



ONCORHYNCHUS

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Pacific Halibut carcasses in one of the carcass bins at a public fillet station at the port of Homer. Photo from FAST Lab, APU.

Don't Trash That Data: The FAST Approach to Halibut Research

Sarah Webster, Nathan Wolf, Aileen Nimick, and Brad Harris

In 2011, fisherman in the Cook Inlet region of Alaska began reporting Pacific Halibut with "Mushy Flesh Syndrome," a condition characterized by opaque, gelatinous muscle tissue. Previous research had identified large-scale cell lysis as responsible for the mushy flesh; however, the underlying cause of the syndrome was unknown. *Ichthyophonus hoferi*, a cosmopolitan marine parasite known to have caused similar symptoms in other fish species, had also recently been detected in Pacific Halibut. Could this parasite be the culprit behind the Cook Inlet Mushy Flesh outbreak? In order to examine this potential connection, the Fisheries, Aquatic Science and Technology Laboratory (FAST Lab) at Alaska Pacific University partnered with the Alaska Department of Fish and Game Sport Fish Port Sampling Program and the US Geological Survey Marrowstone Marine Field Station. Under this cooperative partnership, teams of undergraduate and graduate FAST Lab students travelled to Homer, Seward, Whittier, Valdez, and Central Cook Inlet (CCI) to collect Pacific Halibut tissue samples from sport fishermen to detect *Ichthyophonus* presence. Samples were collected after fish had been filleted, but before the remaining carcasses were discarded. Consequently, the team adopted the moniker "pre-dumpster/post-mortem" to describe the sampling technique. In this way, the team was able to take advantage of samples, and resultant data, that would have otherwise been trashed.

While the team did not find a correlation between Mushy Flesh Syndrome and *Ichthyophonus*, the pre-dumpster/post-mortem sampling technique successfully yielded several other important results. Baseline information on prevalence of *Ichthyophonus* in Halibut was established in all five ports and ranged from 26.2 to 44.7%. The first findings of *Ichthyophonus* in Pacific Cod, Lingcod, Yelloweye Rockfish, and Black Rockfish were also documented, and baseline data on *Ichthyophonus* prevalence was established for these species. Six additional species (Canary, Copper, Dark, Dusky, Quillback, and Silvergray rockfishes) tested negative for *Ichthyophonus*. Perhaps the most fundamental lesson

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The President's Corner



Mary Beth Loewen, AFS Alaska Chapter President.

I didn't want to write this Corner. What I planned to write was a cheery holiday-winter-wonderland-lets-look-forward-to-a-great-new-year Corner. Instead, in a climate of nervousness about federal and state budget cuts, concern about politicians targeting climate scientists, and alarming threats to the Clean Power Plan and the Clean Water Act, I vacillated between a call to action, and trying to write a positive retrospective of the good things that happened in the past year (Paris Climate agreement! Really cool deep sea creatures discovered! US National Parks 100th birthday! Enhanced habitat protections for monarch butterflies and other pollinators, not to mention imperiled trout species in the Lower 48! Katrina Liebich winning the Sense of Wonder award!).

But... to say the 2016 Presidential election was tumultuous is an understatement. To say that I'm worried about the health of our planet, waterways, fish communities, and scientific integrity is an understatement. To say that I tend to get on my high horse and lecture people about the importance of recycling and contacting your legislators is

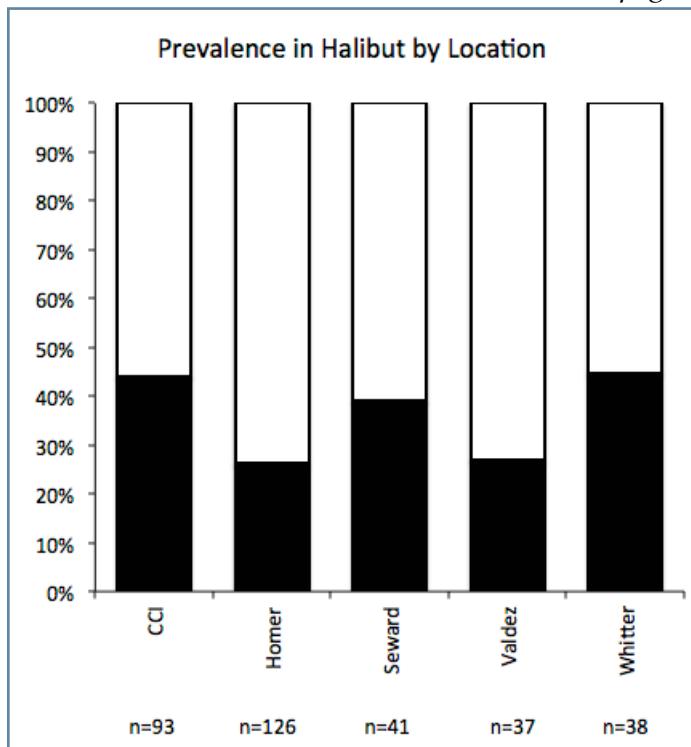
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Halibut Research, continued

from this project was the success of the sampling technique in generating powerful, reliable data from fish that were otherwise dumpster-bound.

The initial success of the pre-dumpster/post-mortem sampling technique fostered new research interests and lines of inquiry within the FAST Lab. In 2014, FAST Lab student Caitlin Grenier successfully defended her M.S. thesis titled “Quantifying *Ichthyophonus* prevalence and load in Pacific Halibut (*Hippoglossus stenolepis*) in Cook Inlet, Alaska” with research that expanded on the initial pre-dumpster/post-mortem port sampling. Caitlin’s work provided a more comprehensive survey of *Ichthyophonus* prevalence in Pacific Halibut at the port of Homer, developed a new pepsin digestion assay to isolate and count *Ichthyophonus* schizonts, with the schizont being a particular life stage of the *Ichthyophonus* parasite. Having this assay allowed the establishment of baseline data for infection intensity (schizonts/gram of heart tissue), and assessment of impacts of this parasite on fish size-at-age. Caitlin’s research showed that *Ichthyophonus* prevalence rates in the port of Homer were 22.6% in 2012 and 29.5% in 2013. Intensity of infection ranged

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Prevalence of Ichthyophonus (black bars) in Pacific Halibut by sampling location in 2011 (CCI - Central Cook Inlet). Figure from FAST Lab, APU.

President's Corner, continued

definitely an understatement. In the past, I've encouraged you to renew your membership or support membership of co-workers because of discounted books and meeting registration fees and the cool t-shirts. Now, I encourage you to renew your membership or those of others around you as a sign of solidarity and support for fish and aquatic resources, and the importance of healthy waterways, aquatic habitat, and fish populations.

