

Kachemak Bay Research Reserve

Quarterly Report for Feb 25, 2015 – Jun 9, 2015

Kachemak Bay Research Reserve's mission is to enhance understanding and appreciation of the Kachemak Bay estuary and adjacent waters to ensure that these ecosystems remain healthy and productive.

Facilities

- The Alaska Islands & Ocean Visitor Center (AIOVC) is open during summer hours 9:00am – 5:00pm.daily. Offices for both the Alaska Maritime National Wildlife Refuge and the Kachemak Bay Research Reserve are open Monday through Friday from 8:00 a.m. – 5:00 p.m.

Administration

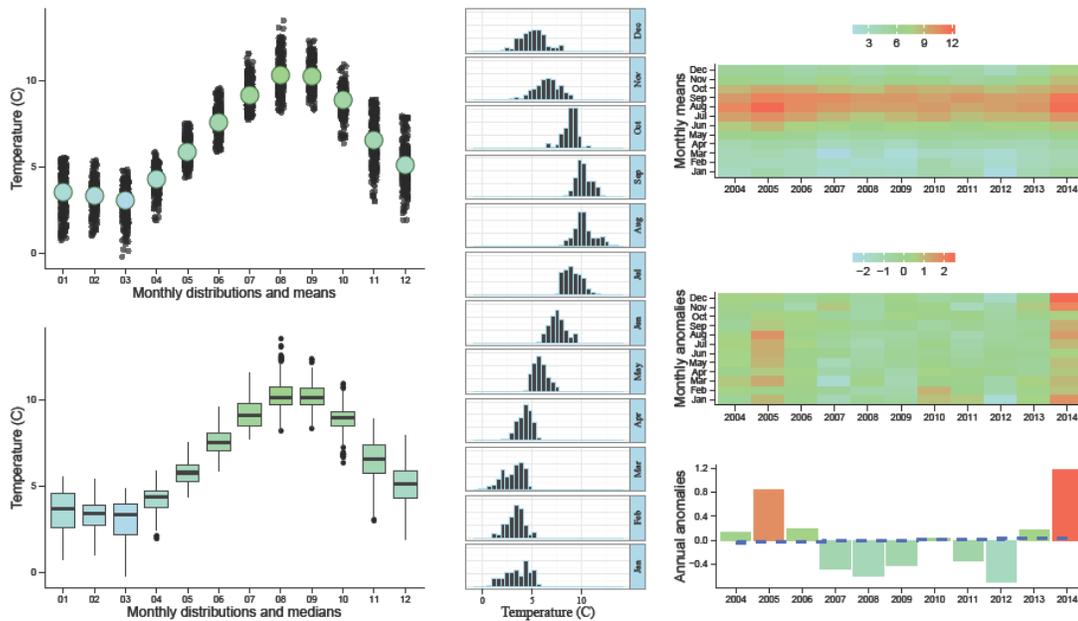
- The transition from ADF&G to UAA is now truly underway. We have a signed MOA between NOAA and UAA. Reserve staff will cease being ADFG employees on June 30th and join UAA staff on July 1st. The Reserve will be under the Alaska Center for Conservation Science (ACCS) within UAA's College of Arts and Sciences, led by director Keith Boggs.

Staff

- In mid-March we hired Syverine Abrahamson in a non-permanent capacity to support us in the role of Administrative Assistant. Syverine has already become indispensable in navigating our transition to UAA.
- Unfortunately we will lose Stacey Buckelew who has been enticed away by a new position. We will miss her keen insight and organizational skills, but she's not going far and our paths are sure to cross frequently.
- And Carmen Field, who has always been the face of education at the Reserve, will remain with ADF&G to focus on fishing education, but she will share office space with us and will continue to be an important part of our education team.

Research Project Updates

- **System-wide Monitoring Program (SWMP):** Tracking weather, water quality, and water nutrient levels continues at our long-term monitoring sites located in Seldovia and Homer.
 - AOOS has a new real-time sensor map showing KBRR water quality and weather stations, and it includes data from the Bear Cove water quality monitoring site and the Anchor Point weather station: <http://portal.aos.org/real-time-sensors>.
 - Real-time data can be accessed from websites such as: National Data Buoy Center, Weather Underground, Google Earth, and the Northwest Association of Networked Ocean Observing Systems (NANOOS).
 - Historical data (2001-present) can be accessed from the Centralized Data Management Office: <http://cdmo.baruch.sc.edu/>



In Fig. 1, we show the monthly distribution of mean and median water temperatures for the Seldovia deep water quality station from 2004-2014. Note that 2014 was an above average warm water year in Kachemak Bay. This warm water signal was also picked up in the Gulf of Alaska. Thus far, it looks like 2015 will also be a warm year in our Bay.

