



ONCORHYNCHUS

Newsletter of the Alaska Chapter, American Fisheries Society
Vol. XXXVI Spring 2016 No. 2

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Mass mortality of razor clams thought to be driven by a storm event at Ninilchik in eastern Cook Inlet, November 2010. Photo by Jamie McKellar.

Digging into a Dilemma — Cook Inlet Razor Clams

Carol Kerkoliet and Michael Booz

In sandy intertidal beaches of Cook Inlet, Pacific razor clams (*Siliqua patula*) are found in large concentrations along eastern Cook Inlet between the Kasilof and Anchor rivers and along western Cook Inlet from Polly Creek to Crescent River. Cook Inlet's eastern beaches have supported Alaska's largest sport and personal use razor clam fishery, whereas western beaches have supported the state's largest commercial razor clam fishery. But in recent years, razor clams in eastern Cook Inlet have declined substantially, with the razor clam sport and personal use fisheries closed since 2015 from the Kenai River to the tip of the Homer Spit. So what has driven these declines?

To begin, one must first consider general razor clam biology. Razor clams are dioecious with both sexes first maturing at ~80 mm shell length in eastern Cook Inlet. Maximum age in Alaska is 18 years. Growth varies by location with size-at-maturity occurring at age -3 or -4 at Ninilchik compared to age -2 at Clam Gulch. Spawning in eastern Cook Inlet occurs in late July and August with the broadcast of 6–10 million eggs/female clam coinciding with sperm broadcast from males; large females are more fecund. Razor clams in eastern Cook Inlet spawn over multiple years, but might not spawn annually (McKellar 2014). Larvae drift from six weeks to over two months before settling to the substrate as juveniles. Juvenile razor clams live in the top few centimeters of substrate and are more exposed to heavy wave action and changes in temperature and salinity than adults. Mechanisms of razor clam recruitment to eastern Cook Inlet beaches are unknown.

Regulations for east side fisheries have remained fairly consistent since the 1960s. For most years, gear

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The President's Corner

Mary Beth Loewen



Mary Beth Loewen, AFS Alaska Chapter President.

Here on Kodiak (aka, The Island that Winter Forgot) it seems like spring is coming early, and with it, a bit more energy around the office. Reports have been written and published about prior research, field logistical plans are starting to be mapped out, blueberries are already blooming, and people are beginning to look ahead to long summer days that bring a chance to get rejuvenated and get your hands on fish (or get in and on the water, or at least have some sunshine coming in those lab windows). In addition to planning summer adventures and successful projects, it's also a great time to increase your involvement in the fisheries community, perhaps beyond your specific study area. More than ever, the voices, insights, and experiences of Alaska's fisheries community are needed to direct the future of our state.

Perhaps the best way to get involved is to increase your activity within the Chapter, beyond just presenting and networking at the annual meeting. While the annual meeting is the cornerstone of our Chapter activity, the Alaska Chapter is busy year-round, and there are multiple ways to make AFS an active part of your work beyond that single meeting week. Several standing and ad hoc committees are always looking for new members to add variety and share the workload. A listing of Chapter

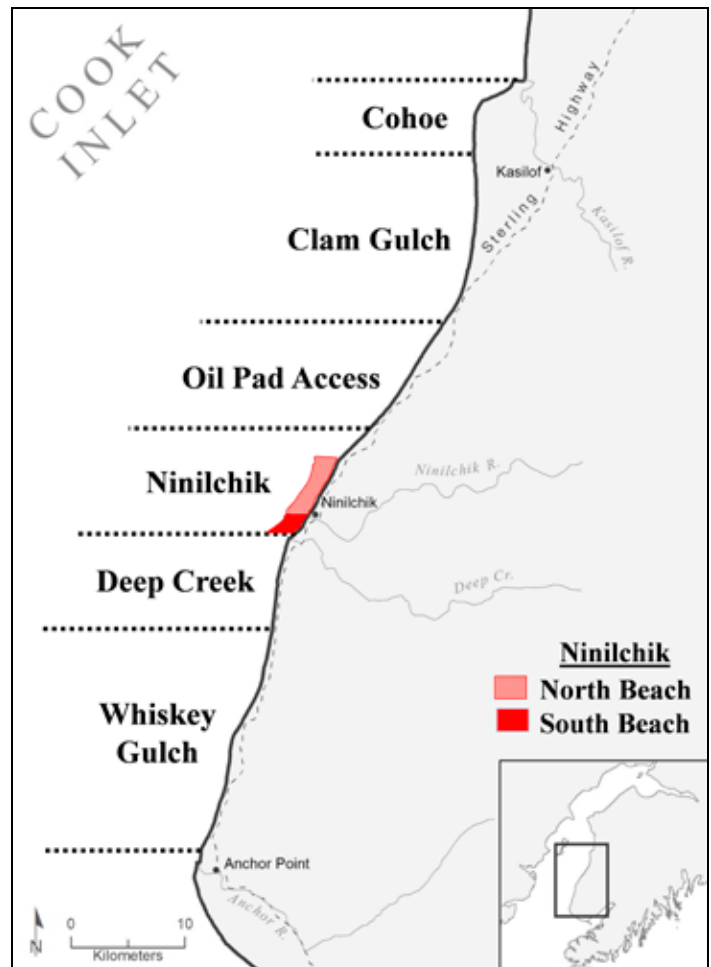
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Cook Inlet Razor Clams, continued

was limited to shovels, rakes, clam guns, or hand digging, and the bag limit was the first 60 razor clams dug. This limit was considered so liberal that many diggers were incapable of achieving the limit (D. Nelson, ADF&G, unpublished report). Razor clams can be dug year round; however, most effort occurs from May through August on tides lower than -2.0 ft.