Alaskan waters provided 60% (by biomass) of seafood landed in the US in 2014. Today, these waters are experiencing rapid acidification, threatening some of the world's most productive fisheries and approximately 70,000 jobs. As fisheries professionals, we are fortunate to live and work in Alaska. Many of us take it for granted until we travel elsewhere and are reminded how untouched our natural systems are. For half of my family, this luxury is also livelihood. It is difficult to get through a conversation with your commercial fishing family who, as an instinctual reaction to the huge, scary, looming problems of ocean acidification and changing sea temperatures, holds to hope that the massive bird, whale, and fish die-offs on beaches near and dear to us are unrelated to changes in the ocean. The other half of my family are teachers and, while I don't spend much time in the classroom, I recognize my responsibility to share knowledge with others, because I am the one who is tapped into our incredible community of fisheries professionals. My family may not love the news, but I remind myself that climate change is happening on my watch, and I want to have a good answer when my nieces and nephews ask why I didn't do more to protect their livelihood and planet. My family and I cannot negotiate international climate deals, but we can take daily steps in our own lives to be relentless in questioning legislative action, supporting causes and colleagues we believe in, and providing facts and context to educate others. I urge you to do the same. The time to stay quiet for the sake of not potentially offending someone has passed. I remain confident we can continue conversations in reasonable, fact-based discussions, and that

as Alaskans working in marine, freshwater, and human dimensions, we should be pushing these conversations forward. When people ask how we can afford to prioritize fish, remind them that fish and healthy waters are an indicator for humans. If fish can't thrive in our landscapes, and can't live in our waterways, it's a sign that things are looking bad for people, too.

I am someone who grew up in Alaska playing outdoors, with a great love for fish and natural spaces. Enough so that I earned degrees in biology and fisheries, read science journals for pleasure, and get on my soapbox at family holiday meals. I'm don't have dozens of peer-reviewed publications or a Ph.D., but I do a ton of field work in remote places, touch a lot of fish, and look at the world around me. I aspire to the work and publications of many of my AFS colleagues, and to be as influential as many of our Alaska Chapter members. We do good, meaningful work here, and I want to continue that legacy. As the U.S. President-elect assembles his cabinet, a consistent theme has emerged: many nominees expressing doubt about the science of human-caused climate change.

As scientists, we are conditioned to accept that our theories may not be correct, to include and consider all possibilities. As responsible scientists, we accept and declare that our findings include uncertainty. Which is perhaps why people still claim that climate change isn't happening, or isn't influenced by anthropogenic causes, even though the scientific community is convinced!

Expert consensus is a powerful thing. We don't have the time or capacity to learn about everything, and so we frequently defer to the conclusions of experts. It's why we visit doctors when we're ill. The same is true of climate change; most people defer to the expert consensus of climate scientists. As the oldest and largest organization dedicated to strengthening the fisheries profession, advancing fisheries science, and conserving fisheries resources, AFS has a mission to promote scientific research and sustainable management of fisheries resources. The AFS members are experts in their fields,

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President's Corner, continued

and we need to speak loudly, with facts and context. A 2015 national poll commissioned by *ScienceDebate.org* and *Research!America.org* revealed that 87% of Americans feel it important that candidates for President and Congress have a basic understanding of the science informing public policy issues. We are the educators and information disseminators for fish, aquatic resources, and hydroconnectivity. I urge you to be active and relentless in your opportunities to educate others, and support healthy fisheries, fish habitat, and aquatic resources.

Alaska is at the forefront of climate change, and I know I'm preaching to the choir. Shrinking sea ice, changes in precipitation, earlier onset of spring snowmelt, more frequent and severe storm events, coastal inundation from fall storms...we are bearing witness to climate change. Our knowledge and tools to gather science is accelerating all the time, and we

should be searching for a more robust way of incorporating science into policy dialogue. We, as fisheries professionals, are the ones who should be at the forefront of providing information, and helping to shape policy. We need to be pro-active. Human-induced climate change is acknowledged by AFS in the online policy statement of the Resource Policy Subcommittee for Climate Change, and also the document *Future of the Nation's Fisheries and Aquatic Resources* which lists specific threats and challenges, and more importantly, action items. Please, take a moment today to go to that link. Pass it along, especially to people whose emails don't end in the same domain as yours. Perhaps 2016 feels so terrible partly because so many of us thought we'd come so far. Stay strong; stay positive. Keep a tube of Aquaseal on hand and play the long game. Fish of the future need your brains, your voice, and your advocacy today!

Halibut Research, continued

from 2 to 100 schizonts/gram of heart tissue. No evidence of schizonts were found in kidney, liver, or spleen tissue. Presence of *Ichthyophonus* did not have an impact on average size-at-age for male or female Halibut.

Sioned Sitkiewicz, a FAST Lab M.S. student, is currently using pre-dumpster/post-mortem sampling to further investigate *Ichthyophonus*. Sioned's work focuses on assessing *Ichthyophonus* infection in Pacific Halibut, Pacific Cod, and Walleye Pollock in the ports of Homer, Seward, and Whittier using PCR analysis. Sioned will also investigate relationships between *Ichthyophonus* prevalence and intensity (using qPCR and histopathology) and Halibut condition (using Fulton's K and bioimpedance).