- **Headwater Stream Research:** The AKSSF headwater stream research project was granted an extension, with a new project end date of June 30, 2015. We will use the remaining time to complete analyses, report and manuscript preparations.
- **Watershed Research Proposals:**
 - *Moving forward!* Our proposal to design tools for decision making based on economic valuation of ecosystem support for rearing juvenile salmon was selected by the [UA Center for Salmon and Society](#). Development staff from the Center will work with us to develop a full proposal that they will market to potential funders, including the Moore Foundation. This project will be a collaboration between KBNERR, ACCS, UA Institute of Social and Economic Research, and the Kenai Peninsula Fish Habitat Partnership.
 - *Final preparations are underway* for a proposal to the NERR Science Collaborative. Our project will center around working collaboratively to fill important knowledge gaps about juvenile Chinook salmon rearing in the mid river region between the headwaters and the estuary. We would like the support of the KBRR Council to work collaboratively with us on this project. Pre-proposals are due February 27th 2015. This project will be a collaboration between KBRR, Baylor University, University of Washington, UA Natural Heritage Program, Cook Inletkeeper, and the Kachemak Heritage Land Trust. The Kenai Fish Habitat Partnership and the KBRR Community Council are proposed conduits for collaboration with end-users.
 - *Next up* is development of a proposal to EPA for investigations of focused groundwater inputs to headwater streams. This will be a partnered effort with the University of South Florida and the Smithsonian Institute.
- **Anchor River: Juvenile Chinook and Coho Salmon Estuary and Nearshore Rearing:** Approval for funding of this new project was delayed at the USFWFS for several months. However, we received word that the project can officially begin this month. This will be a two year project with

matching funds coming from the University of Washington and Coble Geophysical Inc. The project will include a graduate student from the UWA and a NOAA Hollings Scholar intern.

- **Seabird Diet Monitoring:** We are closing out this project with U.S. Fish and Wildlife Service (FWS) Alaska Maritime National Wildlife Refuge as of the end of June. It has been an interesting and productive project! Lab protocols were developed and finalized for zooplankton, otolith, and whole fish methods of seabird diet analyses and identification guides were developed for zooplankton species and refined throughout the project by Ori Badajos. Working collaboratively with FWS, we trained a new seabird diet sample analysis expert and we successfully transferred an Access database to the Fish and Wildlife Service for this project.
- **Gulf Watch Kachemak Bay & Lower Cook Inlet:** Ocean conditions are dynamic in the lower Cook Inlet region. Mapping currents and water mass movements in this region contributes to the understanding of patterns in the abundance and diversity of marine plankton, invertebrates, fish, birds, and mammals in coastal Alaska. The complex structure of fronts where water masses meet and the patterns associated with the movement of water masses are still not well understood for this region. Developing an understanding of the structure of physical oceanography helps to understand the connectivity of water movement and potential transport between lower Cook Inlet and Kachemak Bay. For example, by determining the local species of phytoplankton and zooplankton and understanding their seasonal distribution we begin to understand the biological patterns associated with upper trophic levels of the nearshore marine system. By continuing monitoring that began in 2004 in a Gulf Watch project (long-term ecosystem monitoring program of the Exxon Valdez Oil Spill Trustee Council), we are able to catalog long-term changes in the physical and biological environments of Kachemak Bay and other areas of lower Cook Inlet. This information can be used to explain the variability of the survival of economically-important species like salmon.
 - Since 2012, we have sampled seasonally in lower Cook Inlet and outer Kachemak Bay and monthly along a transect line in the Kachemak Bay area. In addition to continuing the time series that began in 2004 at the Reserve, we are adding a time series for marine plankton monitoring (Fig. 2).
 - KBNERR is partnered with the NOAA Kasistna Bay Lab on this study with funding from the Exxon Valdez Oil Spill Trustee Council.

