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Glacial recession around the Gulf of Alaska is already having substantial ecosystem effects through increased freshwater discharge into the marine environment. Picture from Martin Dorn.

Climate Science – Planning for Climate Change Research for the Gulf of Alaska

Martin Dorn

Substantial climate changes are expected to occur in the marine waters of United States in the coming decades. These changes will likely include warming of ocean surface and subsurface temperatures, decreasing ocean pH (i.e., more acidic conditions), rising sea level, changes in ocean circulation and stratification, and potential shifts in species distributions, ecosystem productivity, and food-web structure. While some aspects of these physical oceanographic changes are clear, such as warming and ocean acidification, ecosystem responses to changing physical conditions are difficult to predict because it is unknown which of several forcing factors will be dominant and how

individual species will respond to specific factors. Directed research is being planned by the National Marine Fisheries Service (NMFS) to address the need to predict and evaluate the magnitude of climate-driven change on critical ecosystem components, evaluate potential effects on marine species, and determine risks to the ecosystem and fishing communities. This research will guide policies to reduce climate impacts, to manage anthropogenic involvement in changing ecosystems, and to capitalize on novel opportunities that may arise for marine resource-dependent human communities.

As part of the National Oceanic and Atmospheric Administration, NMFS recently developed a
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The President's Corner



Jeff Falke, AFS Alaska Chapter President.

As your new 2018–2019 Alaska Chapter AFS President, it is my pleasure to write this inaugural President's Corner! To start, a few words of introduction for those of you who I have yet to meet. My name is Jeff Falke, and I work for the U.S. Geological Survey. My day job is as Assistant Unit Leader-Fisheries at the Alaska Cooperative Fish and Wildlife Research Unit at the University of Alaska Fairbanks where I conduct cooperative research on freshwater fish ecology and conservation, mentor graduate students, and provide technical assistance to the Unit's cooperators which include the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, University of Alaska Fairbanks, and Wildlife Management Institute. I was born and raised in the Midwest, just outside Kansas City, MO, where my parents fostered a love of fishing (exotic species such as bluegill sunfish) and the outdoors. Since I completed my undergraduate degree at the University of Missouri, I've been steadily homing north and west, from Kansas State University (M.S.), to Colorado State University (Ph.D.), to Oregon State University (Post-doc). I arrived in Fairbanks six years ago where I live with my wife and two rambunctious children.

My service with AFS started almost 20 years ago when I joined the University of Missouri Student Sub-Unit where I was the Vice-President.

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Climate Science, continued

National Climate Science Strategy (NCSS; [Link et al. 2015](#); [Busch et al. 2016](#)) to guide and direct the collection and use of scientific information to prepare for and respond to climate impacts on the nation's living marine resources and resource-dependent communities. One requirement of the NCSS is for each region to develop a Regional Action Plan (RAP) that identifies actions needed to make progress in implementing seven objectives of the NCSS in each region over the next five years. The RAPs are also intended to increase awareness and support of these collaborative efforts, both internally, and externally with partners and stakeholders. The RAP objectives are arrayed hierarchically, building from science infrastructure and monitoring activities (objectives 6 and 7), to process studies (objective 5), to projection of future conditions (objectives 4), and finally to management strategy evaluations (objectives 1–3).

Monitoring, assessment, and process-oriented research activities at the NOAA's Alaska Fisheries Science Center (AFSC) are fundamental to meeting legislative mandates to provide scientific advice to manage and protect marine resources to support ecosystem sustainability and dependent human communities. The AFSC provides scientific data and analyses, and technical advice, to the North Pacific Fishery Management Council (NPFMC), the NMFS Alaska Regional Office, the State of Alaska, and Alaska coastal communities. Data, analyses, and advice also support the fishing industry by identifying appropriate responses to ecological- and human-driven changes to the ecosystem. Enabling legislation for these mandates is found in the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Marine Mammal Protection Act (MMPA), the National Environmental Policy Act (NEPA), and the U.S. Endangered Species Act (ESA). Many activities related to monitoring, assessment, and process-oriented research can be framed in the context of climate science. To continue to fulfill this mission in the face of climate change, the AFSC will also conduct new research and develop science-based strategies for sustaining fisheries, healthy ecosystems, protected species, and coastal communities in a changing climate.

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President's Corner, continued

I continued as President of the Kansas State AFS Student Sub-Unit, and then served as Western Division Representative to the Parent Society while I was in Colorado. At the Society level I have been the Western Division Representative to the Education Section (where I continue to actively participate), and served on the Society Membership Committee. I've been a member of six state AFS chapters and very much enjoy working at that level of our society. My time so far on the Alaska Chapter Executive Committee (ExComm) has been wonderful and very rewarding!

Did you know we had a hugely successful annual meeting last month? Working with our Western Division colleagues, the Alaska Chapter hosted the 43rd Annual AFS Western Division meeting at the Egan Center in Anchorage. The theme for the meeting was "Change, Challenge, and Opportunity in Fisheries: Fishing for Solutions." We had over 500 registered attendees composed of fisheries professionals and students from across the West and Alaska. Activities ranged from the Welcome Social held at 49th State Brewing, to numerous student activities that included a Professional Panel Lunch and Student-Mentor Fish Trivia Challenge, to the Tradeshow and Poster Session, AK Fish Habitat Partnership Film Fest, and the almost TOO much fun Spawning Run and Banquet at Kincaid Park. Our science was disseminated through 21 Symposia and a Contributed Papers session (six concurrent sessions over three days!). We had five outstanding plenary speakers who spoke on a range of topics that included diversity and inclusion in AFS, human dimensions, conservation of Alaska salmon, science communication, and Chum Salmon reintroduction in Oregon. Two continuing education courses (PIT Tag Technology and Reproducible Research in R) were well-attended. We also sponsored five very popular field trips in and around Anchorage. If you missed the meeting and would like to catch up in detail, the meeting program is available online at <https://wdmtg.fisheries.org/program/full-program/>. We will also post the 2018 program on the Alaska Chapter website (www.afs-alaska.org) later this summer.