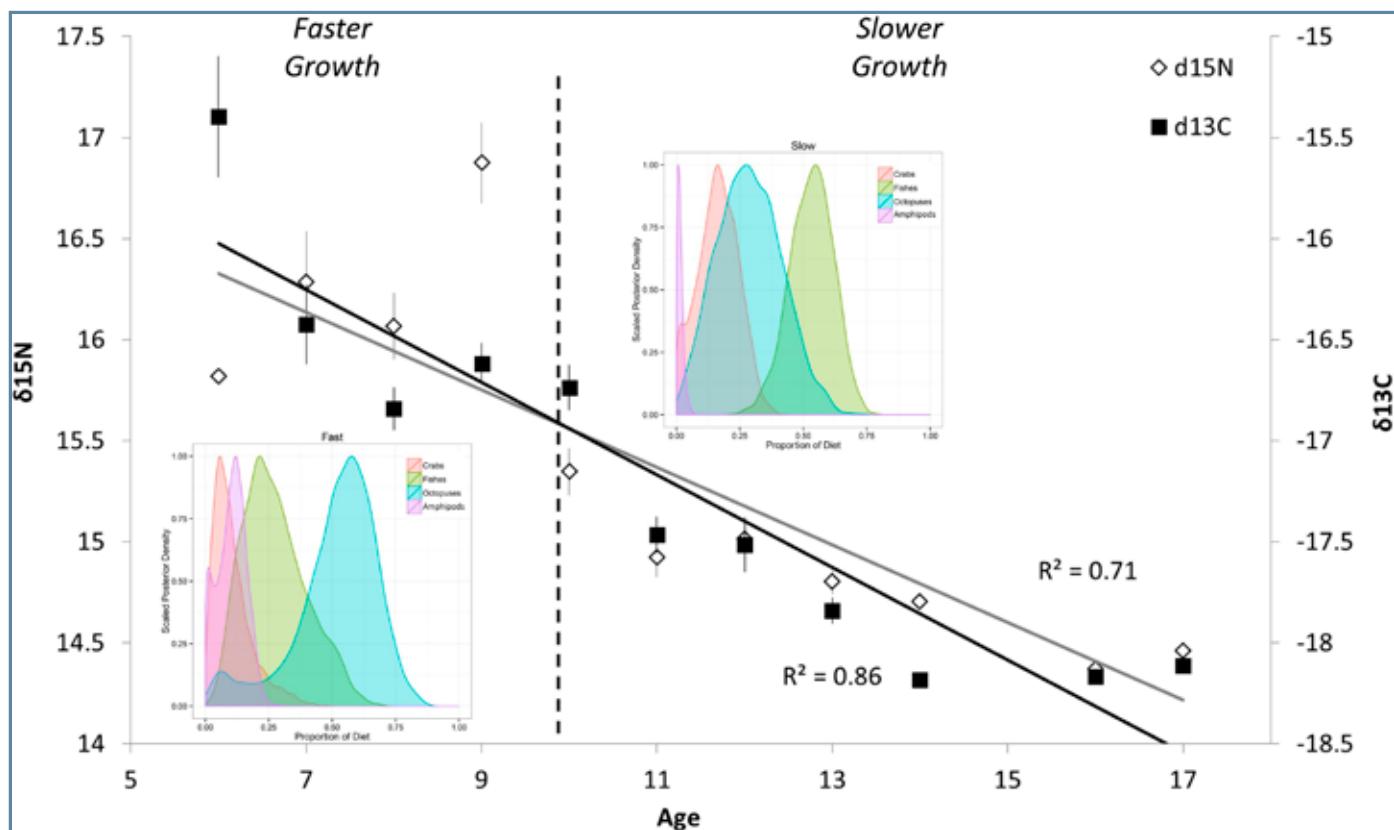
In addition to the *Ichthyophonus* work, the FAST Lab's dumpster data protocol has resulted in a comprehensive line of research on the diet of Pacific Halibut using stable isotope analysis. The initial driver for this work was to examine potential relationships between diet and observed decreases in size-at-age of Pacific Halibut in southcentral Alaska. In 2014, FAST Lab student Sarah Webster successfully defended her M.S.

thesis titled "Size-at-age and diet composition of Pacific Halibut (*Hippoglossus stenolepis*) in Cook Inlet, Alaska." Sarah's work examined the diet of Cook Inlet Pacific Halibut using stable isotope analysis of muscle tissues. She began by constructing the first isotopic "prey library" for Cook Inlet, and was ultimately able to isolate proportional contribution of an array of prey items to the diets of faster and slower growing fish using mixing models. The flesh of faster growing fish revealed a diet that was from a higher trophic level and a more benthic environment, possibly octopus. Current M.S. student Brian Ritchie is continuing with this research and is working closely with the Homer charter fleet to incorporate new data sources.

The scope of marine fisheries research projects is generally constrained by time and funding; projects are frequently delayed waiting for permits or shortened by inclement weather. Port sampling has long been used to gather data on harvested fish, often including aspects such as age, length, and sex by species. We have been able to successfully reduce both time constraints and costs by expanded sampling in southcentral Alaska ports

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Halibut Research, continued



Mean carbon and nitrogen stable isotope ratios by age for 80 - 90 cm female halibut. The vertical dashed line indicates the separation of fast ($n=48$) and slow ($n=45$) growing fish. The inserts show the posterior distributions of the diet mixing models for each group. Figure from FAST Lab, APU.

to include dumpster-bound carcass tissues. Our pre-dumpster / post-mortem sampling approach is limited in the sense that it constrains our frame of statistical inference to the samples we process. For



Researchers at the port of Homer collect a heart tissue sample from a Halibut carcass. Figure from FAST Lab, APU.

example there is no way to randomize what comes to the port when and from where. However, in many cases (e.g., Mushy Flesh Syndrome, *Ichthyophonus*, and Halibut size-at-age) our understanding of the phenomena of interest is so nascent that these trash data are worth their weight in gold (to the right scientist!).

These projects depended on strong partnerships with the Alaska Department of Fish and Game, Division of Sport Fish, Groundfish Research Program in Homer, AK, and the US Geological Society Marrowstone Marine Field Station. The project was also facilitated by relationships with the charter industry and fillet businesses in the port of Homer, such as North Country Charters and Buttwhackers. The FAST Lab would like to thank all of these entities for their valuable contributions to our work.

The authors work at the Fisheries, Aquatic Science and Technology Laboratory at Alaska Pacific University. Sarah Webster is Program Manager, Nathan Wolf a Principal Researcher, Aileen Nimick a Graduate Student, and Brad Harris the Director. 

Shaving for Simpler Solutions

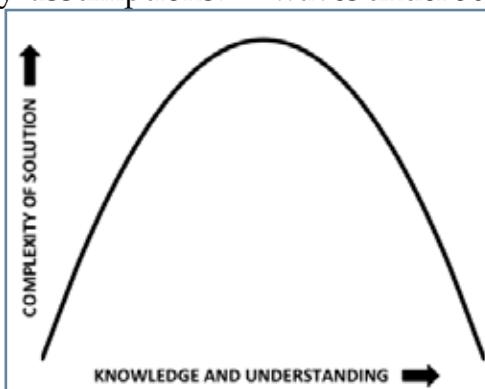
Jim Reynolds

Ockham's razor is a principle attributed to the Franciscan friar William of Ockham (c. 1287–1347). Ockham, a village in the English county of Surrey, was William of Ockham's birthplace. William said, "Entities should not be multiplied unnecessarily." In science, the principle has been interpreted as saying that "among competing hypotheses making the same prediction, the simpler one (the one with fewer assumptions) is better" – presumably because it is easier to understand. The term "razor" refers to distinguishing between two hypotheses by "shaving away" unnecessary assumptions. A popular version, that "the simplest explanation is usually the correct one," seems to have its origin in Ockham's razor.

As scientists, in our attempts to understand nature, our answers (solutions) depend on the extent of our knowledge and understanding. We extend our understanding by building on previous work; this is the way of science. I've come to view this relationship between solutions, and the understanding on which

they depend, like the graph of a parabola. Near the origin of the graph, we have limited knowledge; our answers are simple because we have little understanding of the objects or processes under study. As we develop and test hypotheses, our knowledge increases but so does the complexity of our solutions. Data noise increases, making the signal harder to detect. It's like a multivariate regression, adding variables to a statistical stew and tasting it for acceptability at each step. But, science is often more about asking the right questions than getting the right answers. Eventually, our hypotheses are more pointed and experiments are more directed. Our understanding then advances to an extent that allows us to ask better questions. Shaving with Ockham's razor removes the extraneous. We descend the right limb of the parabola and insight is our reward.