Monitoring: The Alaska Department of Fish and Game Division of Sport Fish (ADF&G) began managing the razor sport fishery on the east side of Cook Inlet after the 1964 earthquake caused subsidence of Cook Inlet beaches. Eastern beaches were delineated into six major areas based on beach characteristics and their major access points. Within each area, specific beaches were identified. Razor clam studies focused on fishery management and stock monitoring. Several long term data sets

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Razor clam beaches along the east side of Cook Inlet. Figure from ADF&G.

The President's Corner, continued

committees and committee chairs may be found at <http://www.afs-alaska.org/about-us/committees>. Two of the more active year-round committees include the Cultural Diversity and Environmental Concerns committees. The Environmental Concerns Committee, chaired by Bert Lewis, is frequently asked to consider a variety of topics which require expert input on subjects ranging from salmon to stream flow inputs, and old-growth timber to ocean acidification. Contact Bert Lewis or Nicky Szarzi if you are interested in adding your contributions to this committee. The Cultural Diversity committee, chaired by Sara Gilk-Baumer, awards scholarships to undergraduate fisheries students, and is involved in encouraging and sustaining involvement in fisheries by women and underrepresented minorities. Contact Sara if you'd like to help our Chapter membership become stronger and more diverse, and encourage the success of our undergraduate students.

A new committee for Chapter fundraising is in the works, and will be recruiting creative, committed members who really want to help ensure our Chapter's financial future. Anyone is welcome to join this new committee, from students to retirees, and we hope to start a new phase of robust financial development that could offset unexpected fluctuations in the stock market. Feel free to contact me if you are interested in getting in at the ground floor of this new, active committee.

Beyond the Chapter, take time to share your experience and expertise with our fisheries future through participation in local science camps or sharing your time with summer school programs. Consider becoming a Hutton Mentor, a summer mentoring program for high school students designed to stimulate interest in careers in fisheries science and management among groups underrepresented in the fisheries professions. (more information is at <http://fisheries.org/about/committees/hutton-committee/>) or look closer to home, such as: the Juneau Economic Development Council's summer camps for the STEM (Science, Technology, Engineering, and

Math) program; the "Girls Rock," "Girls on Ice," or "Bright Girls" summer camps; "Salmon Camp" through the Kodiak National Wildlife Refuge; assisting with Homer's Center for Coastal Studies; working with environmental education programs through USFWS; volunteering with scout troops; or the many, many other programs happening in your home community. Donating even a half-day of your time to showcase your work and interact with future scientists can be a lasting contribution to the youth attending these summer programs, and may make an impactful difference in determining whether students choose to pursue a career in a field of science.

Beyond our state, there are myriad opportunities to get involved. The 146th AFS Parent Society meeting will be held in Kansas City, Missouri from August 21 to August 25. I've never been to Missouri, but it's probably pretty great, and even better if you can surround yourself with fishy folks while you're there. The Parent Society has been seeking member input on two sets of changes to the AFS Constitution and Rules: one change to clarify the current duties and roles of the Governing Board and Management Committee, and the other to form a new Imperiled Aquatic Species Section. I find the policy page of the Parent Society a great place to keep informed on how things are shaping up with fish and habitat on the national stage.

Closer to home, the Alaska Chapter will be hosting the 2018 AFS Western Division meeting in Anchorage! We have had some awesome Chapter members already volunteer to help plan the meeting, but we are going to need a tremendous effort from many, many people. Meeting committees will likely include Program, Hotel and Venue, Fundraising, Socials, and many more. Planning begins soon! Please contact Aaron Martin or myself if you are willing to help plan and pull off the Western Division meeting.

Finally, there's no way to avoid the dire financial situation Alaska is in right now. I urge every Chapter member to educate themselves on the state budget, including potential cuts or sources

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The President's Corner, continued

of revenue. We hear it all the time, but it really is important to contact your representatives and let them know the critical needs for science-based management, strong research programs, and prioritizing our natural, biological systems. There's no way everyone can have it all, but it's very important that our state decision-makers understand the importance of a strong, experienced fisheries community within the state. You can find contact information for our State Legislature, as well as our Congressional Delegation, at <http://w3.legis.state.ak.us/pubs/doso.php>.

If you truly don't think you have the time to commit to serving on a committee, feel powerless to shape politician decisions, and are overwhelmed with setting up field work, but still want to contribute, here's a perfect opportunity. Help out your Alaska Chapter by taking ten minutes to find a great photo of your work, and

send it to our webmaster, Audra Brase, in order to augment and update our website. The website continues to evolve, and is only as good as the content contributed by Chapter members. Later this summer we will be hosting a photo contest on the website, so keep that in mind as you head out into beautiful Alaska. Alternatively, simply encourage your colleagues to renew their AFS membership or sign up as new members. Or, even more straightforward, send me an email at marybeth.loewen@alaska.gov and tell me what you think your Chapter Executive Committee needs to know. Having members pass along information from past meetings, committees, and member discussions has been incredibly helpful this year, and I hope to gather more information from as many long-term members as I can.

