



ONCORHYNCHUS

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Newly hatched red king crab larvae. Photo from Robert Foy.

CO₂, pH, and Anticipating a Future under Ocean Acidification

Robert J. Foy, Mark Carls, Michael Dalton, Tom Hurst, W. Christopher Long, Dusanka Poljak, André E. Punt, Michael F. Sigler, Robert P. Stone, Katherine M. Swiney

Increases in atmospheric carbon dioxide (CO₂) concentrations have accelerated substantially since the Industrial Revolution (mid-1700s). With the world's oceans absorbing 30–50% of the new CO₂, mean surface ocean pH declined by 0.1 (equivalent to 30% greater acidity), reducing calcium carbonate saturation and compromising calcium and carbonate extraction by shell building organisms. In the North Pacific, the saturation depth of calcium carbonate has shallowed to ~200 m, below which calcium carbonate dissolves.

In March 2009, the U.S. Congress passed the Federal Ocean Acidification Research Monitoring Act, establishing an interagency committee to develop ocean acidification research and monitoring. Scientists at the National Marine Fisheries Service Alaska Fisheries Science Center (AFSC) and colleagues have worked locally, nationally, and internationally since 2007 on ocean acidification impacts at scales from individual organisms to ecosystems. In 2008, AFSC scientists developed research to examine the effects of reduced calcium carbonate on growth, survival, and reproduction of important shellfish, fish, and cold water corals. Species-specific responses to ocean acidification are not well understood, and larval and juvenile stages were prioritized at laboratories in Juneau and Kodiak, Alaska, and Newport, Oregon.

Red king crab (*Paralithodes camtschaticus*) and Tanner crab (*Chionoecetes bairdi*) studies have been conducted by Chris Long, Katherine Swiney, and Robert Foy (AFSC). Effects of increased CO₂ on survival, condition, and growth of crabs were investigated from 2009 to 2011 at the AFSC in Kodiak. One experiment studied late-stage embryos and larvae of ovigerous red king crab held at ambient pH 8.0 (control) and a treatment of pH 7.7, a level expected within 50 years. Embryos reared in acidified water were larger, but had smaller yolks; females in acidified seawater had longer hatch duration, but similar fecundity. After hatching, larvae were examined in fully crossed experiments, with embryos previously held in

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Mark Wipfli, AFS Alaska Chapter President, during a NMFS lab tour at the recent Kodiak Alaska Chapter meeting. Photo by Jason Neuswanger.

The President's Corner

Mark Wipfli

As I ponder what to write in my first piece for The President's Corner, I find myself gazing out of my office window south across the Tanana Flats and up the snow-covered Alaska Range. It's 2:30 p.m., the sun is already setting above the range, and the ground outside my window is covered in several feet of snow, reminding me we are entering the heart of winter. One of the nicest things about winter in Alaska is the ample time it provides to reflect on the past year(s), and to eagerly anticipate the prospects and excitement of the coming ones. I moved to Alaska just over 20 years ago (wow, time really does fly), settling in SE Alaska for the first half and interior Alaska the second half. This amazing state, no matter where we live within it, never ceases to inspire and provide. Like most of you I'm now enjoying the fruits of my fishing, hunting, berry picking, and gardening adventures (yes, gardening can certainly be an adventure in Alaska) from the past year. It's been a snowy and cold interior winter so far, so all that woodcutting has also paid off, again.

I've also been reflecting upon our recent AFS Alaska Chapter meeting. I think everyone had a blast in Kodiak, and can you believe the weather?!?! Okay, maybe we got a little

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Ocean Acidification, continued

acidified or control water after exposure as larvae to either control or treatment water. Larval survival was reduced by acidified water at both embryo and larval stages, with additive effects giving the lowest survival for larvae in acidified water at both stages. Survival and growth of juvenile red king crab were assessed at three pH levels (8.0, 7.8, and 7.5). Juvenile survival decreased with pH, producing 100% mortality after 95 days in pH 7.5. Acidification did not affect morphology of juvenile red king crab, but growth was slower in pH 7.8.

Tanner crab research included examination of ocean acidification effects on: (1) fecundity, embryo viability, embryo development, and hatching success; (2) larval condition and survival; and (3) juvenile growth, condition, and survival. For juvenile Tanner crab held at three pH levels (~8.0, 7.8, and 7.5) for nearly 200 days, survival decreased at lower pH, growth was slower in pH 7.5 water, and calcification was lower in acidified water, but morphology and condition were similar. Subsequent experiments involved adult females with embryos and their larvae exposed to two treatments (pH 7.8 and 7.5) and a control (pH 8.0). While data on embryo development are still being analyzed, larvae died slightly faster at pH 7.5 than in pH 7.8 or control treatments.

Thus, red king and Tanner crab studies to date indicate that ocean acidification may have a substantial negative effect on red king and Tanner crab stocks. Reduced survival at the larval and juvenile stages is likely to reduce recruitment and subsequently affect abundance of mature males available for commercial fisheries. Variability in condition among species and life history stages revealed different physiological responses to increased dissolved inorganic carbon concentration. Regardless, increased physiological costs are likely to lead to the higher mortality rates observed across these experiments. More research on other life history stages, and the molecular response, is necessary to fully understand the effects ocean acidification will have on red king, Tanner, and other crabs. In particular, dosing experiments are needed that accurately mimic the *in situ* conditions encountered by crab at different

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The President's Corner, continued

lucky here and there, but having a great team of Local Arrangements people on site made the meeting possible, and hugely successful. We had 236 registered attendees, very impressive for a meeting in a place that can often be expensive and challenging to get to and from. Meeting goers were treated to a host of fascinating, complimentary tours (windmill farm, hatchery, USCG base, fish processor, NOAA facility, UAF's Seafood and Marine Science Center), four evening socials, and a fabulous banquet to top it all off. We also enjoyed lots of great locally caught and prepared food (thanks to UAF's Quentin Fong and company, Shelikof Lodge, Kodiak Island Brewery, NOAA, and a mix of local caterers).