One parabolic experience for me occurred during a study of the effects of jet boats on salmon reproduction in the early 1990s. Conflicts between fishing guides using jet boats and traditional users



Tradeoff between solution complexity and knowledge/understanding. Figure from James Reynolds.

were occurring in western Alaska. The study, serving as the basis of a M.S. thesis for my student Gregg Horton (*Horton 1994*), focused on incubating eggs that might be vulnerable to jet boat traffic in shallow waters. We were deluged with ideas concerning the effects of boat speed, hull type, engine type and size, water depth, substrate, and so on. Our position near the origin of the graph was quite apparent. We went to Katmai National Park to study the effects of our jet boat on spawners and eggs we had artificially fertilized and planted in cages. We also went to the Rogue River in Oregon to measure pressure waves under 50+ passenger jet boats. Working with hydrologists at the UAF Institute of Water Resources, we developed simulation models to predict effects of various factors. Our efforts took us up the parabola of learning, but with additional complexity. As we gained insight, the right questions became apparent. In the end, the answer was straightforward, something that any hatchery manager might have told us: eggs are killed when the substrate is disturbed, regardless of equipment and habitat.

We had come down the right side of the parabola and achieved a simpler solution as a result of greater understanding. (By the way, a passing jet boat had little effect on spawners which were back on the redds soon after our wake subsided. But spawners disappeared for hours if we were wading nearby.) We recommended that jet boats be excluded from spawning/nursery areas and we had the advantage of knowledge with a simpler solution to back us up.

Heeding William's advice is a challenge. Not all solutions are immediately simple. We must keep building knowledge until we start asking better questions. Then, we get out the razor and the simpler, elegant solutions will, hopefully, reveal themselves.

Jim Reynolds served as Unit Leader of the Alaska Cooperative Research Unit during 1978–1999 and is now Professor Emeritus with the University of Alaska Fairbanks. He was AFS Alaska Chapter President during 1981–1982, and is an active member of the Alaska, Idaho, and Arizona-New Mexico chapters. Jim spends winters in Arizona, summers in Idaho, and he continues to teach courses and conduct research in electrofishing. 

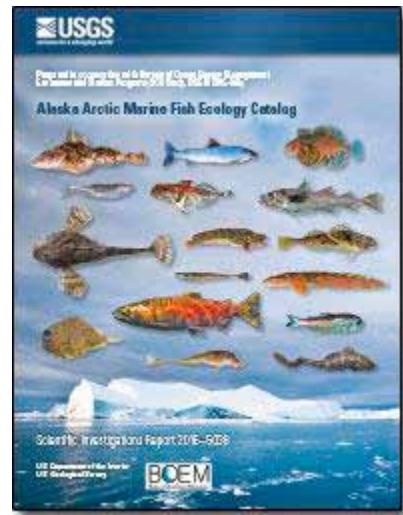
Alaska Arctic Marine Fish Ecology Catalog

Kate Wedemeyer

Following is an example of how career-long AFS membership and service can enrich professional accomplishment, personal growth, friendships, and our understanding of the aquatic resources. This story is intended to inspire students, new aquatic resource professionals, and long-time AFS members alike to augment and inspire your career as an active AFS member. My mind marvels at the amazing circle, built over many years of professional friendships and collaborations in the AFS Alaska Chapter. Now that circle is completing another cycle to present the *Alaska Arctic Marine Fish Ecology Catalog* to AFS and the world!

This particular circle has a long history, starting in 1989 when the Alaska Chapter embarked on an effort to support Ray Baxter in putting the finishing touches on an Alaska fish key he had been developing over his career. My role began in earnest as the Chapter Treasurer in 1990 using Chapter funds to provide Ray with a computer and travel to several museums; a review draft of the key was expected by June 1991. But Ray's unexpected death in March 1991 left the Chapter in a dilemma as the Chapter Fish Key Committee, including Lyman Thorsteinson, Bill Wilson, and Bob Meyer, discovered multiple manuscripts with differing notations and concluded that with the loss of Ray, project completion would require a much greater effort. Many challenges, and sometimes controversy, ensued with the effort to complete this valuable project. As Treasurer, I scoured the Chapter finances and presented ideas to the Chapter Executive Committee about how we could focus Chapter funds to continue the effort during lean times, while the Fish Key Committee continued to seek funds to complete this, now gargantuan, project. Fast forward several more years during which time I served on the Chapter Executive Committee, saw many more thousands of dollars of Chapter funds dedicated to the effort, and as Chapter President it became my responsibility to deliver the sad news that with exhaustion of available Chapter funds, the effort appeared to be coming to a halt, at least temporarily. Fast forward again through several more years of fundraising, grant writing, and notable dedication on the parts

of Lyman, Bill, and others. Finally, after 13 years (1989–2002) of effort on the part of the Alaska Chapter, particularly the Fish Key Committee, and hundreds of thousands of dollars in grants and support, the now-venerated *Fishes of Alaska* was published in 2002.



Inspiration for the new *Alaska Arctic Marine Fish Ecology Catalog* came from Alaska Chapter member Jeff Childs. Jeff and I worked together at Minerals Management Service, now Bureau of Ocean Energy Management (BOEM), identifying the most important information needed to assess the potential impacts that offshore oil and gas development might have on fish populations. Jeff identified the need for a fish desk reference that would complement information available in *Fishes of Alaska*. After several thwarted attempts to get the fish catalog off the ground, I turned to my long-time AFS colleague Lyman Thorsteinson to lead the effort because of his tenacity and success with *Fishes of Alaska*. Lyman proved to be the right person for this effort and deserves special thanks for continuing on as the lead even after his retirement from United States Geological Survey (USGS).

Now, 15 years after the 2002 publication of *Fishes of Alaska*, we announce the publication of *Alaska Arctic Marine Fish Ecology Catalog*. This 800-page catalog, edited by Lyman Thorsteinson and Milton Love with contributions by many AFS members and professionals (such as Bob Meyer, who had also been instrumental in the *Fishes of Alaska*), was developed by BOEM as a desk reference for analysts writing Environmental Impact Assessments and identifying mitigation for potential offshore oil, gas, and renewable energy developments in the federal waters of the Outer Continental Shelf. This 800-page catalog provides an understanding of

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Alaska Arctic Marine Fish Ecology Catalog, continued

the general ecology and productivity of the Arctic marine habitat. An inventory is then provided for fish species in United States Chukchi and Beaufort Seas, followed by summaries of the current knowledge from the scientific literature for over 100 fish species including important subsistence species, occurring in this area. For example, each species listing is accompanied by a diagram showing depth distribution by life stage, including the adults, juvenile, larval, spawning, and egg stages. One unique approach in the description of each fish is that information that is specifically known about the fish living in the Arctic is in italics,

whereas data derived from studies outside the Arctic are in plain type, so the information sources are clear.

