create long-term ecological habitat improvements for NOAA trust resources. Successful proposals will be funded through cooperative agreements. While removal operations can be paired with outreach and education to prevent further introduction of marine debris, the overall grant focus is on removals. Projects that focus on Japan tsunami marine debris (JTMD) are eligible for this grant, as are projects that focus on general marine debris. Funding of up to $2,000,000 is expected to be available in FY2014, with typical awards ranging from $50,000 to $150,000.

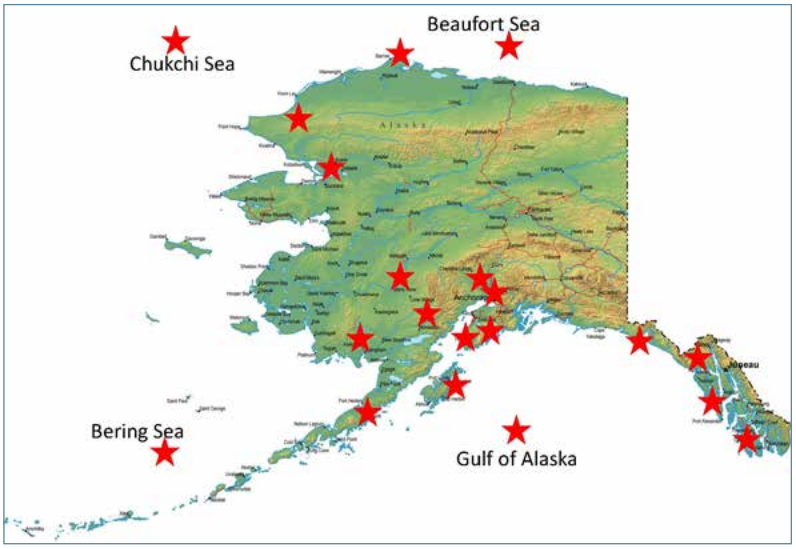
Applications are due by November 1, 2013. Additional information is available at *http://www.habitat.noaa.gov/funding/marinedebris.html*.

Student Subunit Happenings

Kari Fenske

Now that classes are back in session and students are back from summer internships, field work, and jobs, this is a great opportunity to highlight the incredible diversity of field activities in which our students participate. These are just some of the places we've spent our summer – science can really take you places!

- Noel Sme - Arctic Ecosystem Integrated Survey cruise in the northern Chukchi Sea
- Nick Smith - Retrieval of acoustic receiving stations for Kotezebue region inconnu in Selawik Lake and Hotham Inlet, Alaska
- Michael Courtney - Tagged Dolly Varden using PSAT tags in the Wulik River, Alaska to study spatial and temporal summer distribution
- Jessica Glass - Yakutat, Kodiak, Anchorage, and Homer to interview people about the weathervane scallop fishery
- Kari Fenske - NOAA sablefish longline survey in the Gulf of Alaska
- Ben Gray - Inshore fish survey via beach seine in Barrow, Alaska
- Stacy Vega - Surface trawl survey in southern Chukchi Sea (66–70 deg. N lat.) as a part of the Arctic Ecosystem Integrated Survey
- Dan Olsen - Killer whale photo ID and satellite tag surveys in Kenai Fjords
- Thomas Farrugia - Collected and tagged skates in Prince William Sound and Gulf of Alaska
- Alyssa Frothingham - Fish and invertebrate collection in the Beaufort Sea
- Dan Michrowski - NOAA sablefish longline survey in the Bering Sea
- Alex Nicori - Crew lead on the Tatlawiksok River weir
- Bryce Mecum - Field course in Pacific salmon management, Lake Aleknagik, Bristol Bay, and NOAA SE Coastal Monitoring research cruise in SE Alaska.
- Rachel DeWilde - Lab tech in US Fish and Wildlife conservation genetics lab
- Lucas Stumpf - Fisheries Technician 3 at Chignik weir



Locations of some of the summer work conducted by members of the Alaska Chapter Student Subunit. Figure from Kari Fenske.

- Harrison DeSanto - Fisheries Technician through Bristol Bay Native Association at Lake Clark National Park and Preserve
- Ellen Chenoweth - Tenakee Springs doing acoustic prey mapping and putting biologging tags on humpback whales
- Elizabeth Figus – International Pacific Halibut Ccommission stock assessment survey in the Bering Sea
- Maggie Chan - Coral restoration research in the British Virgin Islands
- Julie Nielsen - Tagging and tracking Pacific halibut in Glacier Bay National Park
- Sonia Ibarra - Hydaburg Cooperative Association salmon stream assessments and subsistence gathering
- Matt Catterson - Italio River near Yakutat, using a net weir and digital video recording system to estimate sockeye population abundance and assess fish passage over a barrier fall
- Suzie Teerlink - Juneau area humpback whale surveys
- Mayumi Arimitsu - Glacier-marine ecosystem research at Columbia Glacier, Alaska

Congratulations to recent graduates: Brian Walker, MS Fisheries (Growth-increment formation using otoliths and scales of juvenile Chinook salmon); Brittany Blain, MS Fisheries (The effects of barotrauma and deepwater-release mechanisms on the reproductive viability of yelloweye rockfish in Prince William Sound, Alaska). Recognition is also extended to Ph.D. student Ellen Chenoweth, who traveled to Washington, D.C. where her video on humpback whale depredation of hatchery-released salmon was selected as one of the 25 winning submissions in the 2013 IGERT Video and Poster Competition sponsored by the National Science Foundation.