Oh yeah, and we were treated to a wide diversity of interesting oral sessions, talks, posters, and keynote presenters, all speaking to the theme of the meeting – Ecosystem, Fishery, and Food Sustainability. It seemed that everyone enjoyed our guest speaker at the banquet, Jim Brashear, sharing his perspectives on the history of the expression of fish and ecosystems through art, from an artist's perspective. His talk was brilliant! The society made a whopping \$9,600 just on the auction alone, thanks to a long list of donors (and bidders!), AFS student support, and a very effective and entertaining auctioneer, with all auction proceeds going to support AFS student travel to future meetings. I personally made an effort to garner extra monetary donations from a diverse and generous set of sponsors, and that, too, helped the Chapter move further into the black. Certainly not least, a big thanks goes to Lee Ann Gardner and Trish

DeMontfort for administrative support, and to Thomas Farrugia for a lot of help with a little bit of everything. We're doing very well as a Society Chapter in many important ways.

And speaking of doing well, I had a really nice visit with one of our invited speakers, commenting from an east coast perspective on our meeting. In particular, she was impressed with the balance of women and men professionals within our Chapter compared to what she's seen elsewhere. It was great to hear this "outsider's" perspective, and made me realize that it's something that I take that for granted, maybe because it's been commonplace within our Chapter for so long. Nonetheless, it was gratifying to hear.

I also want to take a moment to thank Trent Sutton for serving as our 2012 Chapter President. His efforts certainly show, and are appreciated. I look forward to serving as your next Chapter President this coming year. Among other things, I want to continue the push towards greater diversity, not only across gender and cultural, but also in how we approach and embrace the increasingly broad, complex, and challenging natural resource management issues we face as professionals in our fisheries and fisheries-related fields. I also want to emphasize the need to work together as we face new and continued resource management challenges throughout the state, but also remember to take the time to recognize, reflect upon, and appreciate the advances we've made.

So, I wish you all the best in your professional and personal endeavors in 2013. Here's to good health, happiness, and success in the coming year!!

Ocean Acidification, continued

life stages and the effects of other co-occurring environmental stressors such as temperature.

Genomic studies of larval and juvenile red king crab from Alaska are being conducted by Jonathon Stillman (University of California, Berkeley) to find mRNA biomarkers that indicate sublethal effects of increased CO₂. Gene expression indicates basic cellular responses to increased temperature and CO₂. Patterns of gene expression are being described

using sequencing approaches called RNA-seq, and will produce information about genes that are responsive to increased CO₂ and temperature. Juvenile red king crab for this project were exposed to four temperature treatments (ambient, ambient +2°C, and ambient +4°C, with ambient at ~10.7°C) and three pH treatments (7.5, 7.8, and ambient). Initial experiments were completed June 2012 and genomic analyses are ongoing.

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Ocean Acidification, continued

Bioeconomic research for red king crab has been conducted by Michael Dalton (AFSC) in collaboration with André Punt and Dusanka Poljak (University of Washington). Most existing ocean acidification models do not consider different degrees of vulnerability among life-history stages, and few studies have included other population-level stressors such as commercial fishing. By coupling pre-recruitment vulnerability with post-recruitment dynamics, the Bristol Bay red king crab model incorporates ocean acidification effects on vulnerable juvenile crab in combination with effects of commercial fishing on the Bristol Bay population. The pre-recruitment component is a stage-structured model that includes effects of ocean acidification by adjusting survival and growth among stages. Survival rates for pre-recruit crab were tuned to results of survival experiments for Bristol Bay red king crab conducted at the Kodiak Laboratory. Post-recruitment dynamics are based on a simplified version of the full Bristol Bay red king crab stock assessment model. Preliminary results under various management strategies suggest that ocean acidification could substantially affect the Bristol Bay red king crab fishery. For example, the proxy for fishing mortality at the maximum sustained yield (F_{MSY}) is projected to be much lower if considering ocean acidification impacts to juvenile crab survival. For the most extreme scenario, ocean acidification effects alone are sufficient to reduce stock biomass to the target level of productivity without any fishing mortality. Applying the pre-recruit survival rates based on the Kodiak experiments, estimated maximum sustainable yield is predicted to remain at current levels for 20–40 years, and then decline rapidly owing to the non-linear relationship between pH and survival.

Effects of ocean acidification on Alaskan marine fishes are being examined by Tom Hurst (AFSC) and Jeremy Mathis (University of Alaska Fairbanks). Marine fishes are generally assumed to be less sensitive to ocean acidification than invertebrates due to internal skeletons composed primarily of calcium phosphate, a high metabolic capacity, and an ability to increase intercellular buffering. However, early life stages with acid-base regulation may be more susceptible to ocean acidification. Initial experiments examined



Collage of experimental CO₂ dosing systems at the AFSC laboratories. Photo from Robert Foy.

early life stages of walleye pollock (*Theragra chalcogramma*) under short- (6 week) and long-term (6 month) exposures to elevated CO₂; preliminary results suggested growth was not affected by elevated CO₂. Additional experiments tested vulnerability of eggs and larvae to ocean acidification compared to larger juveniles. Five batches of eggs from laboratory-maintained broodstocks were incubated until hatch across a range of CO₂ conditions. At the highest CO₂ level (~1,800 μatm), the average delay in time to hatch, while significant, was <1 day. Body size at hatch did not differ among treatments. While resiliency in growth energetics among juvenile walleye pollock is indicated, recent work with some coral reef fishes found exposure to elevated CO₂ altered sensory and behavioral responses without depressing growth. Whether such disruptions could also occur in cold water fishes is unknown and future experiments are planned to examine these behavioral impacts in young walleye pollock.