Stay safe, collect great data, and have a pleasant start to summer 2016. ☺

Cook Inlet Razor Clams, continued

used to monitor fishery and razor clam population trends include: 1) harvest and effort (digger-days) since 1969 for specific beaches in eastern Cook Inlet; 2) the distribution of diggers among specific beaches, assessed through aerial surveys since 1970; 3) since 1969, harvest success (clams per digger-day; CPUE); 4) since 1977, age and length composition of the harvest for most beaches; and 5) since 1989, periodic surveys of the abundances of the estimated mature (≥ 80 mm shell length) and juvenile (< 80 mm) clams on beaches in the Clam Gulch, Oil Pad Access, and Ninilchik areas.

Harvest, Effort, and Population Trends, 1969–2008:

Fisheries on eastern beaches were historically managed in unison with blanket regulations for all beaches. Total harvest and effort peaked in the mid 1990s, before steadily declining. Harvest success, was relatively stable during 1969–2001, averaging 29 clams/digger-day, then declined to 18 clams/digger-day during 2002–2008. During 1969–2008, the fishery focused on the Clam Gulch and Ninilchik areas. Clam Gulch accounted for 46% of harvest and 54% of effort from east side beaches during 1969–1984. But due to availability of larger clams and more abundant large clams, harvest and effort shifted in the 1980s to Ninilchik, which accounted for 54% of harvest and 49% of effort during 1985–2008. In general, a broad range of ages was present in the areas. The annual razor clam harvest was comprised of 8–12 age classes (broods) among areas. Annual age-length compositions for beaches within areas suggested the fisheries were supported by strong recruitment classes (Szarzi and Hansen 2009). Both the average and the most prevalent age classes differed among areas, but were in the range of 4–6 years for most areas.



Recreational diggers on the east side of Cook Inlet. Photo by Carol Kerkvliet.

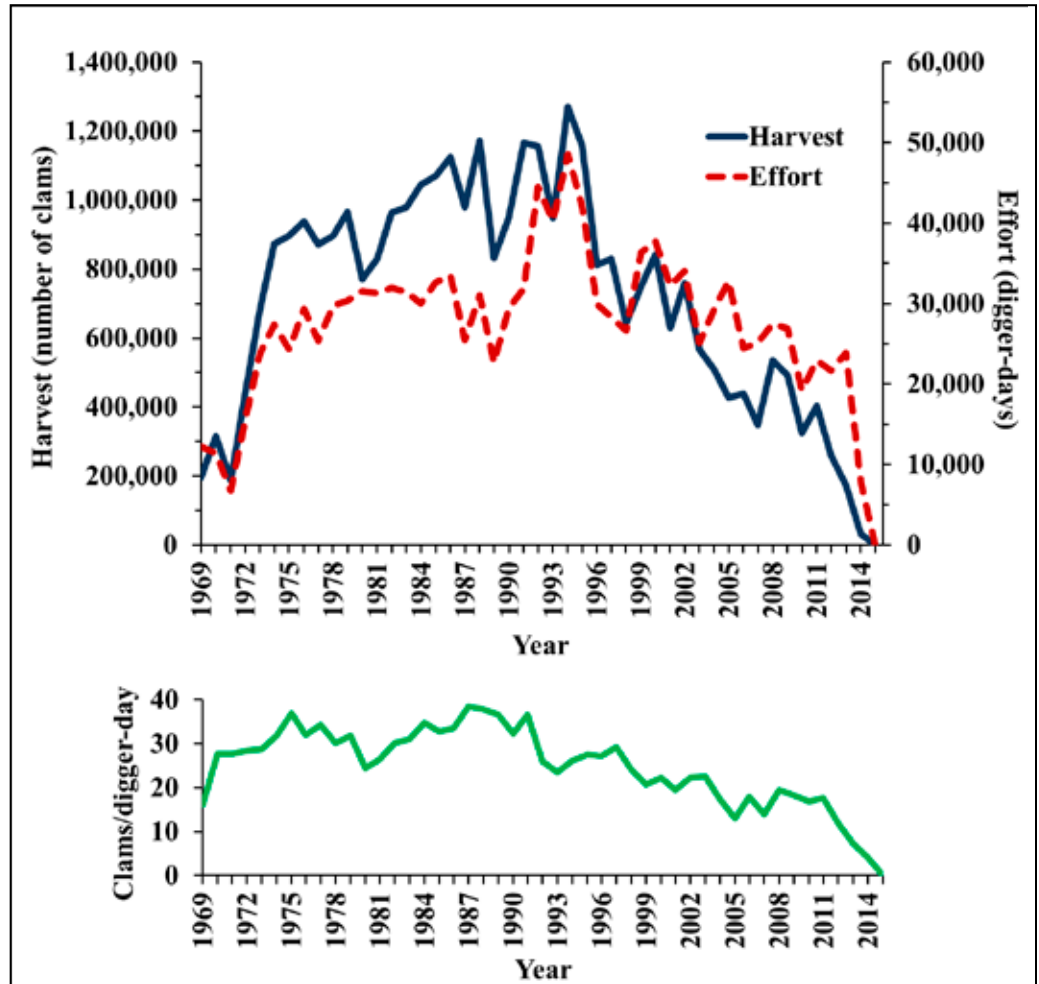
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Cook Inlet Razor Clams, continued