A limited number of hard copies of *Alaska Arctic Marine Fish Ecology Catalog* will be available in early 2017 through Alaska Sea Grant. Distribution of hard copies will be announced through the AFS Alaska Chapter listserve so that Chapter members will receive early notice of availability. The electronic version is available through websites at both USGS (<https://pubs.er.usgs.gov/publication/sir20165038>) and BOEM (<https://www.boem.gov/Alaska-Reports-2016>). 

AFS Award Nominations

There is no recognition like peer recognition. Awards by the Alaska Chapter to recognize either individuals or groups for professional achievement have been important in maintaining the high standards of the American Fisheries Society. The Alaska Chapter is currently soliciting nominations for the Meritorious Service Award, the Chapter Service Award, the Almost Darwin Award,

and the Wally Noerenberg Award for Fishery Excellence. Chapter members are encouraged to consider deserving individuals to nominate for these awards. Award presentations will be made at the Chapter Annual Meeting in March 2017 at Fairbanks. Nominations are due January 15. Additional information may be found at <http://www.afs-alaska.org/awards-scholarships>. 

Cultural Diversity Travel Award/Scholarship

The primary mission of this award is to fund entry-level applicants who are involved in the natural resource field to attend the AFS Alaska Chapter conference. Applicants must: be an Alaskan Native or Minority (woman, black, Hispanic, or other ethnic minority); and be a student in good standing in the field of fisheries or a related discipline, or in an entry level position in a government, private, or non-profit sector in a natural resource field. Applicants will be evaluated on their work and/or educational experiences and interest in the natural resources field, interest in professional advancement, reason(s) for attending the conference, reference contact information, and financial need. The Cultural Travel Award recipient may receive one or all of the following: (1) one year membership to AFS; (2) round-trip travel to the Alaska Chapter Annual Meeting; (3) lodging during the meeting; (4) one banquet ticket; and (5) Alaska Chapter Annual Meeting registration.

This award is based on need and the committee

will try to get as many deserving candidates to the meeting as possible. In past years some recipients had their own lodging, were already members of AFS, and/or didn't have to travel very far and the savings translated into allowing more recipients to participate.

Award recipients will be introduced at the Alaska Chapter AFS conference. The recipients will also be expected to write a brief statement about their experience at the Chapter conference; statements will be submitted for publication in an issue of the Alaska Chapter newsletter, *Oncorhynchus*. Applicants will also be encouraged to attend the Student-Mentor Luncheon at the Chapter conference to provide positive role models through interactions with students.

Applications for the Cultural Diversity Travel Award/Scholarship are due January 15; the application form is at <http://www.afs-alaska.org/awards-scholarships> or by contacting Sara Gilk-Baumer (907-267-2535, sara.gilk@alaska.gov). 

ShoreZone Program Update

The ShoreZone program takes a close-up inventory of the biology and geology of North America's Pacific coast from Oregon to Alaska. In the spring of 2016, the ShoreZone program completed imagery surveys for over 4,800 miles of shoreline in the Eastern Aleutians (Fox Islands), central Alaska Peninsula, and Barren, Chirikof, and Semidi Islands. With funding from NOAA's National Marine Fisheries Service-Alaska Region, the Bureau of Energy and Ocean Management, and the Prince William Sound Oil Spill Recovery Institute, all of the 2016 imagery and previously unmapped imagery is now funded for mapping. This milestone for the ShoreZone program marks completion of imagery collection and, soon, mapping for approximately 92% of Alaska's coastline. The Eastern Aleutians imagery can now be found at <https://alaskafisheries.noaa.gov/mapping/szflex>, and this and other imagery from 2016 will soon be available on this site as well as at <http://shorezone.org>. All ShoreZone imagery and mapping data are available for download at no cost to the user.

The ShoreZone User Manual has also been updated. The new manual adds more detail to ShoreZone protocols, expanding ShoreZone's use as a decision support tool for coastal management and emergency response. Upgrades include: nested habitat classification to provide spatially explicit geomorphic descriptions at mapping resolutions to 10 meters; additional quantitative measures of width and slope, percent cover of substrate, and percent cover of biobands; and addition of a Coastal Vulnerability Index that combines 5 attributes (including flood zone width and shoreline erosion).

The 2016 ShoreStation surveys will be presented at the Alaska Marine Science Symposium poster night, along with a coastal habitat assessment for an area along Alaska Peninsula's remote coast by Sue Saupe of Cook Inlet Regional Citizens Advisory Council. Stop by to fly the coast and learn more information about ShoreZone's imagery, data, and applications.

ShoreZone represents a partnership of over 60 organizations and agencies in Alaska, British Columbia, Washington, and Oregon. ShoreZone imagery data support a wide range of projects including oil spill response, land management planning, research studies, coastal erosion monitoring, coastal development, subsistence, and art. For more



Alaska coastline for which imagery has been collected through 2016. Figure from Kelly Ingram. For more information about the recent imagery, new User Manual, or ShoreZone training, contact Kelly Ingram, ShoreZone Partnership Coordinator at The Nature Conservancy (kelly.ingram@tnc.org; 907-865-5703.)

Salmon and Salmon-Dependent Communities Workshop

Lauren Frisch

Over 200 people attended a recent workshop in Anchorage to discuss how to maintain salmon populations and the communities that depend on functioning salmon ecosystems. The three-day workshop, “Long-term Challenges to Alaska’s Salmon and Salmon-Dependent Communities,” gathered representatives from Alaska Native groups, nongovernmental organizations, fishing and processing companies, and academic institutions to discuss a wide range of topics, from subsistence fishing to habitat biology.

Many Alaska communities depend on salmon as a key source of food, a principal driver of the economy, and a cultural keystone species. But increases in human population size, urbanization, and climate change pose long-term challenges to salmon populations.

“The ability to think and collaborate in such a diverse room of people was one extremely positive outcome of this workshop,” said Milo Adkison, a workshop organizer and professor at the University of Alaska Fairbanks College of Fisheries and Ocean Sciences. “People tend to get siloed in the issues that they work on or think about. For me, it was eye opening to look at, and listen to, some of the panels on racial equity and salmon governance, which is outside of my research-focused field. People got exposed to completely different sides of the salmon story.”

Breakout sessions aimed to define key issues relating to salmon habitat and development, community sustainability, governance of salmon, and racial equity. The sessions included discussion about topics such as fisheries co-management by government and Native groups and regulation



*Andrea Sanders and Jorie Paoli lead a discussion about racial equity.
Photo by Courtney Carothers.*

enforcement. Breakout teams will continue to develop plans to address the issues discussed at the workshop.

“This workshop provided a great opportunity for people to meet and begin a dialogue on a lot of tough conversations. It brought together a group of people who otherwise wouldn’t have had the opportunity to learn and understand each other’s perspective. We all have the same goal, to protect salmon-dependent societies, and it was refreshing to witness those gathered to collaborate on the future sustainability of Alaska,” said Barbara Blake, special advisor to Lt. Gov. Byron Mallott.