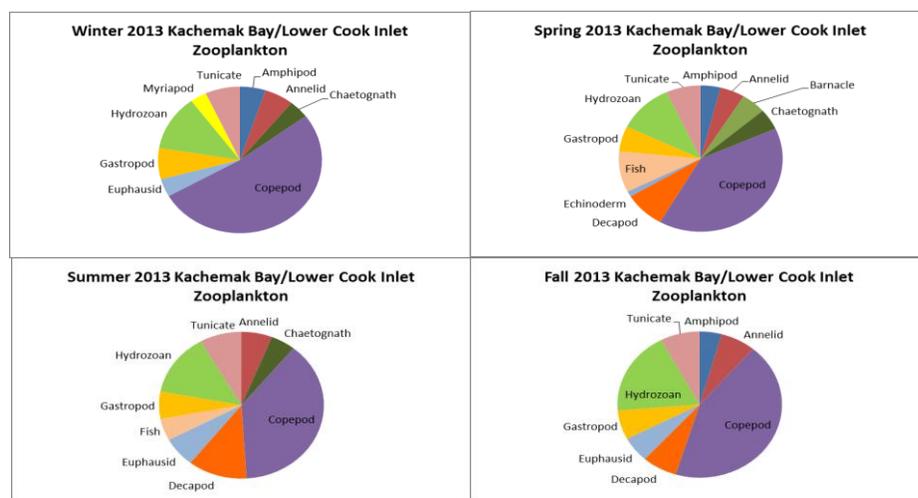


Figure 2. Zooplankton species present and relative species abundance in the seasonal Kachemak Bay and Cook Inlet (all sampling locations combined)

- **Synthesis of Oceanographic Data to Aid Monitoring Programs for Harmful Algal Blooms (HAB) in Kachemak Bay, Alaska:** This study integrates several long-term monitoring efforts by KBNERR in Kachemak Bay. We are partnering with UAF faculty members Georgina Gibson, Mark Johnson, and Ken Coyle to validate an ocean circulation model being developed by NOAA's National Ocean Service for Kachemak Bay. Data from satellite drifters are being compared to the modeled current speeds and directions to assess model skill in replicating observed surface ocean circulation patterns. If necessary, model adjustments will be made in order to improve model skill. An understanding of ocean circulation in the estuary will help to identify convergence zones that concentrate primary productivity and, in doing so, we may be able to minimize detrimental effects to this area's natural resources from point-source pollution, larval transport of marine invasive species, and harmful algal blooms. This study is funded by leveraging the ongoing Long-term Monitoring of Environmental Drivers and ADF&G State Wildlife Grant funding. In May, we had an opportunity to present some preliminary results of this work to the Cook Inlet Aquaculture Association in Soldotna and, in June, we will be working with Axiom to host data products on their website as well as UAA ACCS's web site. Stay tuned!

Education

Winter/Spring Programming for Families & Public:

- We hosted 1 public *Translating the Science of Our Landscape II Discovery Lab* on April 8th. This event was attended by 54 people. This very special lab program—a collaboration with UAA's EPSCoR (Experimental Program to Stimulate Competitive Research) Southcentral Project researchers and staff—was featured in a great Homer Tribune article in April: <http://homertribune.com/2015/04/sandbox-science-teaches-creative-lessons-about-earth/>. If you missed the amazing science sandbox, be sure to visit our lab in the first week of July...it'll be set up again for that week's 3 public Discovery Labs.
- During the this month's annual *Kachemak Bay Shorebird Festival*, Reserve staff:
 - led 2 *Family Bird Walks* (in Beluga Slough and along Mud Bay) for 51 bird enthusiasts of all ages.
 - assisted Refuge colleagues with a *Pigeon Dissection Lab* for 30 in our classroom.
 - gave *Alaska's Amazing Seabirds* presentation (Carmen) that was attended by 89 birdwatchers at the festival.
 - helped to host a *Birding Kachemak Bay Discovery Lab* for 110 Jr. Birders and festival attendees of all ages.

TOTAL festival attendees (all ages) we reached: 280

K-12 Programs:

- In January, February, and March we offered a new, collaborative *Water Birds in Winter* outdoor program with staff from the AK Maritime National Wildlife Refuge for 129 second – twelfth grade students from Homer and Soldotna schools.
- Our April and May Discovery Lab programs for students were among the most fun and rewarding we've ever delivered.
 - At Islands & Ocean, we provided watershed science education through *Translating the Science of Our Landscape II Discovery Labs* for 141 K-12th grade students plus 38 teachers/chaperones. Over 90% of these Homer students were in grades 4th-6th. This same lab was delivered across the bay to 136 K-12th students + 17 teachers/aides in Seldovia, Port Graham, and Nanwalek over 3 days.
 - Jess and Rebekah Jones (NPS educator) delivered *Estuaries Discovery Labs* to 82 pre-K-12th grade students in the Lake Clark School District (at Nondalton and Newhalen schools).