Coral research is being conducted by Robert Stone (AFSC) working with scientists from the Marine Conservation Institute, Woods Hole Oceanographic Institution, and the Smithsonian Institution. Corals occur throughout Alaska, including the continental shelf and upper slope of the Gulf of Alaska, the Aleutian Islands, and the eastern Bering Sea. Found from the shallow subtidal to depths over 6,000 m, corals provide habitat for many fish and crab species. Decreases in oceanic pH, and resulting decreases in calcium carbonate saturation, could affect the ability of corals to extract calcium carbonate from seawater for skeletal building. Impacts may depend on

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Ocean Acidification, continued skeletal composition (aragonite vs. calcite vs. high-magnesium calcite), skeletal concentrations of those compounds, geographical location, depth relative to saturation horizons, and the degree of external organic tissue insulation. Skeletal composition is known for few deep-sea corals worldwide and only a handful of the 130+ taxa documented in Alaska. Extensive archives at the Auke Bay Laboratory and Smithsonian Institution were sorted and 130 specimens, comprising 61 taxa from major coral groups, were selected for analyses. Multiple specimens were selected for taxa of particular ecological importance (i.e., those forming large single-species assemblages) and also for single species from multiple

depth and geographic zones. Laboratory analyses included X-ray diffraction to determine aragonite/calcite ratios and Inductively Coupled Plasma Mass Spectrometry to determine magnesium content of high magnesium calcite species. Corals composed of high-magnesium calcite may be most at risk to decreases in oceanic pH since it is the most soluble compound. The mineralogy data will be used in conjunction with species distribution data (depth and geographical) and the present and projected aragonite and calcite saturation horizons to identify those taxa that are most at risk to potential effects of ocean acidification in the North Pacific Ocean.

Future AFSC research on ocean acidification will develop nearshore monitoring tools and continue to focus on physiological responses of crabs, fish, and coldwater corals. King and Tanner crabs will continue to be the target species at the Kodiak Laboratory, with expansion to include blue king crab, which live in relatively shallow water, and golden king crab, which live at such extreme depths that they likely already inhabit a corrosive environment. Experimental treatments for red king crab will add temperature as a covariate with increased CO₂ to assess additive effects. New studies to assess metabolic condition for crab will include determination of hemocyte pH as a



Primnoid coral covered with brittle stars on Dickins Seamount in the Gulf of Alaska.
Photo by NOAA Office of Ocean Exploration.

potential mechanism affecting calcium transport. Additional species and mortality information from multiple life history stages will be incorporated into bioeconomic models. Fish research into the effects of decreased pH will be expanded to include Pacific cod and northern rock sole and will consider temperature and food limitation treatments. Coral research will be extended to additional taxa and broadened spatial considerations of the current taxa, with the ultimate goal of developing risk assessment models for Alaskan corals. Additional information may be found at <http://www.afsc.noaa.gov/Quarterly/jas2012/JAS12-Feature2.pdf>.

Robert J. Foy is a Research Fisheries Biologist at the AFSC-Kodiak. Michael Dalton is an Industry Economist at the AFSC-Seattle. Tom Hurst is a Research Fisheries Biologist at the AFSC-Newport, OR. W. Christopher Long is a Research Ecologist at the AFSC-Kodiak. Dusanka Poljak is a M.Sc. candidate at the University of Washington. André E. Punt is a Professor of Aquatic and Fishery Sciences at the University Washington. Mike Sigler is a Marine Biologist at the AFSC-Juneau. Jonathon Stillman is an Assistant Adjunct Professor of Integrative Biology at the University of California, Berkeley. Robert Stone is a Research Fisheries Biologist at the AFSC-Juneau. Kathy Swiney is a Research Fisheries Biologist at the AFSC-Kodiak.

Student Subunit Happenings

New Student Subunit Representative

Kari Fenske began working on a Fisheries Ph.D. at the University of Alaska Fairbanks, Juneau campus in August 2012. Kari's research will incorporate several decades of mark-recapture data into a sablefish assessment to estimate movement, and then use a spatially-explicit assessment model to evaluate harvest strategies that maximize sablefish harvest while maintaining spawning potential.

Prior to joining the UAF Fisheries program, Kari was a stock assessment coordinator for the Southeast Data, Assessment, and Review (SEDAR) program in Charleston, SC, and worked as a fishery biologist at the South Atlantic Fishery Management Council. Kari received her M.S. in Marine, Estuarine and Environmental Sciences from the University of Maryland in 2009, working on population dynamics and demographics of the American eel.

Despite recent years spent in warmer climates, Kari is very excited to be living and working in Alaska and learning about the ecosystems of the North Pacific.



Kari Fenske, graduate student and new Student Subunit representative.

Student Events

Fall was very productive for the Student Subunit of the Alaska Chapter of AFS. In October, 49 students attended the AK AFS Chapter meeting in Kodiak. The Student Subunit would like to thank the AK Chapter for providing support for 28 students to come and present their research. These 28 students also volunteered with meeting setup, on-site registration, and social events to help the meeting run smoothly. Overall, approximately 34 UAF and UAA Fisheries students presented posters and papers and had the opportunity to network with fisheries professionals.

The Fairbanks group of the Student Subunit elected the following new officers: President Kurt Heim, Vice President Stacy Vega, Treasurer Trevor Haynes, Secretary Steph Meggers, and Social Coordinator Thaddeus Buser. Working with faculty advisor Andres Lopez, the Fairbanks group has been designing a project to study the overwintering ecology of resident and migratory fishes, and on the outmigration of juvenile salmon in the Chena River in downtown Fairbanks. With fieldwork scheduled to start in February, this project will provide a great opportunity for both graduate and undergraduates at UAF to get outside and gain

some fieldwork experience this spring semester. For more information on the project visit (<https://sites.google.com/a/alaska.edu/studentafs/2012-research-project>).

On November 19, a Job Panel was organized by the Juneau group to help current graduate students and recent graduates find out what potential employers are looking for (experience, course work) and also get some advice on applying for jobs, interviewing, etc. Students were also able to talk one-on-one with panelists during more informal social time following the workshop. Ten fisheries professionals participated as panelists, including representatives from ADG&F, The Nature Conservancy, NOAA, Oceana, UAF, and UAS. More than 45 students from the Juneau, Fairbanks, Anchorage, and Kodiak campuses participated in the event. The Job Panel will be continued in the spring in Fairbanks, and there are ongoing discussions about hosting resume and cover letter writing workshops, as well as mock interview practice. Also in November, the Juneau student subunit organized a garbage pickup along their section of "Adopted a Highway" outside the Lena facility.