Following the harvest and effort shift from Clam Gulch to Ninilchik, periodic abundance surveys were implemented in 1989 to inform better management. Surveys were designed to estimate the abundance of mature and juvenile razor clams for the beaches with the highest harvest so exploitation could be assessed. Abundance surveys were conducted concurrently with the fishery from May through August. Because a clam smaller than 20-mm in shell length is difficult to detect during these surveys, juvenile razor clams were considered to be underestimated. For the Clam Gulch area, annual abundance ranged from 2.9 to 10.0 million mature razor clams with a harvest rate $\leq 10\%$ based on four surveys conducted during 1989–2008. For the Ninilchik

area, abundance ranged from 750,000 to 3.6 million mature razor clams for the seven surveys conducted during 1990–2005. For some years, exploitation exceeded 25%, which caused concern because it exceeded the harvest rate estimated as “sustainable” for Washington State razor clam fisheries (Szarzi *et al.* 2010).

Harvest, Effort, and Population Trends, 2009–present: The strategy of managing east side fisheries in unison continued through 2012, but was refined when declines in productivity were observed. East side harvest and effort continued to decline from 2009 to 2014, and the fishery has been closed since 2015. While the fishery was open during 2009–2014, CPUE averaged 13 razor clams/digger-day, but reached a low of four razor clams/digger-day in 2014. During 2009–2013, digging continued to focus on Ninilchik, which accounted for 64% of the harvest and 51% of the effort. Closure



Annual harvest and effort in the recreational/personal use razor clam fishery (top figure) and CPUE (bottom) between the Kasilof and Anchor rivers, 1969–2015. Figure from ADF&G.

of the Ninilchik beaches in 2014 resulted in a shift of the harvest to other areas, with Deep Creek supporting the greatest percentage (33%) of the annual harvest and effort.

Age and length compositions from the six major areas indicated fewer age classes with a shift toward younger clams. Abundance surveys were not conducted in 2009 or 2010, but resumed in 2011 after a large die-off of razor clams was observed in November 2010 on the Ninilchik beaches. The die-off

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

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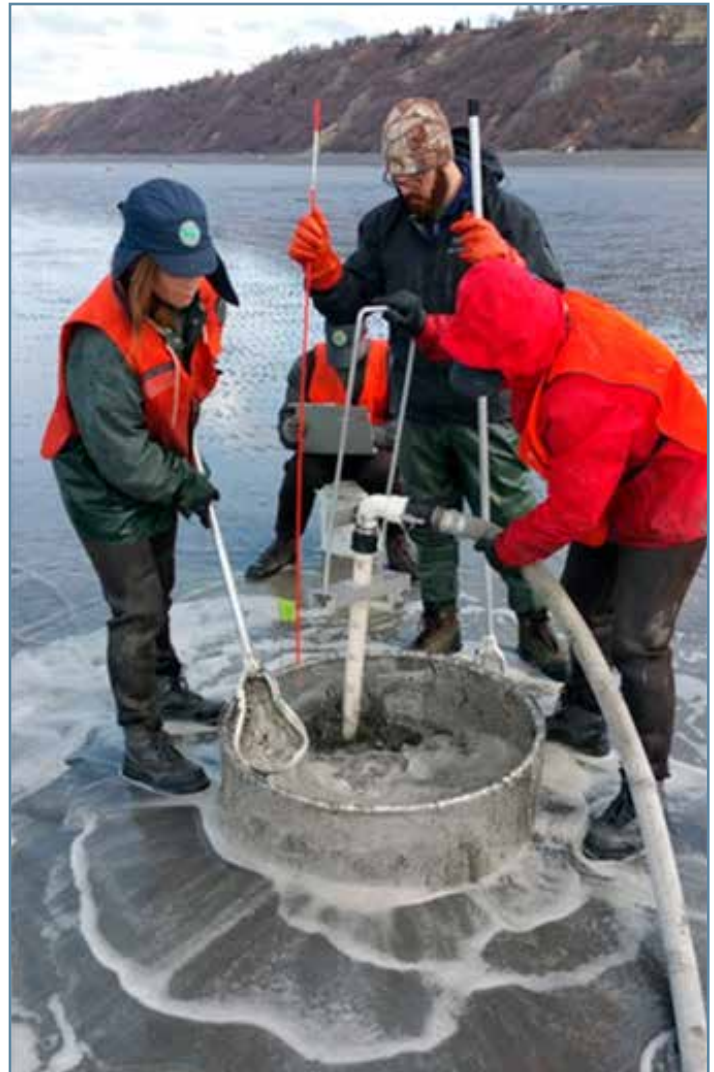
Deadline for materials for the next issue of *Oncorhynchus* is June 10.

Cook Inlet Razor Clams, continued

likely resulted when surf from a large storm displaced clams from the substrate. Razor clams observed in the die-off were primarily age-2 and had likely reached maturity and spawned the previous summer.