The meeting could not have been such a success without the hard work of our dedicated

volunteers and committee chairs. Special thanks to Brian Missildine (WDAFS, Meeting Co-Chair); Jon Gerken and Cleve Steward (Awards); Hamachan Hamazaki, Sabrina Garcia, and Bill Hauser (Arrangements); Lee Ann Gardner (Budget and Finance); Bert Lewis (Socials); Tyler Dann and Lee Ann Gardner (Registration); Mike Daigneault and Jackie Watson (Program); Mary Beth Loewen and Joel Markis (Website); APU Student Unit (Fundraising, Silent Auction, and Raffle); Britta Baechler and Tessa Minicucci (Student Activities and Volunteers); Kevin Foley (Trade Show); Dan Rinella (Field Trips); and Kyle Shedd and Sue Mauger (Spawning Run). If you run into these folks over the course of the next year, please give them a special THANKS! The Chapter and myself are also grateful for the generous financial donations from our meeting sponsors to help offset meeting costs. Check out the meeting program for a full list of our sponsors. Also, a huge thanks to all of you for submitting items for the meeting silent auction and raffle. They were a huge hit!

We recognized several outstanding individuals with Chapter-level awards at the meeting. The Molly Ahlgren Scholarship went to Keenan Sanderson (UAF) and the Cultural Diversity award recipient was Sonia Ibarra. The highest award given by the Alaska Chapter, the Wally Noerenberg Award for Fishery Excellence, went to UAF College of Fisheries and Ocean Sciences professors Dr. Brenda Norcross and Dr. Stephen Jewett. Best Student Presentation and Poster awards were given to Lauren Wild and Neil Mochnacz (tie, Presentation, Ph.D.), Taylor Ulrich (Presentation, M.S.), Britta Baechler (Poster, Ph.D.), and Laura Junge (Poster, M.S.). A special award was given to Tessa Minicucci for Best Student Presentation in the Pink and Chum Salmon Symposium. If you are familiar with our Alaska Chapter awards, you might notice that I didn't mention winners of the Meritorious Service, Service, and Almost Darwin awards. We had NO nominations for these awards for 2018! Please keep in mind that these awards are available for nomination, and consider submitting a nomination for our 2019 meeting.

Continued on next page

President's Corner, continued

Also, and more on this over the Chapter listserve, we are soliciting a new Alaska Chapter Awards Chair. Many thanks to Jon Gerken for his service in this capacity for the past several years!

I would like to welcome two new folks to the Alaska ExComm: Stephanie Quinn-Davidson (Yukon River Inter-Tribal Fish Commission) is our new Vice-President, and Scott Ayers (USFWS) will serve as our Chapter Secretary. Continuing members include President-Elect Joel Markis, myself, Past President Aaron Martin, and Treasurer Lee Ann Gardner. We wish a fond farewell to Mary Beth Loewen for her years of enthusiastic service on the Alaska Chapter ExComm!

Joel Markis is now President-Elect and Program Chair of our 2019 annual meeting to be held in Sitka in March 2019. If you are interested in helping with coordination of the meeting or chairing a symposium, contact Joel at afs.alaska.presidentelect@gmail.com. More information on what will be a great Southeast Alaska meeting is coming soon!

I'd like to close my first President's Corner with a quick plan of work to tackle during my short year as President of your Alaska Chapter. I look forward to a productive year and to capitalize on the momentum garnered by our recent successful meeting! Over the next year I would like to work with the Chapter ExComm to continue to develop and put into action a dedicated Student Travel Fund to support our students' meeting travel financial needs. Also, we held a very informative meeting on Alaska environmental



New AFS Alaska Chapter President Jeff Falke presents plaque of recognition to outgoing Chapter President Aaron Martin. Photo from Randy Brown.

concerns at our recent annual meeting. Besides several specific topics, one concern voiced during this meeting was the process through which concerns are submitted to the Chapter ExComm and Environmental Concerns Committee for consideration. Some guidance is provided through the Chapter's Advocacy Policy, listed as an appendix in the Chapter Procedure Manual (https://www.afs-alaska.org/wp-content/uploads/AK_AFS_Procedures_Manual_2011.pdf). I hope to work with both committees to shed some light regarding how this process works, and make sure it is transparent and easy to use by both our membership and the public. Finally, speaking of communication, I would like to continue to work with the ExComm and Chapter membership to improve our communication processes on Chapter activities, recognitions, and other happenings of interest through better use of our Chapter website, list serve, and social media.