The workshop was co-sponsored by the UAF College of Fisheries and Ocean Sciences, Alaska Sea Grant, the National Center for Ecological Analysis and Synthesis, the Mat-Su Salmon Habitat Partnership, the Southwest Alaska Salmon Habitat Partnership, the Salmon Project, and the Bristol Bay Habitat Land Trust. 

Riparian Award Challenge

The Riparian Award Challenge was developed to encourage the Bureau of Land Management, U.S. Forest Service, conservation organizations, and private industry to pursue excellence in riparian and watershed habitat management. In particular, submissions must document efforts that have already or will contribute to improved resource values.

Examples of resource values include, but are not limited to: stream bank stability, water

quality, stream flow, aquatic/fish habitat, forage production, education, and recreation/aesthetics.

Winners will be announced at the 2017 AFS Western Division meeting in Missoula, Montana May 21–26, and will receive a \$500 travel reimbursement to attend the meeting as well as a plaque of recognition. Entries must be received by February 15, 2017. For more information on the application process, contact Tracy Wendt at tracywendt@gmail.com. 

Additional Scholarship and Grant Funding Opportunities

Postdoctoral Fellowship – Gulf of Alaska Ecosystem

The Department of Fisheries at the UAF College of Fisheries and Ocean Sciences in Juneau, in cooperation with co-PIs at NOAA Fisheries, Alaska Fisheries Science Center, is recruiting a Postdoctoral Fellow to work with the Gulf of Alaska (GOA) Integrated Ecosystem Assessment (IEA) Program. Responsibilities include: developing (1) a conceptual model of the GOA; (2) an overarching plan for IEA Program in the GOA; (3) a proposal for regional IEA for coastal Southeast Alaska; (4) applications of statistical and mathematical models to assess and incorporate environmental drivers and/or indicators in ecosystem assessments; (5) journal manuscripts with other team members; and (6) other related research. Qualifications: Ph.D. or advanced degree in fisheries, biological oceanography, quantitative ecology, biology, zoology, mathematics, or statistics. Appropriate experience or additional education, including evidence of statistical work such as: field sampling, computing, and analyzing statistical data. Salary: Commensurate with experience plus benefits. Contact: Gordon Kruse (907-796-5458; Gordon.Kruse@alaska.edu). Apply online at <http://careers.alaska.edu/cw/en-us/job/505316/post-doctoral-fellow>. Include: cover letter describing your interest and experience relevant to the position, CV with contact information for three professional references, letter of recommendation from adviser, and PDFs of publications. Applicant reviews begin on January 31, 2017; open until filled.

The Steven Berkeley Marine Conservation Student Fellowship

This fellowship was created by AFS in 2007 to honor the memory of Steven Berkeley, a dedicated fisheries scientist with a passionate interest in integrating the fields of marine ecology, conservation biology, and fisheries science to improve fisheries management. Berkeley was a long-time AFS member and on the first Board of Directors for the Fisheries Conservation Foundation. The fellowship comprises a competitively-based \$10,000 award to a graduate student actively engaged in thesis research relevant to marine conservation. Research topics may address any aspect of conservation; a focus on fisheries issues is not required. Electronic applications and recommendations must be

received no later than February 1, 2017. For more information see http://mfs.fisheries.org/?page_id=155.

Eugene Maughan Graduate Student Scholarship

The AFS Western Division is soliciting applications for graduate-level student scholarships. This scholarship program provides up to \$5,000 annually in scholarships to masters or doctoral students in the general area of fisheries science with one to three awards to individual students. Beginning in 2002, the Sustainable Fisheries Foundation established the William Trachtenberg Memorial Scholarship Fund, which augments the Western Division scholarship program by providing up to \$600 annually to a graduate-level student conducting studies on fisheries sustainability. Applications for the Western Division scholarship program will automatically be considered for the Sustainable Fisheries Foundation scholarship program. The 2017 scholarships will be awarded at the AFS Western Division meeting in Missoula, Montana, May 22–25, 2017. The application package should be sent (electronically preferred) no later than April 1, 2017, to Bob Gresswell at bgresswell@usgs.gov. For more information, go to <http://wdafs.org>.

John A. Knauss Marine Policy Fellowship

This unique fellowship is designed for graduate students with an interest in ocean, coastal, or Great Lakes resources and in national policy decisions affecting those resources. Eligible graduate students from any discipline receive a year of paid experience in Washington, DC, working on ocean issues with U.S. Congressional offices or with an executive branch, such as the National Oceanic and Atmospheric Administration or National Science Foundation. The application deadline is February 10, 2017, for fellowships that begin in February 2018. For more information visit <http://seagrant.noaa.gov/fundingfellowships/knaussfellowship.aspx>.

Alaska Sea Grant State Policy Fellowship

The state fellowship program provides a unique professional opportunity for graduate students interested in Alaska's marine resources and policy decision-making. The paid twelve-month fellowship offers on-the-job experience to highly motivated graduate students, who are matched with host state or federal agencies in Alaska. Graduate students close to completing a degree, or with a recently earned degree, are eligible.

Continued on next page

Additional Scholarship and Grant Funding Opportunities, continued

The application deadline is February 24 2017, for fellowships that begin in July 2017. For more about this fellowship visit <https://seagrant.uaf.edu/research/state-fellowship>.

Alaska Sea Grant announces request for preliminary proposals

Alaska Sea Grant invites pre-proposals for research projects for the 2018–2020 biennium. We seek creative and innovative research proposals in the natural, social, and education sciences

that address one of the following focus areas: Healthy Coastal Ecosystems; Sustainable Fisheries and Aquaculture; Resilient Communities and Economies; or Environmental Literacy and Workforce Development. Pre-proposals are due February 27, 2017. For more information go to <https://seagrant.uaf.edu/research/rfp/2018/2018-2020-Alaska-Sea-Grant-Funding-Opportunity.pdf>, or contact Michele Frandsen at michele.frandsen@alaska.edu; (907) 474-7088.