Changing Climate of Resource Management: Reach to Region

Philip Loring

Curious how the Landscape Conservation Cooperatives work, and what opportunities they might have to offer for you and your research?

As part of the AFS Alaska Chapter annual meeting, session chairs Karen Murphy (Western Alaska LCC) and Stephen Gray (Alaska Climate Science Center) will provide a snapshot of documented impacts to freshwater systems and the resources that depend upon them, and then explore how the Landscape Conservation Cooperatives in Alaska and the Alaska Climate Science Center are working with you, the region's fisheries and freshwater scientists, to: (A) improve our understanding of regional impacts of climate change on freshwater systems; (B) facilitate information flow between researchers, resource managers and other stakeholders; and (C) provide regional context for local efforts and findings

Learn about efforts to establish representative watersheds for monitoring in the Arctic LCC, new opportunities to participate in and help establish a statewide voluntary water temperature monitoring network, and efforts to improve the National Hydrography Dataset for Alaska. Find ways that you can improve information/data flow across partners to meet goals concerning sustainable healthy fish populations and ecosystems in Alaska.

As a special opportunity for people that are unable to attend the meeting, this session will also be streamed online as a webinar, courtesy of the Alaska Center for Climate Assessment and Policy. For more information, go to: *http://accap.adobeconnect.com/afs/event/event_info.html*.

Travel Grants for WDAFS Mexico Meeting

Professional Travel - The Western Division of the American Fisheries Society has announced funding opportunities to offset professional travel costs to the 2014 Annual Meeting during April 7–12, 2014 in Mazatlán, Mexico. For travel support, preference will be given to those presenting an oral (symposia or general session) or poster presentation at the Mazatlan meeting, and to applicants serving on a planning committee for the meeting. Applicants must be a member in good standing of a chapter within the Western Division and must demonstrate that their employer will not otherwise pay for attendance.

These funds apply only to a non-student, Professional level or retired individuals (employed by state, federal or private entity for compensation as a means of livelihood). Chapters within Western Division and the Western Division itself will have opportunities for student travel to Mazatlan that are separate from this opportunity. Individual awards will be a maximum of $1,500 each and can include meeting registration, round-trip airline fare, parking fees, hotel costs, and transportation to/from the airport. Preference will be given to those applicants who can provide some match to offset total cost. To apply for professional-level travel assistance, please complete the application at:*https://docs.google.com/a/wyo.gov/forms/d/18H763l0qYRxZo2ZhOCzGtHMhImE4P2GdTHZsSA5LVcI/viewform*.

Student Travel – The AFS Western Division is awarding travel grants to help students attend the 2014 annual meeting in Mazatlán, Mexico, April 7–12, 2014. Additional information will be available in mid October at *http://wdafs.org/students/scholarship-travel-award-information/*.

Orange feather duster.

ONCORHYNCHUS

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Deadline for materials for the winter issue of *Oncorhynchus* is Dec 10.

Meetings and Events

40th Annual Meeting of the American Fisheries Society Alaska Chapter

October 7–11, 2013: This meeting will be held in Fairbanks, AK with the theme "The Practice of Fisheries: Celebrating All Who Work Toward Sustainable Fisheries in Alaska." The meeting chair and program contact is Philip Loring at *ploring@alaska.edu*.

2013 Annual ShoreZone Partners Meeting

October 29–30, 2013: This meeting, The ShoreZone partnership, will be held in Anchorage, with webinar/ teleconference available. For more information, visit *www.shorezone.org*.

Pacific Salmonids: Ecology

November 18–19, 2013: This continuing education course, offered by Cramer Fish Sciences in collaboration with the Northwest Environmental Training Center, will be held in Anchorage. For more information, contact contact Joe Merz at *joe.merz@fishsciences.net* or 209-614-4073.

Alaska Young Fishermen's Summit V

December 10–12, 2013: This conference, sponsored by the Alaska Sea Grant Marine Advisory Program, will be held in Anchorage to provide future fishing leaders with training to run a successful commercial fishing business. More information is at *www.marineadvisory.org/ayfs*.

Annual Meeting of the American Fisheries Society Western Division

April 7–12, 2014: This meeting will be held in Mazatlán, Mexico with the theme "Rethinking Fisheries Sustainability: The Future of Fisheries Science." Please visit *http://www.wdafs.org*.

Fisheries Bycatch: Global Issues and Creative Solutions

May 13–16, 2014: This 29th Lowell Wakefield Fisheries Symposium will be held in Anchorage. More information is at *http://seagrant.uaf.edu/conferences/2014/wakefield-bycatch/index.php*.

International Congress on the Biology of Fish

August 3–7, 2014: This meeting will be held in Edinburgh, Scotland. For more information, visit *http://icbf2014.sls.hw.ac.uk/*.

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Feel free to contact the Executive Committee members