OK, enough for now! I wish each of you tight lines over our short but beautiful Alaskan summer! Keep up the good work! ☺

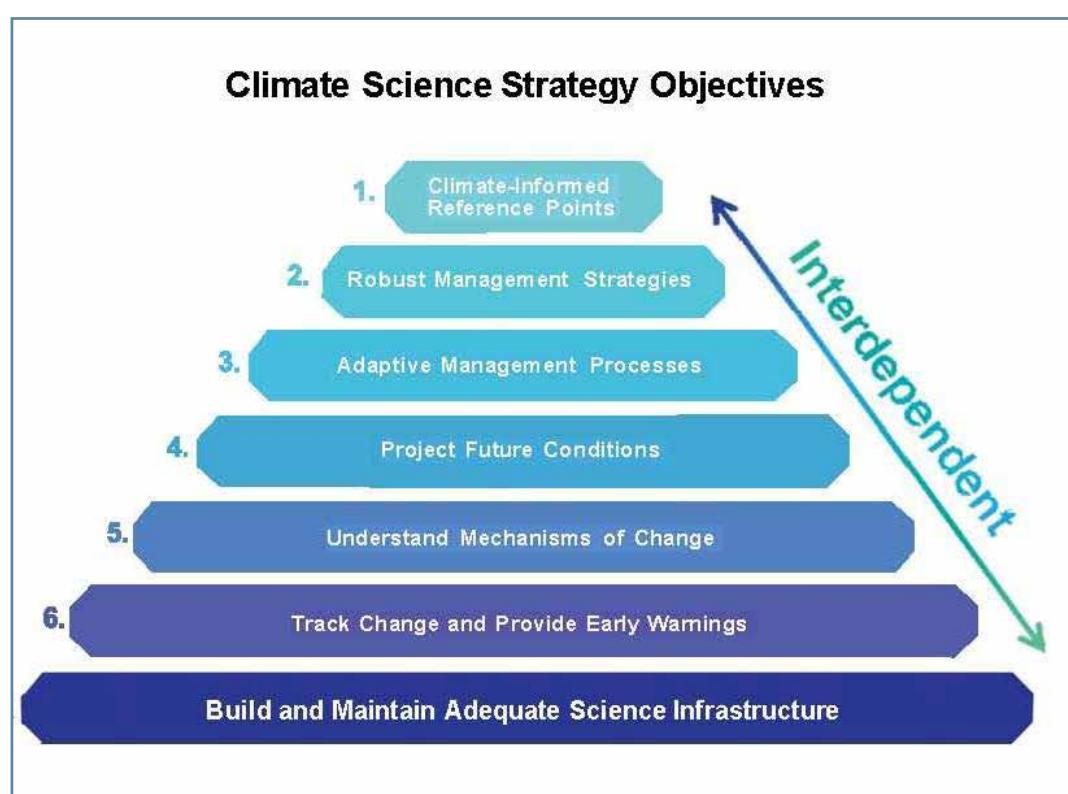
Climate Science, continued

Furthermore, such efforts are consistent with policy recently adopted by the NPFMC to use an ecosystem approach to management, including a proactive approach to monitor and manage climate change impacts on Alaska's fish and fisheries. Specifically, the Council intends that fishery management should consider environmental variability and uncertainty, changes and trends in climate and oceanographic conditions, productivity fluctuations for managed species and associated ecosystem components such as habitats and non-managed

or non-harvested species, and relationships among marine species.

A RAP was recently developed for the Gulf of Alaska ([Dorn et al. 2018](#)) to implement the NCSS. The Gulf of Alaska (GOA) is a basin in the North Pacific Ocean off the southern coast of Alaska and extending 1,500 miles from Alexander Archipelago in the east to the Alaska Peninsula in the west. The primary focus of the RAP is the U.S. Exclusive Economic Zone, extending to 200 miles offshore. The GOA is considered one of five large marine ecosystems (LME) off Alaska for which RAPs are being developed. With the LME extending from Canadian waters to the Aleutian Islands, the GOA includes a tectonic plate boundary that has created one the most seismically active region in North America with numerous active volcanos, some of the world's highest mountains, and glaciers that are undergoing rapid retreat while increasing freshwater discharge into the GOA.

Ecosystem responses to climate change occur over multiple temporal and spatial scales, so research needs to occur along multiple lines. Four broad areas of research were therefore considered critical to a comprehensive climate science strategy:



The seven core climate science strategy objectives behind the Gulf of Alaska Regional Action Plan. Figure from Martin Dorn.

(1) long-term monitoring; (2) process studies; (3) risk assessment; and (4) modeling climate impacts and management scenarios.

1. Long-term monitoring

Ecological responses to environmental change can be rapid (e.g., ecosystem reorganization during regime shifts), or long-term (e.g., genetic and population-scale shifts in response to altered conditions). Because marine ecosystems are characterized by short-term fluctuation that can confound detection of long-term changes, repeated, standardized, long-term monitoring is needed to understand patterns of variability, to identify links between physical and biological processes, and for early detection of large-scale ecological changes.

The NMFS Alaska Fisheries Science Center currently conducts a comprehensive set of GOA surveys using a variety of sampling gears to monitor a broad range of ecosystem components for trends in abundance and distribution. For example, the GOA biennial shelf and slope bottom trawl survey assesses summer trends

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Climate Science, continued

in the abundance and distribution of demersal fish and invertebrates. A summer acoustic trawl survey uses acoustics, coupled with mid-water trawls for species identification, to assess pelagic populations, notably Walleye Pollock, but also Capelin, Pacific Cod, Pacific Herring, rockfishes, and krill. In contrast, a winter acoustic trawl survey in Shelikof Strait and the Shumagin/Sanak Islands collects data to estimate mid-water abundance and distribution of pre-spawning Walleye Pollock. A summer Alaska longline survey assesses Sablefish and other upper continental slope species.

Additional examples of ongoing, long-term monitoring projects by AFSC and collaborative entities include: EcoFOCI/EMA Larval Walleye Pollock Assessment Survey and Ecosystem Observations; ADF&G large-mesh trawl surveys of GOA and Eastern Aleutians; young-of-the-year Walleye Pollock Assessment Survey and Ecosystem Observations in the Gulf of Alaska; long-term monitoring of apex predators; Southeast Alaska Coastal Monitoring to identify processes or factors influencing growth and survival of salmon in different marine habitats along seaward migration corridors and in the nearby GOA; Recruitment Processes Alliance to identify and quantify major ecosystem processes for key groundfish species in the southeastern GOA; and juvenile Sablefish tagging in Southeast Alaska to identify migration and distribution patterns.