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Student Subunit Happenings, continued

The AFS Student Subunit would like to congratulate the following UAF School of Fisheries and Ocean Sciences students who defended their research this past fall:

Parker Bradley (M.S. Fisheries) — “Characterizing the Fish Community in Turbid Alaskan Rivers to Assess Potential Interactions with Hydrokinetic Devices”

Jesse Coleman (M.S. Fisheries) — “Quantity and Quality of Freshwater Rearing Habitat in Relation to Juvenile Pacific Salmon Abundance in the Kulukak River, Alaska”

Shelley Cotton (M.S. Fisheries) — “Subsistence Salmon Fishing in Beaufort Sea Communities”

Michael Garvin (Ph.D. Fisheries) — “Population Genetics and Mixed Stock Analysis of Chum Salmon (*Oncorhynchus keta*) with Molecular Genetics”

Michelle Gutsch (M.S. Fisheries) — “Identification and Characterization of Juvenile Coho Salmon Overwintering Habitats and Early Spring Outmigration in the Anchor River Watershed, Alaska”

Sean Larson (M.S. Fisheries) — “Impacts of Sea Otter Predation on Commercially Important Sea Cucumbers (*Parastichopus californicus*) in Southeast Alaska”

Christopher Manhard (M.S. Fisheries) — “A Test of Local Adaptation in Seasonally Separate Subpopulations of Pink Salmon (*Oncorhynchus gorbuscha*)”

Tammy Hoem Neher (Ph.D. Fisheries) — “The Influence of Estuarine Habitats on Expression of Life History Characteristics of Coho Salmon Smolts in South-Central Alaska”

Rachael Wadsworth (M.S. Fisheries) — “Incorporating Stakeholder Input in Research Priorities for the Aleutian Islands”

2012 Wally Noerenberg Award

Kenneth Gates

The Wally Noerenberg Award (WNA) for Fishery Excellence is the highest award bestowed by the Alaska Chapter. It honors an individual's life-long achievements in a career focused on Alaska's fisheries. Contributions may include, but are not limited to: fisheries research; technology development; species and habitat management; innovations in harvesting, processing or marketing; academics or fisheries education; and involvement in national and international affairs affecting Alaska fisheries. The award was created in 1981, and in 1982 was awarded posthumously to its namesake, Wally Noerenberg. Since then, there have been fifteen other recipients. The 2012 WNA committee consisted of chair Ken Gates and past chapter presidents Bill Bechtol, Hal Geiger, and Bill Wilson.

Contributions warranting the WNA are not easily translated into lifelong achievements that ultimately affect fisheries in a state the size of Alaska. To accomplish this takes hard work, dedication, and sacrifice and, most importantly, recognition of an individual's successes by one's colleagues. The individual receiving the 2012 WNA has had a distinguished fisheries career spanning over 40 years, nearly all of which was in Alaska. You can actually say he started his career in 1963 as a commercial fisherman in Bristol Bay before obtaining his B.S. and M.S. in Fish and Wildlife Biology between 1965 and 1971 from Humboldt State University. After working as a seafood inspector for the U.S. Army Corp. of Engineers,

he joined the Alaska Department of Fish and Game in 1974 as a biologist. He served ADF&G in capacities ranging from the Bristol Bay Research Project Leader to Regional Research Supervisor for Bristol Bay, Cook Inlet, and Prince William Sound. After that, he was Fishery Program Manager for the Division of Oil Spill Impact Assessment and Restoration following the Exxon Valdez Oil Spill before becoming the Deputy Commissioner of ADF&G in 1991, retiring from the department in 1995. Following this 21-year career with the department, he was a fisheries consultant during 1995–2005.

His contribution to Alaska fisheries could be summarized by the term “coalition building.” His background growing up in Territorial Alaska, working as a commercial fisherman, in salmon canneries, and as a seafood inspector, and being a lifelong sport angler has helped him to empathize with the various resource user groups. It has also helped him to share fishermen and industry perspectives with resource managers. Because of his ability to work with others, especially on complex fisheries issues, he has served on many boards and commissions throughout his career including a representative of the State of Alaska in the international fisheries agreements through the International North Pacific Fisheries Commission, Pacific Salmon Commission, and U.S.-Canada Yukon River Negotiations. As the Regional Research supervisor for Prince William Sound, Cook Inlet, and Bristol Bay during the Exxon

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2012 Wally Noerenberg Award, continued

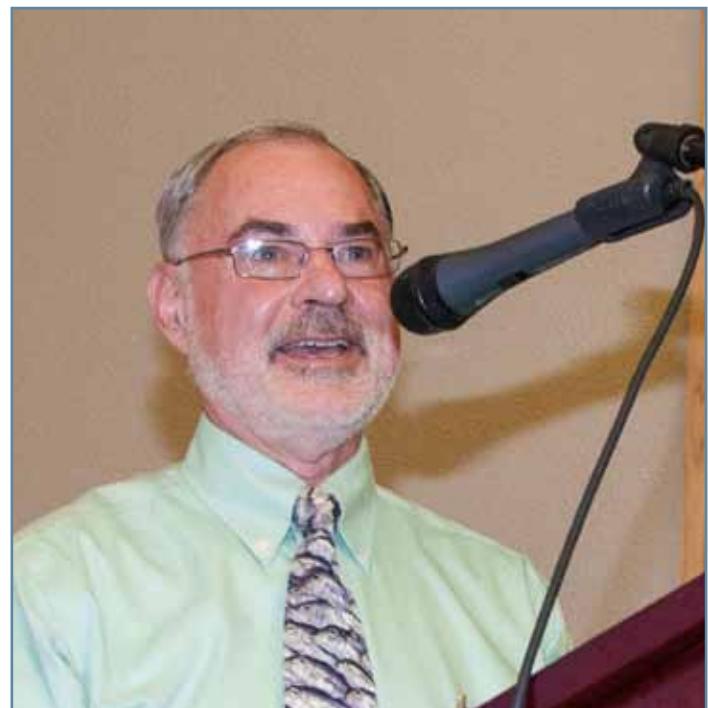
Valdez Oil Spill and later ADF&G's EVOS Fishery Program Manager, he played a major role in the design and execution of early research projects directed at determining the short- and long-term ecological effects of the oil spill.