2017 Annual Meeting of the AFS Alaska Chapter in Fairbanks

Aaron Martin, President-Elect and Program Chair

The AFS Alaska Chapter will be holding the 2017 annual Chapter meeting, co-hosted with the American Water Resources Association, during March 19–23, 2017, at the Westmark Hotel in Fairbanks, Alaska. The meeting theme is “Alaskan Fisheries and Waters: Success, Limitation, and Innovation in the Face of Data Scarcity and Uncertainty.” Researchers, managers, and stakeholders are often forced to make decisions with little to no information due to Alaska’s expansiveness, weather conditions, and logistical challenges to collecting data or utilizing resources. The meeting theme was chosen to highlight the challenges and innovative solutions surrounding conservation and management of fisheries and water resources in Alaska. In particular, we want to identify the necessity for adaptive thinking to anticipate and respond to future scenarios involving climate change, developing fisheries, invasive species, and changes in fisheries and hydrological processes. Tentative contributed oral sessions include: (1)

Communication Science: Success, Challenges, and Innovation; (2) Shared Knowledge; (3) Resource Security; (4) Changing Processes [climate effects]; (5) Statewide Chinook Salmon Research; (6) Alaska Gems [Alaska’s unique organisms]; (7) Ecosystem Management; (8) Fisheries Bycatch; (9) Science in Support of Alaska’s Future; (10) Contributed Papers; and (11) Speed Talks. A poster session and Tuesday social will be held at the Morris Thompson Cultural and Visitors Center. Abstracts for all presentations must be submitted by February 10. Tuesday night will also include a film festival, featuring short films that focus on the fish and waters of Alaska. Finally, a variety of Continuing Education courses will be held beginning March 19. More meeting information, including registration and abstract submission links, may be found on the Chapter website at <http://www.afs-alaska.org/annual-meetings/spring-2017>. If you have questions or suggestions, please contact Chapter President-Elect Aaron Martin (aaron_e_martin@fws.gov). See you in Fairbanks!

Hutton Junior Fisheries Biology Program

The Hutton Junior Fisheries Biology Program is a paid summer internship and mentoring program for high school juniors and seniors interested in pursuing the disciplines of fisheries science, marine biology, and STEM related fields. The principal goal is of the Hutton Program to stimulate interest in careers in fisheries science and management among groups underrepresented in the fisheries professions, including minorities and women. Selected students known as “Hutton Scholars,” are matched and mentored by a fisheries professional to enjoy an 8-week hands-on fisheries science summer experience in a marine and / or freshwater setting. Scholars receive a \$4,000 scholarship award.

Mentors and their organizations not only have the opportunity to impart a positive effect on the life of a high school student, but also receive assistance with important summer projects and may even discover a potential future employee! The American Fisheries Society (AFS) simplifies the mentor’s involvement by providing guidance and administrative support.

For more information on how students apply for an internship, or information on serving as a mentor, please contact hutton@fisheries.org and visit <http://hutton.fisheries.org>. The application deadline for this summer scholarship or to serve as a mentor is January 31, 2017.

Student Subunit Happenings

Cheryl Barnes, Student Subunit Representative

The Student Subunit of the AFS Alaska Chapter would like to recognize the following University of Alaska students for defending their theses during the 2016 fall semester: Cory Graham (M.S.) - “Evaluation of growth, survival, and recruitment of Chinook Salmon in Southeast Alaska rivers;” Michael Godin (M.S.) - “Effects of salmon abundance and timing on the growth and behavior of two major predators in Southeast Alaska: Brown Bears (*Ursus arctos*) and Coastrange Sculpin (*Cottus aleuticus*);” and Dan Olsen (M.S.) - “Shifting hotspots and behavioral patterns for resident Killer Whales (*Orcinus orca*) in Southern Alaska.”

With the March 19–23, 2017, AFS-AWRA meeting rapidly approaching, preparations are in full effect and we are looking for student volunteers to help with setup, registration, session timing, and various social events. We are also starting to seek out donations for the silent auction. Please contact Cheryl Barnes (afs.alaska.studentsubunit@gmail.com) for more information, to add your name to the volunteer list, or to donate an item for the silent auction. Also be on the lookout for student-produced t-shirts and the return of the AK-AFS buff during the meeting. Proceeds will go to support Alaska student travel to the Western Division meeting in 2018! If you are interested in donating to support Alaska student travel, please contact Lee Ann Gardner (alaska.afs.chapter@gmail.com).

Save the Date: The 21st annual AK-AFS Student Symposium will be held on Friday, March 3rd (8 AM to 4 PM). This year, we would like to invite marine science and oceanography students to present alongside those pursuing advanced degrees in fisheries. Remote connections will be available in Fairbanks, Juneau, and Kodiak. Other locations can be added, upon request. Additional information about abstract submissions and contributed talks will be provided at a later date. For questions or comments, contact Casey McConnell (cmccon13@alaska.edu). 



Cheryl Barnes, AFS Alaska Chapter Student Subunit Representative. Photo from Cheryl Barnes.

Training Opportunities for Acoustic Tag and Hydroacoustic Assessments

Several short courses in acoustics will be presented through HTI and the School of Aquatic and Fishery Sciences at the University of Washington, Seattle, WA. *Using Acoustic Tags to Track Fish*, offered on February 2–3, 2017, will address aspects of tracking fish movement with acoustic tags, including three-dimensional tracking with sub-meter resolution. The course will include hands-on-operation and a variety of applications. *Using Hydroacoustics for Fisheries Assessment* is offered on February 9–10, 2017. The hydroacoustics

course covers mobile and fixed-location survey techniques, including basic hydroacoustic theory, deployment logistics, and data collection and processing; split-beam, single-beam, and multi-beam frequency techniques are discussed.

These courses are available on-site or online, with tuition discounts up to 50% for university students and staff, non-profit, and tribal organizations. To reserve a seat or ask a question, email HTI at support@HTIsonar.com, or go to <http://www.HTIsonar.com>. 

2017 Alaska AFS/AWRA Film Festival

The 2017 Alaska AFS/AWRA Film Festival will feature short films that focus on the fish and waters of Alaska. Films from a variety of perspectives are welcome. To be considered, films must be: filmed in Alaska; feature some aspect of fish and/or water resources in Alaska; less than 20 minutes in length; posted to www.vimeo.com by Tuesday, March 7. A jpeg (symbolizing the film), short title, film description (<100 words in length) and the Vimeo link must be emailed to katrina_liebich@fws.gov and jimmy_fox@fws.gov by Friday, March 10. More information is available on the AFS Alaska Chapter website at http://www_afs-alaska.org. 

AFS Alaska Chapter Officer Elections

Under the AFS Alaska Chapter Bylaws, Chapter officers consist of a President, President-Elect, Vice-President, Treasurer, and Secretary, with officers elected from ballots presented in the Chapter newsletter, *Oncorhynchus*. The terms of the Treasurer and Secretary are two years, with the Treasurer's election on even numbered years and the Secretary's election on odd numbered years. The term of the Vice-President is one year. At the end of the one-year term, the Vice-President succeeds the President-Elect, who succeeds the President. This year, 2017, the Chapter is electing a Vice-President and a Secretary. Candidates' statements are shown below. ♀

Candidate Statements

Joel Markis, Vice President

Joel Markis has been involved in Alaskan fisheries his whole career. As a fisheries professor at the University of Alaska Southeast, he has taught fisheries and marine sciences courses for the last five years. Joel received a B.S. in Fish and Wildlife Management from Montana State University and a M.S. in Marine Biology from the University of Alaska Fairbanks, where he studied nearshore fish assemblages in Kachemak Bay.