2. Process studies

The interpretation of environmental observations and predictions of future changes requires an understanding of mechanisms that drive responses of organisms to environmental variation. Ongoing



Climate change will result in a reduction of some species, but other species may increase in abundance, creating new harvest opportunities. Photo from NMFS.

or proposed research to better understand process drivers and linkages include recruitment processes, ocean acidification, life history characteristics, fish and crab behavior, and predator-prey relationships. Recruitment processes focus on the critical first year of life when survival through the egg, larval, and juvenile stages have the greatest impact on survival, stages also highly vulnerable to climate change. The Recruitment Process Alliance, a cross-Divisional research team is exploring bottom-up and top-down mechanisms that regulate fish recruitment. Species of particular interest are five groundfish species (Walleye Pollock, Pacific Cod, Sablefish, Pacific Ocean Perch, and Arrowtooth Flounder), selected midwater forage fishes (Capelin, Eulachon, Pacific Herring), and Pacific salmon (Chinook and Chum).

Population demographics, including growth rates, maturity, and fecundity, are all influenced by environmental conditions and expected to be altered by climate change. Ocean acidification may potentially affect production of marine species through a variety of mechanisms including

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Climate Science, continued

reduction in growth and survival during early life stages and disruption of sensory and behavioral systems. The marine ecosystem will also be affected by acidification impacts to lower trophic levels and availability of primary prey species. Laboratory experiments will explore effects on Walleye Pollock, Northern Rock Sole, and Pacific Halibut. Understanding predator-prey relationships is also important to understanding bottom-up versus top-down controls and how those controls might change under different potential ecosystem structures.

3. Risk assessment

Risk assessments may evaluate the occurrence probability and characterize the consequences of a natural or human-mediated event. Climate change may enhance or reduce pressures on select marine ecosystem components, alter the frequency of particular interactions or events, and potentially introduce new species interactions producing ecosystem reorganization. Assessing the risks of climate change requires consideration of the magnitude of change, sensitivity at different spatial scales (e.g., the population, the ecosystem, the community), and uncertainty around these factors. Because climate change involves multiple stressors, such as ocean warming and pH changes, a comprehensive approach is needed and can range from qualitative to fully quantitative assessments. Evaluating climate change risk is particularly challenging when data availability, mechanistic understanding, and conceptual frameworks vary across species, sub-regions, and human communities.

4. Modeling climate impact and management scenarios

To forecast and project the impacts of climate change impacts to marine fish production involves several steps: identify and model potential links between environmental variables and biological processes (e.g., reproduction, growth, and distribution); downscale from circulation or environmental variable models to obtain projected future conditions under different climate scenarios; use projected environmental conditions to inform population dynamic models in simulations with alternative harvest policies; and use bioeconomic models to assess social and economic impacts

under different climate and management scenarios. Improving the resolution of oceanographic models is critical to better understanding of linkages among different ecosystem components, both within and between large ecosystems.

The AFSC also produces an annual Ecosystem Report that examines the current status and trends in select ecosystem indicators; this report aids the NPFMC and advisory groups with information to consider when establishing overfishing and allowable biological catch levels. Indicators used in the report are both physical and biological. Specific to social and economic impacts of climate change, NMFS has expanded efforts to collect data to establish a socio-economic baseline that considers fisheries participation at the community level and vulnerability to changes in resource availability.

Federal funding levels for marine science are uncertain and funding to support research operations at the AFSC are unlikely to increase substantially in the coming years. Under a level funding scenario, the projects currently underway and planned for the next 5 years will be substantive steps forward in evaluating impacts of projected climate change on living marine resources, ecosystem components, and fishing communities in the Gulf of Alaska. Several gaps were identified in the current suite of projects that make the AFSC research effort in the Gulf of Alaska less than a fully integrated approach, and efforts are underway at AFSC to address those research gaps.

Martin Dorn is a Fisheries Research Biologist at the Alaska Fisheries Science Center, NOAA Fisheries, in Seattle. He holds a M.S. in Biomathematics and a Ph.D. in Fisheries from the University of Washington where he serves as an Affiliate Associate Professor at the School of Aquatic and Fishery Science. Martin is involved in management strategy evaluations to examine impacts of climate and ecosystem change, modeling fishing behavior, and applying Bayesian approaches to resource management. He also leads the stock assessment team for Walleye Pollock in the Gulf of Alaska, has been a member and chaired the Scientific and Statistical Committee (SSC) of the Pacific Fishery Management Council, and is a member of the Bering Sea and Aleutian Islands Crab Plan Team.

Louis Carufel Passes

The AFS Alaska Chapter recently lost an outstanding member and supporter with the passing of Louis Hector Carufel, Jr., age 93, on May 26, 2018, in Fairbanks. A funeral mass was held June 9 in Fairbanks. Lou was born in January 1925 in Bismarck, ND, to parents of French Canadian and Norwegian descent.

Amid a family of business managers that actively fished and hunted, Lou inherited a love for the outdoors and spent his life hunting, fishing, birdwatching, camping, hiking, and being a career biologist and resource manager. After obtaining a B.S. in wildlife management from St. John's University in St. Cloud, MN, Lou found employment in Yellowstone National Park and then in the Sacramento River Valley in California, where he met his future wife Caye. With Caye's urging, Lou obtained an M.S. in wildlife management from Montana State College in Bozeman, MT. Lou and Caye moved to Anchorage, Alaska, in 1977, and to Fairbanks, in 1984. After positions with the U.S. Forest Service and the Bureau of Land Management, Lou retired in 1989.