To this day, he continues to participate in fisheries-related activities in Alaska and the Pacific Northwest, volunteering personal time and providing funding through a family-operated non-profit organization, The Meacham Foundation. It is an honor to recognize Charles P. Meacham, Jr., this year's recipient of the Wally Noerenberg Award for Fishery Excellence.

Charles Meacham, Jr., 2012 Wally Noerenberg Award Recipient

It is truly a great honor to be the recipient of the Wally Noerenberg Award for Fishery Excellence. I personally knew Wally when he lived in Cordova. While I get to Cordova fairly frequently as a Board Member of the Prince William Sound Science Center, I don't get to Kodiak that frequently, so it is a distinct pleasure to be here with you tonight.

Actually, my first trip to Kodiak was about 40 years ago when I was fulfilling my military obligation as a seafood inspector with the U.S. Army. There have been many changes throughout those 40 years but, fundamentally, Kodiak is still Kodiak — a great Alaska community with a viable economy and fabulous recreational opportunities! One reason for this is that Kodiak has excellent access to a substantial piece of Alaska's first permanent fund — FISH. And, this permanent fund



Chuck Meacham, Jr., recipient of the 2012 Wally Noerenberg Award. Photo by Jason Neuswanger.

is blessed with an excellent portfolio of different fisheries and species. Alaskans, and others, have been living off the "interest" or production of this fund for years and should be able to continue to do so for centuries forward.

I'm counting on all of you in this room and the Alaska Chapter to maintain our first Permanent Fund for the benefit of both Kodiak and for all of Alaska; and I know full well that is achievable. The Alaska Chapter of the American Fisheries Society has come a LONG way since about 10 of us sat around a little table in the old ADF&G support building in Juneau where we decided to start a new AFS chapter for the State of Alaska. I called the AFS parent office earlier today and found out that the Alaska Chapter, with 412 members, is now the second largest of all the chapters. Get another 30 members and we will be number one!

In closing, I want to challenge our organization to work diligently to help one another to keep Alaska's fisheries strong. Fish are truly our first Permanent Fund, that with your guidance will continue forever. I am so very proud of the Alaska Chapter and very proud to be the recipient of the Wally Noerenberg Award for Fisheries Excellence. Thank You. ♡



Rachel King seeks bids for a fish plate offered at the live auction during the annual Chapter meeting banquet. Photo by Jason Neuswanger.

2012 Molly Ahlgren Scholarship Award

Ray Hander, Committee Chair

This year the Committee received several excellent applications. Because the applications were so good, we spent more time in deliberation, generated more e-mails and correspondence, and had a harder time deciding than any other year since the committee was formed. We would have been happy to make the award to any of this year's applicants—each one of them was certainly worthy. In the end we selected Ryan B. Lucas, a student at the University of Alaska Anchorage. In addition to his coursework and helping a PhD student with work on the genetics of sticklebacks, Ryan has been working as a night janitor to help put himself through school. Our thanks to all of the students who applied.

Ryan Lucas 2012 Molly Ahlgren Award Recipient

When I was told I had received the Molly Ahlgren Undergraduate Scholarship, I could not believe I had been chosen. Although I have received grants before, this was my first scholarship. I am very thankful for this opportunity. This was also my first time to Kodiak. For having lived in Alaska for 18 years, I was surprised how different the

landscape of Kodiak was from the Alaska that I know (Anchorage and the Mat-Su Valley). I have never before seen mountains and forest quite like those in Kodiak. Unfortunately, I was not able to attend the AFS meeting for the whole week, but I really enjoyed the days I was able to attend. I was able to meet many people who shared my interest and passion for science and nature. I thoroughly enjoyed all of the presentations I attended. I look forward to being able to present my own research in the future. While I was at the meeting, I was fortunate to learn about Molly Ahlgren from her friends. There are those people throughout history whom we wish we had been fortunate enough to meet, and Molly Ahlgren was one of these people. I would like to thank Molly Ahlgren's family for this opportunity, the Molly Ahlgren awards committee for choosing me, and all of the members of the Alaska Chapter of the American Fisheries Society for such a warm welcome. I would also like to extend special thanks to Lee Ann Gardner for all of her help and assistance, to Hal Geiger, and the other two gentlemen I talked with at the social. I look forward to seeing you all next year if not sooner. ♡



Hal Geiger presents Ryan Lucas with the 2012 Molly Ahlgren Award. Photo by Jason Neuswanger.

2013 Call for Chapter Award Nominations

Theresa Tanner and Kenneth Gates

The Alaska Chapter is currently soliciting nominations for the Meritorious Service Award (MSA), the Chapter Service Award (CSA), the Almost Darwin Award, and the Wally Noerenberg Award for Fishery Excellence. We encourage all members to consider deserving individuals and to submit nominations for these awards. Please use the form at <http://www.afs-alaska.org/awards-scholarships> to make your nominations. Award presentations from this call for nominations will occur at the 2013 Annual Meeting. NOMINATIONS MUST BE SUBMITTED BY JANUARY 31, 2013.

Nominations for the MSA can be based on an outstanding contribution in any area of Alaska fisheries, including research, management, education, planning, industry, and policy development. Nominations do not have to come from AFS members, nor do nominees need to be active members. The contribution or accomplishment of the candidate must be recent and not the result of many years of effort; recognition of career-long contributions is more appropriate for the Wally Noerenberg Award. The Awards Committee will select winners based on strength of the nomination and the accomplishment.