This is the first time our Discovery Lab programming has gone across Cook Inlet. *Estuaries* labs were also delivered to 107 K-12th grade students in Port Graham and Nanwalek.

- We delivered 14 ***Estuary Walks*** for 310 pre-K-12th grade students plus 70 teachers/chaperones from Kenai, Anchor Point, Soldotna and Homer (68% from Homer), with over 75% of the students we reached being in grades K-5th.
- We delivered 1 ***Beach Walk*** this month for a local Connections homeschool group of 21 students plus 9 chaperones/parents.
- We delivered 3 ***Careers in Marine Science*** programs for 71 4th graders plus 13 teachers/chaperones from Mountainview Elementary in Kenai.
- We again joined forces with ADF&G Sport Fish staff and volunteers from the central Kenai Peninsula to offer 2 activities—featuring live macro-invertebrates and juvenile salmon—for nearly 800 K-6th grade students plus lots of teachers/chaperones at ADF&G's annual ***Salmon Celebration at Johnson Lake***.

TOTAL pre-K through 12th grade students we reached in Jan-May 2015: 997 plus *Salmon Celebration* students [~800]...and over 200 teachers/chaperones.

We are very thankful for the educational expertise and enthusiasm of volunteer extraordinaire Carole Demers and NPS educator Rebekah Jones this spring...our education programs would've been much diminished without them! We also feel lucky to have had EPSCoR colleagues Courtney Breest and Molly McCarthy join us for our *Translating the Science of Our Landscape II* labs in Seldovia this month!

Community Monitoring Programs

The Community Monitoring Programs are ramping up with equipment readiness, trainings and lots of communication with our citizen scientists to prepare for summer.

- **Harmful Algal Bloom program:** Two new water samplers have joined the returning 10 monitors this spring. Kaylynn Bunnell, a Homer youth, working as a kayak guide will be sampling Eldred Passage. This area is always interesting, yet we have never had a consistent station there. Tutka Bay is another spot that was rarely sampled and we are fortunate to have Cook Inlet Aquaculture sampling there this year. We have seen high numbers of *Pseudo-nitzschia* all around the Bay. The first place spotted was Sadie Cove on May 3rd. A sample from that area was tested at NOAA lab in South Carolina and was below dangerous toxic levels. Currently this organism is at high levels in Bear Cove. Subsequently, three more samples are being sent to NOAA to test. Bimonthly phytoplankton update reports will be sent throughout the summer. We had have received notification from 2 State decision makers who said they valued this reporting.
- **European Green Crab:** No green crab have been reported in Alaska yet. Syverine and Catie are working on a statewide report to share with other groups regarding roles of various organizations detection programs across the state. We have one new monitor in Peterson Bay, Matt Steffy and family; and the Halibut Cove monitor has turned it over to the Miller Family. The other 6 volunteers are all returning to monitor this summer.
- **Invasive Tunicate detection:** Two trips to survey for the invasive *Botrylloides violaceus* took place at Hesketh and the Herring Islands this month. It was found again in the same place on Hesketh Is, and it had actually disappeared from the rock we originally detected it on. Instead, it was found on another boulder about 3 meters away. No invasives were found on the NW tip of the largest of the Herring Islands.

Coastal Training Program

The Coastal Training Program finished a busy spring season with the following workshops and events. Effective May 27, Stacey Buckelew will be leaving her position as the CTP Coordinator. She has thoroughly enjoyed the opportunity to serve KBRR and engage with the dedicated members of the Community Council. While leaving, she will not be going far! You can find her continuing to volunteer for many efforts around town and working to meet the data management needs of several marine ecosystem synthesis projects with Axiom Data Science.

- **Kachemak Bay Science Conference:** CTP partnered with the Center for Alaska Coastal Studies to co-lead the planning and implementation of the 2015 Kachemak Bay Science Conference, which was held March 4-7, 2015 at the Alaska Islands and Oceans Visitor Center in Homer. This conference was merged with the Kenai Peninsula Fish Habitat Partnership's science symposium in an expanded event. The goal of this conference was to provide new information and syntheses to the broad community interested in and working on related issues. We had over 130 people attend the conference, including 170 at the keynote events and over 120 attending the workshops and field trips. Our primary goal was to provide new scientific information relevant to Kachemak Bay and its surrounding coasts in order to foster an informed and engaged community of environmental researchers, educators, and decision-makers. Based on the comments we received, we believe we were effective in achieving that goal, and in providing the community with an informative and worthwhile experience. We also were able to, through social events, provide opportunities for colleagues to connect and network with new ones.