AFS Alaska Chapter file photo provided by Randy Brown.

Fairbanks, in 1984. After positions with the U.S. Forest Service and the Bureau of Land Management, Lou retired in 1989.

Lou was very committed to AFS, having been a member since 1948. He was the AFS Alaska Chapter Treasurer/Secretary from 1980-81 and Chapter president from 1986-1987. Lou was instrumental in instigating the AFS Alaska Chapter newsletter 38 years ago, and he was also an avid supporter of the Hutton Junior Fisheries Biology Program that provides paid summer internships and mentoring opportunities for high school juniors and seniors interested in pursuing careers in fisheries science, marine biology, or STEM related fields.

Lou is survived by four children, Louis H. III, Candace (Don), Mark (Jeanne), and David (Patty), as well as seven grandchildren and three great-grandchildren. He was predeceased by his wife, Caye, and his son, Paul.



The AFS Alaska Chapter officers at the November 1984 Chapter meeting in Juneau (L-R) Ross Kavanagh (Past Secretary-Treasurer, AK Chapter); Tony Novotny (Western Division President-Elect); Gary Sanders (Program Arrangements); Carl Burger (President, AK Chapter); Lou Carufel (Chapter Newsletter Editor); Curt Kerns (Past President, AK Chapter); Kelly Hepler (Secretary-Treasurer AK Chapter); and Bill Wilson (President-Elect AK Chapter). Photo from AFS Alaska Chapter archives.

The Value of Uncertainty

Jim Reynolds

Ask any economist about uncertainty and you may often get answers reflecting distaste. Economists, and the business world in general, embrace certainty and are nervous about uncertainty. To some degree, we all gravitate toward certainty in an uncertain world. Certainty is comforting; doubt is not. Too many of our leaders prefer to speak in absolutes. Yet, as scientists and managers dealing with nature and her resources, we have learned to accept the reality of uncertainty; it is the one thing that is certain. Our culture of science has developed both strategies and tactics to deal with uncertainty. We use the scientific method with an understanding that we can never prove anything right — only prove something wrong. We speak in terms of probabilities and models that gauge our understanding but never guarantee it. There is no shame in this although we are often taken to task for “never being sure.” Uncertainty, however, is a gift, an open door to freedom of thought and the ability to consider all possibilities.

Permit me to use a personal example of the



During a plenary presentation at the AFS Western Division meeting in May 2018, University of Washington ecologist Dr. Daniel Schindler discusses the regional and global importance of Alaska's rivers and fisheries. Photo by Randy Brown.

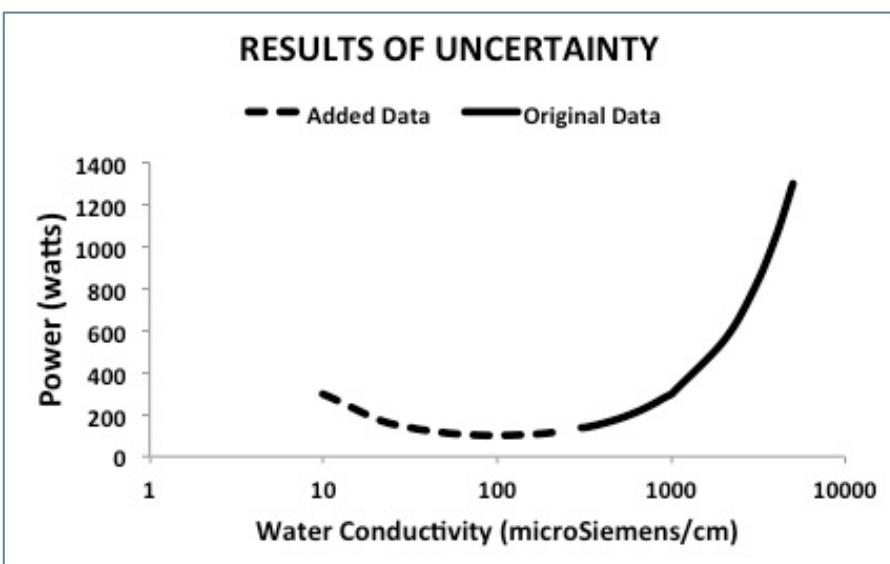


Figure from Jim Reynolds.

potential of uncertainty for problem solving. In the 1980s, I teamed up with A.L. “Larry” Kolz, an electrical engineer in Colorado, to develop a theory of electrofishing. Larry had a background in wildlife radio telemetry and had done studies around the world. When he observed electrofishing, the electrodes reminded him of radio antennae: the former were sending signals in water and the latter were receiving signals in air. But both methods, he thought, were subject to the tenets of Power Transfer Theory (PTT). This well-established theory states that when an object (say, a radio collared animal) is immersed in a medium (air), the minimum amount of electrical power to detect a signal occurs when the conductivities of the two are equal. If the conductivities are different, more power is needed to detect the signal, and as the difference grows, even more power is required. While PTT had never been applied to electrofishing, scientists in the 1950s–1960s recognized the importance of fish conductivity in electrofishing. Their studies treated fish as inanimate objects (fish carcasses) and resulted in estimates generally ranging from 500 to 1,200 micro-Siemens per centimeter ($\mu\text{S}/\text{cm}$). As a fish biologist, I advised Larry that our studies should be based on the behavior of live fish, in particular, the threshold of electrical field intensity for a specific fish response such as

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The Value of Uncertainty, continued

immobilization or taxis. We decided to perform a series of experiments using PTT as the basis for estimating fish conductivity.