The CSA was established to award outstanding service to the Alaska Chapter of the American Fisheries Society. These candidates should have been involved in some or all of the following activities: active participation in standing or ad hoc committees; made important contributions to advance the current objectives, long-term goals, or stature of the Chapter and fisheries professionals; contributed a significant amount of time to Chapter activities; improved public awareness of the Alaska Chapter and Chapter activities; encouraged development of students as fisheries professionals through recruitment and involvement as Chapter members; and recruited fisheries professionals as Chapter members. Submit MSA and CSA award nominations and letters of support for nominations to Theresa Tanner, USFWS, 605 W 4th Ave., Rm G-61; Anchorage, 99501, 271-1799, *theresa_tanner@fws.gov*.

The Almost Darwin Award recognizes the most humorous and outrageous fisheries faux pas of any fisheries professional. The nominees must have committed the faux pas within the last calendar year. Please include a photo of proof along with the story. Submit award nomination stories and photos to Theresa Tanner at the above address.

The Wally Noerenberg Award for Fishery Excellence, the highest award of the Alaska Chapter, is bestowed as a special honor on individuals who have made great and outstanding contributions to Alaska fisheries. This award was established in 1981 by resolution of the membership. The membership has also set, by resolution, specific guidelines for the Wally Noerenberg Award Committee. Nominee contributions may include scientific research; technological development; species and habitat management; innovations

in harvesting, processing, or marketing; academic and fishery education; or involvement in national and international affairs affecting Alaska fisheries. Submit Wally Noerenberg Award nominations and letters of support for nominations to Ken Gates, USFWS, Kenai Fish and Wildlife Field Office, 43655 K-Beach Road, Soldotna, AK 99669, 260-0126, *kenneth_gates@fws.gov*.

Rewarding excellence is an enjoyable but challenging task and finding judges is a challenge too. If you would like to help out, the Chapter is soliciting members for the Awards Committee. If you are interested in being a part of this committee please contact Theresa Tanner.

The application form for the 2013 Chapter awards is available online via the “Awards” link at: <http://www.afs-alaska.org/awards-scholarships>.



*Annual Chapter meeting attendees tour the US Coast Guard base.
Photo by Bill Bechtol.*

2012 Committee Reports

Cultural Diversity

Sara Gilk-Baumer, Committee Chair

The Cultural Diversity Travel Award helps fund entry-level applicants who are involved in the natural resource field to attend the annual Alaska Chapter conference of the American Fisheries Society (AFS). The committee selects the top candidate(s) and then tries to get as many recipients to the meeting as possible depending on the meeting location and where the candidate(s) reside. The main goal of this committee has been to help diversify our Chapter membership and get young up-and-coming people active with AFS. I solicited applications from around the state and received applications from eight highly qualified individuals. After scoring applications with a panel of anonymous judges, we were able to fund two candidates for the 2012 meeting in Kodiak: Casie Stockdale (Bethel) and Danielle Duncan (Juneau).

Casie Stockdale is a fisheries biologist with the Association of Village Council Presidents (AVCP) in Bethel. She serves as a representative for the AYK region on advisory panels including the Joint Technical Committee for the Yukon Panel and the Advisory Panel for the Western Alaska Salmon Stock Identification Project. She has served as a co-investigator on several subsistence sampling projects operated by AVCP, and assists AVCP with communicating with member villages on subsistence issues affecting tribal members. Impressively, she planned and hosted the AVCP “State of Our Salmon” special convention in March 2012, which featured over 30 speakers and was attended by over 150 participants. Her primary area of interest is on the human dimensions of fisheries, and she plans to both continue building the AVCP fisheries program through development of cooperative research projects, and to pursue further education through the University of Alaska.

Danielle Duncan is a Master’s student at the University of Alaska Fairbanks, School of Fisheries and Ocean Sciences in Juneau. In her research, she has worked cooperatively with UAS, UAF, and NMFS to study the toxicity of creosote-treated pilings on herring embryos and larvae. She has also worked for the NMFS lab in Juneau to gather data for hydrocarbon studies, including crude oil toxicity to herring and salmon embryos. Her

primary research interests are on the effects of anthropogenic aquatic pollution, especially the effects of contaminants and pollutants on fisheries, and she hopes to work in a state or federal agency managing and/or researching fisheries.

Environmental Concerns

Cecil Rich, Committee Chair

The Environmental Concerns Committee was established by the Executive Committee to provide coordinated technical and policy analysis and Chapter input and comments on environmental issues that affect Alaska’s fishery resources.

In 2012, one issue was brought to the committee, a request by Dr. Rick Steiner that the Chapter support possible future legislation to create a scientific advisory council to advise the state on fisheries and other environmental issues. The ExCom discussed this issue and was in general consensus that there are sufficient advisory groups on fisheries issues in Alaska and that they did not see a need to support this proposal.

Financial Assets Oversight

Ray Hander (Committee Chair), Tim Joyce, and Lee Ann Gardner

A summary of changes in Chapter assets for the period September 30, 2011 to September 30, 2012 is provided in Table 1. Guidance to the Financial Assets Oversight Committee (FAOC) is provided in the Chapter’s Procedure Manual under the Chapter Financial Plan within the Chapter Investments section. The purpose of the FAOC is to oversee, advise, and make recommendations for directing the financial assets of the Chapter by way of tracking the Chapter’s monetary holdings that are invested through financial or banking institutions.

In 2012, the FAOC met quarterly with the Chapter’s Wedbush Morgan Securities (WMS) representative, Todd Fletcher, to receive portfolio status updates and conduct maintenance of accounts as needed to conduct Chapter business. Lee Ann Gardner, Treasurer, is in frequent contact with WMS as she conducts day-to-day Chapter business and informs finance committee members with information on an as-needed basis.

The Chapter’s WMS portfolio is invested

Continued on next page

2012 Committee Reports, continued

using a moderately conservative strategy with an investment horizon of 7 to 10 years as determined by

the Finance Committee in members in consultation with the WMS investment representative.

Table 1. Alaska Chapter assets summary from the period September 30, 2011 to September 30, 2012.