The 2011 abundance survey, involving collaboration among ADF&G and Alaska Pacific University (APU) marine biology researchers, occurred in April and May prior to months when most harvesting occurs. This survey produced separate abundance estimates for the Ninilchik North and South beaches. To facilitate comparisons among data sets, historical abundance estimates were reanalyzed and standardized to produce separate estimates for the Ninilchik North and South beaches instead of simply by the Ninilchik area. This reanalysis involved using more refined digger distribution data from the aerial survey to estimate exploitation by beach section. Results from the 2011 abundance survey revealed high abundances of mature razor clams on both beaches despite the die-off. The abundance of 1.2 million mature clams at Ninilchik North was the third highest on record with a harvest rate of 16%. The abundance of 1.6 million mature clams on Ninilchik South was a record high with a low 6% exploitation. However, most of the clams were represented by a single age class. This concern triggered continued collaboration with APU to survey Ninilchik South annually and continue surveys of Clam Gulch South and North (surveyed in 2014 and 2015), Ninilchik North (2015), and Oil Pad Access North (2015).

In 2012, to better assess the status of east side Cook Inlet razor clams, we focused on Ninilchik South. Surveys were refined to estimate abundance by age class so natural mortality and recruitment could be better assessed. The 2012 abundance estimate was 600,000 mature clams, representing 1.0 million fewer mature razor clams than in 2011, and harvest accounted for 98,000 clams (16% exploitation), but the survey and harvest were again comprised primarily of a single age class with little recruitment evident. Concerns continued during 2013–2015 when mature razor clam abundances reached historic lows of 66,000–90,000. Natural mortality varied annually by brood year, was generally highest for older clams, but was consistently high at 45%–80%.



Biologists survey razor clams along eastern Cook Inlet. Photo from ADF&G.

Reduced abundances of mature-sized razor clams were also observed at Clam Gulch North and South in 2014 and 2015, Ninilchik North in 2015, and Oil Pad Access North in 2015. During these years, abundances were 90% below historical averages. From 2014 to 2015, preliminary estimates of natural mortality of mature razor clams at Clam Gulch ranged between 68% and 78%.

Reanalyzing historical abundance data to assess recruitment had limitations, but highlighted that recruitment is highly variable among beaches and years. Generally, Clam Gulch beaches had more consistent recruitment while Ninilchik beaches were more variable. Periodic and imprecise assessments limited detection of major recruitment events to Ninilchik beaches despite observations of select age classes in the harvest age composition as cohorts recruited to the fishery. To assess

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Cook Inlet Razor Clams, continued

recruitment to the beach and fishery, a brood year was assigned to age composition samples and then applied to the corresponding harvest for each Ninilchik beach. Results highlighted that annual harvests at Ninilchik beaches were supported by broods that recruited to the fishery every 2–4 years. This pattern continued from the early 1980s through the mid 2000s.

Decreased abundance of mature clams, coupled with high natural mortality and poor recruitment, triggered emergency orders (EOs) to restrict fishing. In 2013, an EO reduced the bag and possession limit for all east side beaches. Despite the limit reduction, exploitation reached a record 57% on Ninilchik South. Since 2014, the east side razor clams fishery has been progressively restricted,

with all beaches closed by EO in 2015. The causes for poor recruitment to the beaches are unknown, but are thought to be related to poor spawning and/or settling success. The causes for the high rate of natural mortality may include winter storms like the one observed in 2010, predation, and other unknown factors. The department will continue to track razor clam population trends annually on east side beaches by collecting age-length data on beaches within the six areas and estimating abundances on selected beaches.

The authors work for the Alaska Department of Fish and Game Division of Sport Fish in Homer managing Lower Cook Inlet Area sport fisheries. Carol Kerkvliet is the Assistant Area Biologist and Mike Booz is a fisheries biologist.

Student Subunit Happenings

Cheryl Barnes, Student Subunit Representative

The Alaska AFS Student Subunit would like to recognize Allyson Olds (M.S., UAF) for defending her thesis, entitled “Integrating local and traditional knowledge and historical sources to characterize run timing and abundance of eulachon in the Chilkat and Chilkoot rivers.” Several other defenses are scheduled as students prepare for spring or summer graduation.

The University of Alaska (UAF) Juneau student group has been finalizing written bylaws in an effort to become an official group of the AFS Alaska Chapter. In February, students banded together to pick trash up off the streets surrounding Lena Point, part of an ongoing “Adopt a Highway” program. In the coming months, members of the Juneau student group will continue discussing potential research projects and outreach opportunities as a way of structuring group participation in upcoming activities.

In January, the UAF Fairbanks student group went on an ice fishing trip to Birch Lake, where students caught both Silver Salmon and Rainbow Trout. During the February group meeting, UAF alumni and research technician Michael Courtney presented his Chinook Salmon tagging work. The March student meeting featured UAF ceramics professor and member of the Fairbanks Midnight Sun Fly Casters, Jim Brashear, who spoke about volunteer opportunities with a youth fly fishing camp during the summer. The Alaska Blackfish sampling project has just begun, and volunteers are needed; if interested, please contact Stephanie Berkman (saberkman@alaska.edu). Finally, the Fairbanks student group is reintroducing weekly “Fish Thursdays” when students, professors, and members of the broader community get together and chat at the UAF Pub.