The subject of our experiments was that great American sport fish, the Goldfish (*Carrasius auratus*). We determined the response threshold at various water conductivities 300-5,000 $\mu\text{S}/\text{cm}$, expecting that the nadir (minimum) of the resulting U-shaped curve would indicate the point of minimum power and, thus, fish conductivity. But when we finished, the plotted data produced a line with positive slope; no nadir. Uncertainty about our theory, as applied to electrofishing, crept in. Uncertainty also forced us to step back, consider what went wrong and what to do next. Then, we realized we had accepted the values from earlier studies as fact. What if fish conductivity, based on live fish and PTT, was actually less? Adding points from trials in water conductivity below 300 $\mu\text{S}/\text{cm}$ produced a nadir at

approximately 125 $\mu\text{S}/\text{cm}$, an estimate much lower than previously reported. Since then, other studies have provided estimates of 75-200 $\mu\text{S}/\text{cm}$ and are similar for all tested species and sizes of freshwater fish. Fish conductivity of 115 $\mu\text{S}/\text{cm}$ is now used as a “constant,” relative to possible values of water conductivity, in standardized electrofishing based on PTT.

When confronted by those demanding certainty from us, we should not apologize for our truth-seeking methods. Thinking that we’ve cornered the market on knowledge belies the self-inflicted wounds we’ll face. In the eloquent words of American historian Daniel Boorstin, “The greatest obstacle to progress is not ignorance — it is the illusion of knowledge.” Embrace uncertainty and use it to your advantage!

Jim Reynolds (jbreyolds@alaska.edu) was AFS Alaska Chapter President during 1981–1982. 



AFS Alaska Chapter Executive Committee officers at the Western Division meeting in May 2018. (L-R) Jeff Falke (President), Aaron Martin (Past-President), Joel Markis (President-Elect), Stephanie Quinn-Davidson (Vice President), May Beth Loewen (outgoing Past-President), Lee Ann Gardner (Treasurer), Tessa Minicucci (outgoing Student Subunit Representative), and Scott Ayers (Secretary). Photo by Randy Brown.

Student Subunit Happenings

Justin Priest, Student Subunit Representative

Since the last newsletter, students of the Alaska chapter were busy with the end of the semester, organizing a Student Symposium, volunteering and presenting at the annual Chapter meeting co-hosted with the Western Division, and of course lots of fieldwork! The 22nd annual AFS Student Symposium was held on Friday, April 6, 2018. Students presented from Juneau and Fairbanks, with remote connects in Sitka, Anchorage, and Friday Harbor. Awards were given to the following students: April Rebert (First Place, Long Talk), Caitlin Forster (Second Place, Long Talk), Ali Schuler (Third Place, Long Talk), Justin Priest (Best Introduction), and Matt Callahan (Best Short Talk). The AFS Alaska Chapter and St. Hubert Research Group graciously awarded cash prizes to the winners.

The Alaska Chapter and Western Division meeting during May 21–24 in Anchorage, Alaska, was a success with dozens of students presenting and attending. We are especially grateful to those of you who volunteered and helped to ensure everything was running smoothly. As the local subunit, students from Alaska Pacific University (APU) were instrumental in managing the fundraising efforts for the Western Division Annual Conference, including setup, running the raffle and silent auction, and logistics. Students were able to participate in several opportunities for mentorship: a student-mentor lunch offered advice for formative early career decisions, and a student-mentor trivia night allowed one-on-one connections in a very fun atmosphere. The Alaska Chapter provided travel funding for 10 “very appreciative” Alaska students to attend the conference. There were 19 student posters and 55 student oral presentations. Laura Junge (APU) won best student poster, Lauren Wild (UAF) won best talk among Ph.D. students, and Tessa Minicucci (UAF) won best talk of the Pink and Chum Symposium.

New officers were elected this spring by the Fairbanks students: President Donnie Arthur will be working with Kyle Gatt (Vice President), Julia McMahon (Treasurer/Secretary), and Katja

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Outgoing and new AFS Alaska Chapter Student Subunit Representatives Tessa Minnucci and Justin Priest. Photo from Justin Priest.

New Student Subunit Representative

Hello I’m Justin Priest, the new student representative for the Alaska Chapter Executive Committee. I have recently taken over this role from Tessa Minicucci and thanks to her, I have been able to hit the ground running! My background ranges all across Alaska, fishing in the streams where many of you work, study, and play. Originally, I grew up in Hope and Palmer, Alaska, before taking my academic career to Fairbanks. At UAF, I received a B.S. in Fisheries in 2007. These connections would later serve me well in selecting UAF as my school for graduate studies. While an undergraduate, and also after graduation, I worked for the Alaska Department of Fish and Game, sampling salmon across Southcentral and Southwestern Alaska. Later this led to almost a decade of work in private environmental consulting with LGL Alaska Research Associates, Inc., as a fisheries biologist specializing in fisheries in Bristol Bay and the Arctic. Eventually I couldn’t put off going back to school and began my graduate career in August 2016 at UAF, studying nearshore Arctic fishes under the direction of Dr. Trent Sutton. I’m very excited to serve the Alaska Chapter and continue the good work as a liaison between the various student groups and the Alaska Chapter. If anyone ever has any suggestions, questions, or just fishing stories, I am always available to chat at afs.alaska.studentsubunit@gmail.com.

Student Subunit Happenings, continued

(L-R) April Rebert, Ali Schuler, Justin Priest, and Matt Callahan of Juneau won Best Long Talk, 2nd place Long talk, Best Introduction, and Best Short Talk, respectively at the April 6 AFS Student Symposium. Photo by Anne Beaudreau.