Account Name	Sep. 30, 2011	Sep. 30, 2012	Contributions	Disbursements
Cultural Diversity	\$15,881	\$17,125	\$0	\$876
Wally Noerenberg	\$18,818	\$18,066	\$0	\$2,000
Molly Ahlgren Scholarship Fund	\$91,217	\$119,813	\$11,155	\$2,000
Chapter Investment Fund				
Fund A	\$86,045	\$54,452		
General funds				
Money Market Checking ^a	\$449	\$14,022	n/a	n/a
1st Nat. Bank of AK Cash Acct. ^a	\$670	\$27,959	n/a	n/a
Total assets	\$213,080	\$251,437	\$11,155	\$4,876

^a Balances fluctuate with annual meeting and continuing education income and expenses.

Oncorhynchus Newsletter

Bill Bechtol, Editor

The *Oncorhynchus* serves as a medium to distribute information to AFS Alaska Chapter members and other interested individuals. The newsletter is produced by editor, Bill Bechtol, who compiles articles submitted by Chapter members, then sends the articles to Connie Taylor of Fathom Publishing who designs, lays out, and mails the newsletter. The AFS style conventions described at http://www.fisheries.org/afs/publications_style.html are generally followed. Prior to finalizing the newsletter, the Alaska Chapter President, the Electronic Communications Committee Chair, and other individuals make final edits.

Submissions of articles for inclusion in the newsletter are solicited quarterly via the Alaska Chapter list-serve; high-resolution photos are encouraged. Newsletter submission deadlines are the 10th of March, June, September and December. Each issue includes a front-page feature

article, including two or three photos. An effort is made to distribute feature article authorship among organizations. Feature articles, by issue, in 2012 were:

Winter (Vol. 32 no. 1) "Fish TV: Using Video to Remotely Monitor Salmon Escapement" – Ted Otis

Spring (Vol. 32 no. 2) "Sharks in Alaska – Really?" – Kenneth J. Goldman

Summer (Vol. 32 no. 3) "Predicting Subsistence Demand in the AYK Salmon Fisheries: People, Dogs, and Fish" – Robert J. Wolfe

Fall (Vol. 32 no. 4) "The Alaska SeaLife Center Aquariums at Fourteen" – Richard Hocking

During 2012, the four issues were each published near the beginning of each calendar quarter. Issues were largely distributed electronically, although 65 paper copies of each issue were printed with most mailed to subscribing libraries or per individual request, and the balance retained for Chapter archival. Total newsletter publication and distribution costs for 2012 were \$1,640.31.

If you have a newsletter contribution, please contact Bill Bechtol (299-6146, bechtolresearch@hughes.net). 

Vol. (Issue)	Hard-copies mailed to AK Chapter members	Hard-copies mailed to libraries, Parent AFS officers, AK congressional members, AFS Division newsletter editors, etc.	Email distribution to AK chapter members	Total distribution
32 (1)	9	37	494	540
32 (2)	14	36	549	599
32 (3)	8	36	388	432
32 (4)	8	36	423	467

Using Citizen Scientists to Build Community Stewardship: Sampling Juvenile Chinook Salmon in the Lower Chena River

Jessica Armstrong

The Chena River Chinook salmon (*Oncorhynchus tshawytscha*) return is one of the largest in the Alaska portion of the Yukon River. The lower river flows through downtown Fairbanks, the 2nd largest city in the state. Surprisingly, many area residents don't realize that this river provides very important spawning and rearing habitat for Chinook salmon and resident species like Arctic grayling (*Thymallus arcticus*). In the summer of 2011, the U.S. Fish and Wildlife Service (USFWS) teamed with local residents to conduct a pilot outreach and education project to learn more about juvenile fish, especially Chinook salmon, in the Chena River. The project was so successful that the USFWS partnered in 2012 with the Tanana Valley Watershed Association (TVWA) to include more sites and volunteer samplers. For both years, the objectives were to: (1) use outreach and education to increase the Fairbanks community's awareness and appreciation for the Chena River Chinook salmon population; (2) use citizen scientists to collect relative abundance information about juvenile fish; and (3) promote stewardship of these important resources throughout the community.

Citizen scientists were recruited from a diverse mix of local families, homeschooled groups, landowners, and University of Alaska and high school students. These scientists used minnow traps to conduct weekly sampling. All captured fish were identified to species, tallied, and released. In 2011, 57 citizen scientists (37 youth and 20 adults) sampled an

average of seven sites weekly from April 29 to October 6, for an estimated 278 hours spent setting and checking traps. In 2012, improved recruiting increased the number of citizen scientists to 124 (77 youth and 47 adults), sampling an average of 13 sites weekly for an estimated 494 hours of effort from 15 May to 1 October 2012. A total of 779 fish were caught in 2011, including 194 Chinook salmon (24% of total) although the most frequently captured species was slimy sculpin (*Cottus cognatus*, 61% of total). We also caught burbot (*Lota lota*), lake chub (*Couesius plumbeus*), Alaska blackfish (*Dallia pectoralis*), lamprey (*Lampetra sp.*), longnose sucker (*Catostomus catostomus*), Arctic grayling, and round whitefish (*Prosopium cylindraceum*) (less



Instilling environmental stewardship in future generations. Photo provided by Jessica Armstrong.

than 5% each). In 2012, we caught almost twice as many fish for a total of 1,511 captures, but did not capture Arctic grayling or round whitefish. The most frequently captured species in 2012 was Chinook salmon (849, 56% of total), with slimy

Continued on next page

Using Citizen Scientists, continued

sculpin ranking second at 37% of the total. Burbot, lake chub, lamprey, Alaska blackfish, and longnose sucker were also captured (less than 5% each). Waters near the Moose Creek Dam provided the highest catches of juvenile Chinook salmon during the project and accounted for 42% of the catch in 2011 and 92% in 2012.

Using citizen scientists as part of an outreach and education program was successful because this approach: (1) engaged the public and provided a weekly vehicle for discussions about Chinook salmon and healthy habitats; (2) educated youth and adults about proper fish identification and handling techniques; (3) provided information to guide future studies; and (4) connected the samplers with their local fishery resources, thereby inspiring stewardship and a sense of ownership and pride. The success of this approach was further reinforced in a post-project evaluation in which sampling groups described the enjoyment of being outside each week and the satisfaction in seeing children learn how to handle fish. Another fulfilling aspect noted by the groups was participating in a project that added to the overall knowledge about Chinook salmon in the Chena River.