Many students have been preparing for the 20th annual Alaska-AFS Student Symposium, occurring on Friday, April 1 (8 AM to 4 PM). This symposium uses video-conferencing to link sites in Juneau, Fairbanks, and Kodiak, with other locations added if requested. Students present either a 12–15-minute talk, a 5-minute speed talk, or a short film. Phil Ganz has been doing much of the organizing.



Sign showing road section adopted by fisheries students at UAF in Juneau. Photo by Gabrielle Hazelton.

Alaska Marine Science Symposium Student Awards

The Alaska Marine Science Symposium, held annually at the end of January, brings together scientists, policymakers, students, educators, media, and the public from all disciplines to share research findings and discuss on Alaska's fisheries and marine ecosystems. Participation is encouraged by all levels of students, recognized as both current researchers and future professionals. The following shows recipients of the best student presentation awards at the 2016 symposium. In addition to being prestigiously honored, student received cash awards ranging from \$100 to 250.

2016 AMSS Best Student Oral Presentation Awards

- Doctoral Level - Jordan Beamer, Oregon State University, Water Resources, *Climate change hydrology and freshwater discharge.*
- Master's Level - Jane Sullivan, UAF/SFOS, Fisheries Science, *Can fishing explain declines in size-at-age of Pacific Halibut?*
- Undergraduate Level - Srithi Dasarathy, NOAA NMML, *Integration of oceanographic data with fin whale calling presence in the Bering Sea.*



AFS Alaska Chapter member and Western Division student representative, Jane Sullivan (right), receives the award from Marilyn Sigman for best oral presentation by a Master's student at the 2016 Alaska Marine Science Symposium. Photo by Brendan Smith.

2016 AMSS Best Student Poster Awards (\$250 cash awards from NPRB)

- Doctoral Level (tie) - Veronica Padula, UAF/SFOS, Marine Biology, *The impacts of plastics on Aleutian Island seabirds: Detection of phthalates in tissues*; Sarah Traiger, UAF/SFOS, Marine Biology; *Sea otters versus sea stars as major clam predators: evidence from foraging pits and shell litter.*
- Master's Level - First Place: Jane Dolliver, Oregon State University, Wildlife Science, *Using satellite imagery to count nesting Short-tailed Albatross in the Senakaku Islands: Implications for Alaska's fisheries*; Second Place: Alexis Walker, UAF/SFOS, Marine Biology, *Microbial community composition in Beaufort Sea sediments: Assessing diversity and environmental drivers of bacteria and meiofauna.*
- Undergraduate Level - McKenna Hanson, UAA Environment and Society Program, *Food web ecology and population genetic structure of Aleutian terns in Alaska*; Carisa Maurer, U.S. Coast Guard Academy, *Giant kelp and coastal resilience: A new long-term monitoring project in Sitka Sound, Alaska*; Alexandra Brownstein, Florida International University, *Stable isotope analysis of humpback whales (*Megaptera noveangliae*) to confirm diet during winter foraging.*
- High School Level - Jedediah Dean, Colony High School, Wasilla, *Radiation monitoring on Prince William Sound beaches: Year 3.*

Alaska Chapter Goodies

Want to show off your AFS or Chapter-centricity, or maybe just be unique while supporting a great cause? Need a fisheries gift for that relative or friend?

The AFS Alaska Chapter is selling a variety of items focused on Alaska and the Chapter. Where else can you find a Pacific Spiny Lumpsucker t-shirt? This shirt is a limited edition printing and is #4 in the Native Fish of Alaska series.

Additional sale items includes coffee mugs and pint glasses. But, the bottom line is — all proceeds go directly to support student travel. More information is available on the AFS Alaska Chapter website at <http://www.afs-alaska.org/online-order-form>.



Design on back of AFS Alaska Chapter's Pacific Spiny Lumpsucker t-shirts.

Tsunami Ocean Sciences Bowl

The Mat-Tsunami team from the Mat-Su Career and Technical High School took first place at the Tsunami Ocean Sciences Bowl regional competition in Seward during February 26–18. The Mat-Tsunamis will go on to compete in the National Ocean Sciences Bowl at North Carolina on April 21–24, 2016. The 19th annual regional competition in Seward featured 19 teams from across Alaska. The Juneau-Douglas High School team Netflix and Krill

took 2nd, and the Juneau-Douglas High School team Pier Pressure took 3rd in the overall competition. Under competition components, the Petersburg High School team Ocean Motion took 1st place in the Research category for the project “Petersburg’s Resilience to a Tsunami” and also 1st place in the Oral Presentation category. More information on competition results, including pdfs of project reports, may be found at <https://seagrant.uaf.edu/nosb/>.



The Mat-Tsunamis from Mat-Su Career and Technical High School win the 2016 Alaska Tsunami Ocean Sciences Bowl competition. Photo by Wolfgang Kurtz.

Online Guide for Recreational Boaters

Terry Johnson, Alaska Marine Advisory recreation and tourism specialist, has turned his experiences in nearshore coastal waters of the eastern and central Gulf of Alaska, into a free online boating guide. The guide covers from Cape Spencer near Glacier Bay up the Gulf of Alaska coast to Homer, Alaska. Although vessel traffic is sparse, communities are few, and exposure to the North Pacific is challenging, “it is a spectacular trip in good weather, with opportunities to experience the scenery, the solitude, geology, human history,

wildlife and excellent angling,” said Johnson. Information gleaned from operating a variety of recreational boats, from a 40-foot tri-cabin trawler to a 15-foot runabout, includes suggestions for navigating, anchoring, and handling typical weather conditions. The *Gulf of Alaska Coastal Travel Routes* includes maps, photos, location information, and basic safety tips.