Berghaus (Social Media Coordinator). We are excited for the enthusiasm of these new officers and look forward to their contributions. As streams thawed, field-based courses took place at both UAF and APU: a UAF “Maymester” course in fisheries techniques taught both graduate and undergraduate students a broad array of laboratory and field skill sets including electrofishing, dietary analysis, and ageing techniques. Similarly, APU held a course in fisheries ecology, focusing on field-based learning to understand local management issues and strategies. Since then, productive field

seasons have kicked off across Alaska.

AFS Alaska congratulates the following students on defending or graduating recently: Stephanie Meggers (M.S., UAF) – “Factors influencing Chinook salmon spawning distribution in the Togiak River, Alaska;” Danielle Gerik (M.S., UAF) – “Assessment and application of DNA metabarcoding for characterizing Arctic shorebird chick diets;” Rhea Ehresmann (M.S., UAF) – “Patterns and environmental drivers of juvenile sablefish movement in Southeast Alaska;” Kristin Brown (M.S., UAF) – “Diet composition and fate of contaminants in subsistence-harvested northern sea otters (*Enhydra lutris kenyoni*) from Icy Strait, Alaska;” Tessa Minicucci (M.S., UAF) – “Determining the effects of Asian pink (*Oncorhynchus gorbuscha*) and chum (*O. keta*) salmon on western Alaska chum salmon growth;” Sioned Sitkiewicz (M.S., APU) – “Physical and physiological effects of *Ichthyophonus* (spp.) on Pacific Halibut (*Hippoglossus stenolepis*);” Jarred Stone (M.S., APU) – “Assessing the relationship between diet and body condition in the

Bering Sea juvenile Chinook salmon using stable isotopes and energy density analyses;” Ben Williams (Ph.D., UAF) – “The reproductive biology and management of walleye pollock (*Gadus chalcogrammus*) in the Gulf of Alaska;” and Ellen Chenoweth (Ph.D., UAF) – “Bioenergetic and economic consequences of humpback whale depredation at salmon hatchery release sites in Southeast Alaska.”

Wherever this summer’s fishing and field activities take you, whether it’s wrangling rockfish or chasing char, we wish you tight lines, full freezers, and easy sampling! 🐟

Amazon Smile

The AmazonSmile Foundation donates 0.5% of the purchase price of eligible purchases to a charitable organization selected by the customer. The AFS Alaska Chapter is enrolled as a charitable organization. There is no additional expense to the customer, no price add-on, and no cost to the Alaska Chapter. Anyone who shops online at Amazon can support the AFS Alaska Chapter financially! Simply shop through AmazonSmile (<https://smile.amazon.com/>); the shopping experience is identical to [Amazon.com](https://www.amazon.com). You might ask what the contribution represents to the Alaska Chapter. It has increased from the initial donation in 2016 and represents a supplemental income that can be used to support Chapter projects. 🐟

UAF Student Wins Knauss Fellowship

Amy Kirkham, a University of Alaska Fairbanks doctoral student, has received a Knauss Marine Policy Fellowship in Washington, DC, starting in February 2019. The one-year, paid fellowship is administered by Sea Grant to match qualified graduate students with hosts in DC. Kirkham grew up on Long Island Sound in Larchmont, NY. Having always been fascinated by the ocean and its inhabitants, Kirkham became a scientific diver as part of her studies of kelp forests while earning a B.S. in marine biology from Stanford University. She also worked as a marine mammal research assistant and naturalist in Maine, communicating ocean science to tourists. After pursuing a M.S. in biological sciences at the University of Alaska Anchorage, Kirkham transferred to the University of Alaska Fairbanks where she is completing her Ph.D. in fisheries with a focus on Weddell seals. Research on seals has taken Kirkham to Antarctica seven times over four years, and her interests also took her to the Pribilof Islands. These experiences have provided Kirkham with unique insights into polar issues. Kirkham will travel to Washington, DC, this fall to meet with perspective host offices in the executive or legislative branches of government. Her hope is to work in a role to learn firsthand how legislation is created and implemented.



Amy Kirkham. Photo from Alaska Sea Grant.



AFS Alaska Chapter President and Western Division meeting co-chair Jeff Falke recognizes Britta Baechler, a student at Portland State University and current Student Representative to the Western Division, for the Best Student Poster by a Ph.D. student for her 2018 Western Division meeting presentation on the occurrence of microplastics in Oregon coast Pacific Oysters and Pacific Razor Clams; Awards Committee chair Jon Gerken is in the background. Photo by Randy Brown.

Paula Cullenberg Leaves Sea Grant

After 15 years as director of the Alaska Sea Grant Marine Advisory Program, Paula Cullenberg stepped down in March 2018. As a professor at the University of Alaska Fairbanks, Cullenberg, specialized in commercial fisheries, human dimensions, and coastal community development. Her publications range from climate change adaptation to aspects of the aging in the Alaska commercial fishing fleet. In February 2018 at the Alaska Marine Gala, Cullenberg was presented the Alaska Ocean Leadership Award for outstanding achievement in marine outreach and education.

In addition to the Marine Advisory Program, Cullenberg has worked with the Alaska Fisheries Development Foundation, the Bering Sea Fishermen's Association, the University of Alaska Anchorage Observer Training Center, and salmon fishing on the lower Yukon and in Bristol Bay. ☺



Paula Cullenberg, leaves Alaska Sea Grant after 15 years as director. Photo from Alaska Sea Grant.