Joel brings an extensive background in fisheries management and research to the American Fisheries Society. Before coming to the UA system, Joel was a research fisheries biologist with the Kachemak Bay Research Reserve in Homer. While there he studied marine ecology and questions relating to fish habitat use in the nearshore environment. Joel also coordinated several other projects, a nationwide water quality and meteorological monitoring project, hardshell clam studies, and invasive species and harmful algal research. He was also a regional dive safety officer for the state.

Joel has also spent time as a shellfish researcher with ADF&G, been involved in a variety of finfish management projects in Southcentral Alaska, and spent laborious hours installing, operating, and maintaining numerous floating weirs, estimating Chinook salmon populations, stocking local sport fisheries, and conducting public fisheries outreach.



Before working for ADF&G, Joel spent time with the National Park Service conducting extensive fisheries inventories across national park units all over Alaska.

In his free time, Joel generally likes spending time outside. He enjoys backcountry skiing, fishing, sailing, and he is also an avid scuba diver and dive instructor. He is passionate about teaching and Alaskan fisheries and looks forward to promoting fisheries and fisheries education as a member of the AFS Alaska Chapter leadership team. ♀

ONCORHYNCHUS

Oncorhynchus is the quarterly newsletter of the Alaska Chapter of the American Fisheries Society. Material in this newsletter may be reprinted from other AFS websites.

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Deadline for materials for the next issue of *Oncorhynchus* is March 10.

Candidate Statements, continued

Karson Coutré, Secretary, Treasurer

Karson Coutré primarily grew up in Wisconsin and caught her first fish at age 6, a bluegill caught off of the dock on a sunny summer day. She has always been fascinated by fish and the ocean so she left the lakes and rivers of the Midwest and moved to Maine for college. Karson began studying marine ecosystems as an undergraduate at University of New England (UNE) in 2008 where she obtained a B.S. with honors in Marine Biology. She was involved in research at UNE in the Sulikowski Fish Lab focusing on the life-history of skate species and their occurrence as bycatch in Northwest Atlantic fisheries. She also enjoyed helping others in her research lab studying Atlantic Sturgeon diet, Spiny Dogfish maturity, and the community composition of the local estuary. Through this work, she became inspired to pursue research that unites the commercial industry and scientists in the common goal of fisheries sustainability.

In 2012, Karson moved to Juneau, Alaska, to continue research in fisheries at the UAF School of Fisheries and Ocean Sciences. She received a Master's degree in Fisheries working with Dr. Anne Beaudreau in 2014. Her Master's thesis focused on the diet composition and habitat use of juvenile Sablefish in Southeast Alaska. Currently, Karson is employed as a fisheries biologist at Earth Resources Technology doing contract work with the Marine Ecology and Stock Assessment (MESA) group at NOAA's Auke Bay Laboratory in Juneau. Her research with MESA involves groundfish tagging and electronic tag data analysis. Since living in Juneau and having the opportunity to conduct fieldwork out of Kodiak, Cordova, Sitka, and Homer, Karson has discovered that studying



Alaska's fisheries is just as rewarding as catching and eating Alaskan seafood.

While she was a UAF graduate student, Karson also served as the president of the Juneau Student Subunit of the AFS Alaska Chapter and presented her graduate research at the annual meetings during 2012–2014. In 2015, Karson was elected as secretary of the AFS Alaska Chapter and is excited to have the opportunity to continue working with the Executive Committee in this role. Karson's involvement in AFS has given her invaluable connections and experiences as a young professional. 🐟

Officer Ballot

For Chapter Vice President and Secretary

Ballots must be received through the SurveyMonkey website (<https://www.surveymonkey.com/r/AKAFSelection2017>) or cut and paste into an email to Chapter Past-President Jennifer Stahl (afs.alaska.pastpresident@gmail.com) no later than February 15, 2017.

Vice President:

Joel Markis

Write-in _____

Secretary:

Karson Coutré

Write-in _____



Alaska Marine Science Symposium

January 23–27, 2017: This meeting will be held in Anchorage, AK. For further information see <http://amss.nprb.org>.

Alaska Forum on the Environment

February 6–10, 2017: This meeting will be held in Anchorage, AK. For more information, visit <http://www.akforum.com>.



43rd Annual Meeting of the American Fisheries Society Alaska Chapter



March 19–23, 2017: This meeting will be held in Fairbanks, AK. The meeting chair and program contact is Aaron Martin at afs.alaska.presidentelect@gmail.com.

ComFish Alaska 2016

March 31–April 2, 2016: This trade show and assorted forums will be held in Kodiak. For more information go to <http://comfishalaska.com>.



10th Western Alaska Interdisciplinary Science Conference and Forum

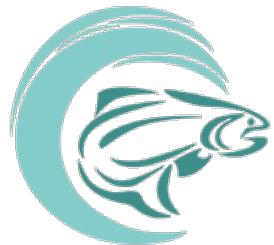
April 26–29, 2017: This meeting will be held in Unalaska, AK. For further information see <https://seagrant.uaf.edu/conferences/waisc/2017>.



Meetings and Events

Impacts of the Environment on the Dynamics of High-Latitude Fish and Shellfish

May 9–12, 2017: This 31st symposium in the Lowell Wakefield Fisheries Symposium series will be held in Anchorage, AK. More information is at <https://seagrant.uaf.edu/conferences/2017/wakefield-fish-dynamics>.



42nd Annual Meeting of the American Fisheries Society Western Division

May 22–25, 2017: This meeting will be held in Missoula, Montana. For more information, see <http://wdmtg.fisheries.org>.



147th Annual Meeting of the American Fisheries Society

August 20–24, 2017: This meeting will be held in Tampa, FL. For more information, see <http://afsannualmeeting.fisheries.org>.



President Mary Beth Loewen

Alaska Department of Fish and Game, 351 Research Court, Kodiak, 99615; Ph: 942-5273; afs.alaska.president@gmail.com

President-Elect Aaron Martin

U.S. Fish and Wildlife Service, 101 12th Avenue, Rm 110, Fairbanks 99701; Ph: 456-0418; afs.alaska.presidentelect@gmail.com

Vice President Jeff Falke

Alaska Cooperative Fish and Wildlife Research Unit, P.O. Box 757020, Fairbanks 99775; Ph: 474-6044; afs.alaska.vicepresident@gmail.com

Treasurer Lee Ann Gardner

RWJ Consulting, PO Box 670346, Chugiak 99567-0346; Wk: 688-1400, Fax: 688-1405, alaska.afs.chapter@gmail.com

Secretary Karson Coutre

National Marine Fisheries Service, 17109 Pt. Lena Loop Rd., Juneau 99801; Ph: 608-397-7551, afs.alaska.secretary@gmail.com

Past President Jennifer Stahl

Alaska Department of Fish and Game, PO Box 110024, Juneau, 99811; Ph: 465-4071; afs.alaska.pastpresident@gmail.com

Student Subunit Representative

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Feel free to contact the Executive Committee members.