Dan Bergstrom Retires after 36 Years

In what surely marks the end of an era, Dan Bergstrom retired after 36 years with the Alaska Department of Fish and Game (ADF&G). Dan started with ADF&G in 1974, initially working on salmon smolt, test fish, herring, and crab projects in Kodiak, Bristol Bay, and the Arctic-Yukon-Kuskokwim (AYK) areas. But his focus settled on the AYK Region as he became the Lower Yukon Assistant Area Management Biologist in 1984, and both the Lower Yukon Area Management Biologist and the Yukon Area Summer Management Biologist in 1989. In 2000, Dan became the AYK Regional Management Coordinator, a position he held until his retirement. As Management Coordinator, Dan provided oversight and supervision to all subsistence and commercial fisheries in the AYK Region.

He was also instrumental in development of state-federal co-management protocols, and an integral participant in U.S-Canada Yukon River Salmon Treaty negotiations, having served as a State of Alaska representative on both the Joint Technical Committee and on the Yukon River Panel. Dan's expertise in subsistence issues on the Yukon River, and his familiarity with the working group process, helped facilitate stakeholder collaboration to the benefit of AYK fishery resources.

When the first and only Tier II salmon fishery for the state was implemented in the Nome area in the early 2000s, Dan served as the appeals officer for Tier II scoring. He subsequently developed a passion for the Nome office where he could work with both salmon and crab fisheries (rumor is that Dan and his wife plan to spend part of future summers in Nome chasing fish and gold!). Dan was particularly known for his institutional knowledge of AYK fisheries resources, an asset that made Dan an exceptional leader and trusted mentor to many of the region's current biologists. Dan's accomplishments during his career have left a legacy that will benefit staff and the public for years to come. 🐟



Dan Bergstrom, Regional Management Coordinator for subsistence and commercial fisheries in the Arctic-Yukon-Kuskokwim Region, retires after 36 years with ADF&G. Photo from ADF&G.

Electrofishing Course

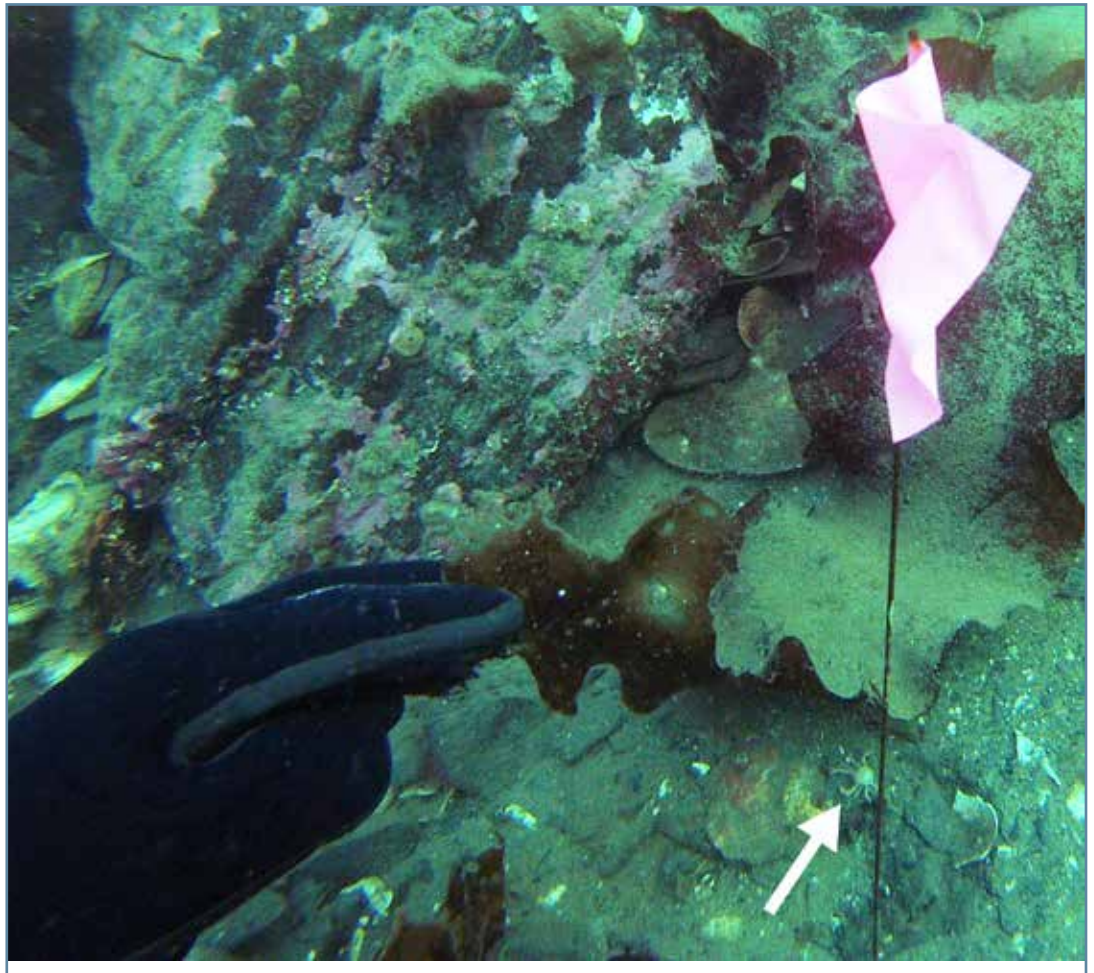
Electrofishing is an effective way to sample freshwater fish populations. However, the equipment may injure or kill fish if applied incorrectly. Proper balance between efficient sampling and minimal harm is achieved through knowledge of electrofishing principles and use of proper techniques. The Northwest Environmental Training Center will offer a 3-day backpack electrofishing course taught by Dr. Jim Reynolds during June 7-9 in Anchorage. Participants may bring their own backpack units but are not required to do so. This course includes two days