25-Year AFS Members

The American Fisheries Society issues commemorative pins to recognize individuals that have been members for 25 years and 50 years. The following AFS Alaska Chapter members were recognized at the May 2018 Alaska Chapter/Western Division meeting. Congratulations! ☺

25-Year Member	City	Joined
Raymond F. Hander	Fairbanks, AK	2/1/1993
Deyna A. Kuntzsch	Cordova, AK	2/22/1993
Jeffry L. Anderson	Soldotna, AK	10/12/1993

Marine Debris – Reducing Marine Plastic Pollution

The National Geographic Society is seeking proposals for projects that will measurably reduce plastic pollution before it reaches the ocean. Funding is for up \$100,000 per project, although typical awards are <\$30,000. Awarded funds may be used over one or two years, up to 20 percent of the total may be used as a stipend for the applicant and/or team members, and up to 15 percent may be used for institutional overhead if the award grant is at least \$50,000. Projects may address conservation, education, research, storytelling, or technology. Priority will be given to projects

focused on one or more of the following: (1) develop innovative solutions to help stop plastic from reaching waterways through improved recycling, waste management, or other means; and (2) implement innovative methods to engage stakeholders to create solutions that dramatically reduce plastic use and/or input into watersheds. This is an open-ended RFP with no specific deadline and applications accepted on a rolling basis. For more information go to <https://www.nationalgeographic.org/grants/grant-opportunities/reducing-marine-plastic-pollution/>. ☺



**147th Annual Meeting
American Fisheries Society 2018**
August 19–23, 2018
Atlantic City, New Jersey

<http://afsannualmeeting.fisheries.org>

Fellowships Announced by Alaska Sea Grant

Five graduate students have been selected by Alaska Sea Grant for the State Fellowship program. This is the fourth year of the program which links students to work for a year with state and federal agencies to support healthy coastal communities and the marine environment. The program promotes future professionals in marine science and policy, fisheries, and related disciplines. Notes Ginny Eckert, interim Alaska Sea Grant director, “We are building capacity in Alaska and providing career opportunities for young professionals.”

The 2018-19 State Fellows are:

Nyssa Baechler, a M.S. student in marine affairs at the University of Washington, will work with the U.S. Geological Survey in Anchorage on hazard-mitigation modeling and Arctic flora and fauna conservation.

Diana Perry, a M.S. student in marine affairs at the University of Washington, will work with the National Oceanic and Atmospheric

Administration’s Alaska Fisheries Science Center in Juneau on the development of marine aquaculture in Alaska.

Kayla Schommer, a M.S. student in marine affairs at the University of Washington, will coordinate the Alaska Harmful Algal Bloom Network for the Alaska Ocean Observing System, and will work on social media with Alaska Sea Grant’s communications team in Anchorage.

Ali Schüller, a M.S. student in fisheries at the University of Alaska Fairbanks, will work with NOAA’s Protected Resource Division in Juneau on management needs for humpback whales and Steller sea lions.

Marguerite Tibbles, a M.S. student at the University of Alaska Fairbanks, will work with the North Pacific Research Board in Anchorage on projects such as how NPRB research is used by stakeholders and an analysis of coastal community research. ♦

Alaska Fishermen Suffer High Rate of Health Problems

A recent study by the University of Washington School of Public Health and Alaska Sea Grant found that compared to the general population, people in Alaska salmon fisheries have a significantly higher rate of health problems, including noise-related hearing loss, upper extremity disorders, and fatigue, possibly due to sleep apnea. The study started in 2015 when Torie Baker, Alaska Sea Grant Marine Advisory agent in Cordova, combined efforts with Dr. Debra Cherry, a physician and injury specialist at the University of Washington Department of Epidemiology, to obtain health information from 600 salmon gillnet permit holders. About 80% of physical exam participants had hearing loss, compared to 15% of most Americans. Physical exam participants also had a 40% occurrence of rotator cuff problems, about three times the national average. Standardized survey questions documented a potentially high prevalence of obstructive sleep apnea during the fishing season, a concern because less sleep during the fishing season, combined with poor quality sleep, may exacerbate fatigue, potentially increasing accidents. ♦



Mike Williams from the village of Akiak discusses developments in tribal co-management of subsistence fisheries for Chinook Salmon in the Kuskokwim River during a presentation at the AFS Western Division meeting. Photo by Bill Bechtol.

Meetings and Events

147th Annual Meeting of the American Fisheries Society 2018



August 19–23, 2018: This meeting will be held in Atlantic City, NJ. For more information, go to <http://afsannualmeeting.fisheries.org>.

National Summit on Coastal and Estuarine Restoration and Management Forum

December 8–13, 2018: This 9th in a series of summits will be held in Long Beach, CA. For more information go to <https://www.estuaries.org/Summit>.



Alaska Marine Science Symposium



January 22–26, 2019: This symposium will be held in Anchorage, AK. For more information, go to <https://www.alaskamarinescience.org/>.



Alaska Forum on the Environment

February 11–15, 2019: This meeting will be held in Anchorage, AK. For more information, visit <http://www.akforum.com/>.



11th Eleventh International Conference on Climate Change: Impacts & Responses

April 16–17, 2019: This meeting will be held in Washington, D.C. For more information, go to <http://on-climate.com/2019-conference>.



Collaborative Fisheries Research



May 7–10, 2019: This symposium in the Lowell Wakefield Fisheries Symposium series will be held in Anchorage, AK. More information is at <https://alaskaseagrant.org/event/wakefield-fisheries-symposium-2019/>.



Back issues of *Oncorhynchus* can be found online
<http://www.afs-alaska.org/newsletter>

ONCORHYNCHUS

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