The Chena River is an important resource for local stakeholders and the fish and wildlife that depend on its habitat. Developing a sense

25-Year Members

In 2009, the American Fisheries Society began to issue commemorative pins to recognize individuals that have been members for 25 years or more. The following AFS Alaska Chapter members have belonged to the American Fisheries Society for at least 25 years and were newly recognized at the October 2012 Alaska Chapter meeting banquet. Congratulations! ☺

25-Year Member	City	Joined
Jeff Adams	Fairbanks, AK	1987
Raymond Beamesderfer	Oregon City, OR	1984
Donald Kramer	Surry, BC	1982
Jason Mann	Surrey, BC	1987
Andrea Hough Tesch	Fort Richardson, AK	1987
Brenda Wright	Juneau, AK	1987

of community stewardship for the river will encourage landowners and managers to make well-informed decisions about future land use and natural resource management. Citizen scientists can play an important role in developing this sense of stewardship.

Special appreciation is extended to all citizen scientists who made this project a success. Appreciation is also extended to TVWA technicians Susan Port and Irene Holak for leading the sampling in 2012. Additional thanks goes to the USFWS Fairbanks Field Office. Project funding was provided by the USFWS and by the National Oceanographic and Atmospheric Administration's Pacific Coastal Salmon Recovery Funds, administered by the Alaska Department of Fish and Game, and by the Alaska Sustainable Salmon Fund in 2011 and the USFWS and the U.S. Yukon River Salmon Research and Management Fund RM 32-12 in 2012. The use of commercial products does not constitute endorsement or recommendation for use by the federal government.

Jessica Armstrong is a Biological Technician with the U.S. Fish and Wildlife Service, specializing in fisheries-focused environmental outreach and education. She is also pursuing a Master's degree at the University of Alaska-Fairbanks. ☺



Newly installed Chapter president Mark Wipfli acknowledging outgoing President Trent Sutton. Photo by Jason Neuswanger.

The Steven Berkeley Marine Conservation 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, 2013. For more information and application requirements see http://sfrc.ufl.edu/mfs/index_files/Berkeley_Fellowship.htm.

Hydroacoustic Courses

The following training courses for acoustic tagging and hydroacoustic assessments are co hosted by HTI and the University of Washington (UW) Student Chapter of the American Fisheries Society at the UW School of Aquatic and Fishery Science. Both courses are presented at the University of Washington in Seattle. A 50% tuition discount is available to non-profit and tribal organizations at http://www.htisonar.com/Training_Special_Offer.htm. For more info, visit http://www.HTIsonar.com/at_short_course.htm or email support@HTIsonar.com.

Using Acoustic Tags to Track Fish - February 7–8, 2013 from 9 a.m. to 5 p.m.

This short course addresses all aspects of tracking fish movement with acoustic tags, including three-dimensional tracking with sub-meter resolution. The course includes hands-on-operation and a variety of applications are covered. Course tuition is \$300. Lunch is provided both days.

Using Hydroacoustics for Fisheries Assessment - February 14–15, 2013 from 9 a.m. to 5 p.m.

The hydroacoustic short course covers mobile and fixed-location survey techniques, and subjects include basic hydroacoustic theory, deployment logistics, data collection and processing, as well as typical results. Split-beam, single-beam, and multi-beam frequency techniques are discussed in detail. Course tuition is \$300. Lunch is provided both days.

Native Fish of Alaska Series#3 T-Shirt

Lisa Stuby

Being unveiled at the recent Alaska Chapter annual meeting in Kodiak, the Native Fish of Alaska Series #3 t-shirts, designed by Karen Lybrand, are a hit! A vote at the 2010 Chapter meeting banquet in Juneau selected the Alaska king crab as the native Alaskan “fish” for the Series #3 t-shirts. The t-shirt is black with the back depicting aspects of the Alaskan king crab life cycle and the Chapter logo on the front. ALL proceeds from Series #3 t-shirts will go to student travel to future Alaska Chapter meetings. So in addition to wearing something cool, you will be helping the future generation of fisheries professionals. All sizes are currently available as either short-sleeved or long-sleeved t-shirts. Costs are \$25 for short-sleeved and \$30 for long-sleeved t-shirts, with shipping costing an additional \$5 (more for international postage). Ordering instructions can also be found on the AFS



Alaska Chapter website at: <http://www.afs-alaska.org/online-order-form> under “Online Orders”.

Meetings and Events



Alaska Marine Science Symposium

January 21–25, 2013: This meeting will be held in Anchorage, AK. For more information, please visit <http://www.alaskamarinescience.org/>.

Responses of Arctic Marine Ecosystems to Climate Change

March 26–29, 2013: This meeting will be held in Anchorage, Alaska. For more information, please visit <http://seagrant.uaf.edu/conferences/2013/wakefield-arctic-ecosystems/index.php>.



7th International Fisheries Observer and Monitoring Conference LOGO 7th IFOMC

April 8–12, 2013: This meeting will be held in the city of Viña del Mar, Chile. For more information, please visit www.ifomc.com.



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 spring issue of *Oncorhynchus* is March 10.

Annual Meeting of the American Fisheries Society Western Division

April 15–18, 2013: This meeting will be held in Boise, ID. For more information, please visit <http://www.wdafs.org>.



Migration and Survival Mechanisms of Juvenile Salmon and Steelhead in Ocean Ecosystems

April 25–26, 2013: This International Workshop sponsored by the North Pacific Anadromous Fish Commission will take place in Honolulu, HI. More information is available at http://www.npacfc.org/new/events/workshops/workshop2013/workshop_home.html.

International Conference on Engineering & Ecohydrology for Fish Passage

June 25–27, 2013: This meeting will be held at Oregon State University in Corvallis, OR. For more information please see: <http://fishpassage.umass.edu/>.



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