A panel at the 2015 Kachemak Bay Science Conference discusses actions that can be taken to better integrate science to improve management of fish habitat on the Kenai Peninsula



Researchers share the results from their work at an evening poster session at social at the 2015 Kachemak Bay Science Conference

Associated with the Kachemak Bay Science Conference, the following events were hosted:

- **David Montgomery**, author of the King of Fish and professor in the Department of Earth and Space Sciences at the University of Washington, gave a keynote talk focused on salmon conservation issues in the Pacific Northwest. This talk was followed by a film entitled, which drew a crowd of 170 participants in the community.
- **Terrie Klinger** was the plenary speaker for the science conference. She opened two days of science-focused presentations by discussing marine ecosystem conservation through the lens of a changing climate. Terrie Klinger is the Director of the School of Marine and Environmental Affairs at the University of Washington and Co-Director of the Washington Ocean Acidification Center.
- **Cook Inlet Response Tool and Data Portal:** This training was designed for fish, wildlife and natural resource managers to become comfortable with using the Cook Inlet Response Tool (CIRT). CIRT was originally designed for oil spill and other response situations, but is also set up to support management activities at the ecosystem scale, integrating marine, human and climatological systems. The tool enables users to explore and visualize over 100 individual data sets in the Cook Inlet region, including shoreline characteristics and imagery to real-time sensors, forecast models, geographic response strategies, and ShoreZone coastal imagery. There were 18 researchers and coastal decision-makers that tool advantage of this training.



Will Koeppen with Axiom Data Science shows users the Cook Inlet Response Tool.

- **Communicating Science through Video:** This workshop was among the more popular trainings, with 38 participants present. The workshop was designed to demystify the video-making process and introduce participants to science videography using readily available and inexpensive technology. Using a GoPro, participants learned how to shoot and edit a 3-minute video about their science. Beyond the technical, the workshop also taught the skills of video story-telling. Based on popular ratings, this workshop will be repeated in an expanded version at the American Fisheries Society Alaska Chapter meeting that will be held in Homer during November 2015.



Participants practice their skills by storyboarding, filming, and editing at the video workshop.

- **Navigating Water and Land Use Permitting on the Kenai Peninsula:** This workshop trained participants to better plan for the permitting and environmental review process on the Kenai Peninsula. An overview of natural resource laws under the governance of the federal government, the State of Alaska, and the Kenai Peninsula Borough, as well as a discussion of how to efficiently navigate the permit process was given. There were 32 participants at the training, which included landowners, state and federal agencies, and planning and land use decision makers.
- **Anchor River: Building Collaborations to Safeguard Habitat and Climate Refugia:** KBNERR and partners, including the Kachemak Heritage Land Trust and Cook Inletkeeper, hosted a field trip with 13 participants to tour Anchor River holdings that safeguard cold water refugia for salmon. They discussed how science-based partnerships are important for building species resiliency and protecting river corridors. They also learned about the salmon stream temperate monitoring used to identify thermal impact to salmon habitat. Coowe and Steve stole the show by providing an up-close and personal viewing of live juvenile salmon. This was a big highlight for those that braved a cold, windy day to learn more about the Anchor River despite a wet, windy winter day.

- **Kachemak Bay and Lower Cook Inlet Marine Ecosystem Workgroup:** On April 16 CTP, together with the Alaska Marine Conservation Council, hosted the first Marine Workgroup (MWG) meeting. The main purpose of the MWG meeting was to serve as a foundation to continually improve the scientific basis for management actions in Kachemak Bay. The goal of this MWG is to work across all regional partners to coordinate monitoring and research efforts to provide credible, high quality and accessible scientific findings for our partners, decision-makers, and ultimately, the public. There were 18 participants from local and regional agencies and community organizations that shared information and updates on ongoing marine research and management efforts. Participations were responsive to this workgroup as a venue for sharing and receiving information, as well as providing the opportunity to build collaborative, professional networks. The group agreed to continue to meet twice a year to share information, discuss key topics of concern in the marine environment, and work together to better share and outreach research activities to management and general audiences.