of classroom lecture, separated by a field day during which the concepts discussed in class will be demonstrated and practiced by attendees. The field day will involve a visit to a local stream where each attendee will operate the equipment under the instructor's guidance. The combination of classroom lecture, field demonstration, and participation exercises gives attendees the basic knowledge and experience needed to safely and effectively electrofish. Additional details are available at <https://www.nwetc.org/course-catalog/bio-407-jun-7-9-2016>. 🐟

Red King Crab 2nd Experimental Release

In a second experimental-scale release of hatchery-reared red king crab, National Marine Fisheries Service biologists Chris Long, Pete Cummiskey, and Ben Daly released over 12,000 juvenile red-king crab into Trident Basin on Kodiak Island, Alaska during summer–fall 2015; the crab were tracked for six months. Crab were cultured at the Alutiiq Pride Shellfish Hatchery in Seward as larvae hatched from ovigerous (egg-bearing) females captured in Alitak Bay on the south end of Kodiak Island. A 2014 study in Trident Basin on the effects of stocking density on short-term, post-release survival found juvenile crab could be released at a high density (75/m²) without substantial mortality increases. In 2015, researchers still found crab from the 2014 experiment.

The 2015 experiment examined the effect of release time and crab size on survival. While study results are still being analyzed, preliminary data suggest predation rates are higher in summer than in fall. In addition to monitoring crab densities, researchers performed



A tethered red king crab (see arrow) hides from predators under a piece of kelp in a study on Trident Basin, Kodiak. Photo by Chris Long.

tethering experiments to examine predation rates and monitor the predator assemblage in the release area. Determining optimal release strategies, such as release density and season, is key to responsible stock enhancement. These small-scale experimental releases represent a significant step forward for the Alaska King Crab Research, Rehabilitation, and Biology (AKCRRAB) project, which has brought together collaborators from the fishing industry, Alaska Native groups, coastal Alaska communities, the University of Alaska, and state and federal agencies. 🐼

Sea Grant Program Enters 50th Year

The National Sea Grant Program is celebrating its 50th year beginning March 2016. To celebrate the successes since being founded in 1966, the program is organizing a year of focused outreach to highlight how Sea Grant has applied science to America's coastal communities. In particular, Sea Grant directly engages community members to identify pressing information and research needs,

and then works with scientists, industry, and individuals to put research to work.

Alaska Sea Grant has been part of this program for 46 years, and Alaska Sea Grant communications coordinator Deborah Mercy has contributed footage and content, including some Alaska faces and locations, to a 10-minute video developed as part of the national outreach. 🐼

Meetings and Events

World Fisheries Congress 2016

May 23–27, 2016: This, the 7th World Fisheries Congress, will be held in Busan, South Korea. For more information, go to http://www.wfc2016.or.kr/english/main/index_en.asp.



Larval Fish Workshop

June 6–17, 2016: The Virginia Institute of Marine Science is hosting this workshop in Gloucester Point, Virginia. For more information, contact Dr. Peter Konstantinidis (peterk@vims.edu).



Aleutian Life Forum

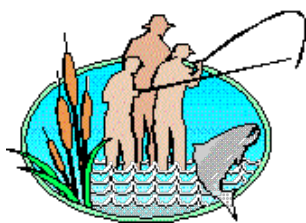
August 16–20, 2016: This meeting will be held in Unalaska, AK. For more information, go to <http://www.aleutianlifeforum.com/>.

146th American Fisheries Society Annual Meeting

August 21–25, 2016: This meeting will be held in Kansas City, MO. For more information, see <http://2016.fisheries.org/>.



2016 Aquatic Resources Education Association



October 23–28, 2016: This biennial meeting of AREA will be held in Shepherdstown, West Virginia. For more information go to <https://area.wildapricot.org/>.

PICES 25

November 1–13, 2016: This conference, celebrating 25 years of efforts by the North Pacific Marine Science Organization to further understanding of the North Pacific's natural and socioeconomic systems, will be held in San Diego, CA. For more information, go to <https://www.pices.int/meetings/>.



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

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



Top - Gabriel Smith and Diego Madrid with their best catch during an ice fishing trip by the Fairbanks students. Bottom - Chelsea Clawson helps Megan Comolly handle the first fish she caught (ever!). Photos by Gabriel Smith (top) and Stephanie Berkman.

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