- **Invasive Species Identification:** On April 24, CTP partnered with the Homer Soil and Water Conservation and the Kenai Cooperative Weed Management Area to host an Invasive Species Identification workshop. Presenters from UAF Cooperative Extensions, Dept of Natural Resources, US Fish and Wildlife Service, and KBRR presented information about terrestrial, aquatic, and marine invasive species identification. The number of invasive species on the Kenai Peninsula is continuing to grow each year. Ecosystems can be safeguarded from the harmful impacts caused by invasive species, if new invasions are detected early and appropriate response procedures are enacted. On the Kenai Peninsula, there is an existing network of agencies prepared to respond to invasive species when notified of an early detection. The day concluded by learning the best management practices to prevent reduce humans from being vectors of further invasion while working or recreating. There were 32 participants that attended the training.



Participants learn about how to prevent the spread of invasive species with Gino Graziano from UAF Cooperative Extensions.

- **Kachemak Bay Coastal Habitat Mapping tool:** KBRR hosted two Coastal Habitat Mapping tool workshops about the recently updated habitat mapping tool that allows researchers and resource managers to quickly explore coastal and intertidal habitat characteristics for Kachemak Bay and the surrounding area. This mapping tool provides access to data on physical characteristics, human uses, and ecological resources for shoreline, nearshore, and estuarine areas using high-resolution aerial imagery. This training was hosted on April 23 in Homer and May 11 in Soldotna to provide users with hands-on demonstrations and explore the tool's functionality. There were 12 total participants at these trainings.
- **Community Resiliency webinar series:** Hal Shepherd with Water Policy Consulting has developed a Community Resiliency webinar series focused on how Kenai Peninsula communities can live more sustainably, and in community, as a means of adapting to the changing environment by applying practical, tested, hands-on tools. An evening webinar was held in each April and May to learn about climate change on the Kenai Peninsula and steps that individuals, households and businesses in the Kenai Peninsula can take towards resiliency. This webinar series will reconvene in the fall and may include local guest speakers and different audiences to help educate and build awareness around climate adaptation.

- **Climate adaptation workgroup:** CTP has engaged with an group that has formed ad hoc in Homer to response to local climate adaptation needs. This group is, in part, being coordinated through MAPP which is a local organization working to foster community engagement and coordination to improve community health. The climate adaptation subgroup is beginning to coordinate efforts that would lead to an election of a City task force in fall 2015 to organize, develop, and implement a climate adaptation plan. Included in this process would be training and workshops that provide the necessary tools and information to support the planning process. CTP is instrumental in helping to coordinate these trainings opportunities to build local capacity for adaptation planning.
- **Woodard Creek Coalition:** CTP continues to serve on the executive committee for the Woodard Creek Coalition, which recently received support from the NPS Rivers, Trails, and Conservation Assistance Program for technical assistance on a watershed project that focuses on restoration, stewardship, trails and urban greenbelts. An important component of the Coalition’s goal of restoring Woodard Creek is to remove as many culverts as possible and “daylight” the creek. CTP and the outreach committee are currently working on communication plan to outreach the watershed planning process to various audiences throughout the community. This group meets monthly and is composed of over 25 Homer-based organizations, business, and land owners.

Upcoming Programs

Jun 1-3 *Introduction to Shellfish Aquaculture- Module 1 (see below)*
Jun 6-8 *Introduction to Shellfish Aquaculture- Module 2*

Summer 2015 Discovery Labs
1:00 – 3:00 pm at AK Islands & Ocean Visitor Center
Wednesday / Friday / Saturday
July 1 – August 8

Jul 1–4 *Translating the Science of Our Landscape*
Jul 8–11 *Sport Fishing in Kachemak Bay: Halibut, Salmon & Rockfish*
Jul 15-18 *Alaska GulfWatch: 26 Years of Ocean Monitoring*
Jul 22-25 *Estuaries: Where Rivers Meet the Sea*
Jul 29-Aug 1 *Estuaries: Where Rivers Meet the Sea*
Aug 5-8 *Our Changing Seas: Ocean Acidification*

June 1-3rd (Mon-Wed) @ 8 am – 5 pm at AK Islands and Ocean Visitor Center

Introduction to Shellfish Aquaculture- Module 1 This comprehensive 3-day workshop will teach you the essentials of shellfish farming in Alaska, including the basics of shellfish aquaculture, shellfish biology, site selection, oyster farming, regulations, and an introduction to business management. The curriculum includes lectures, labs, guest speakers, and a full-day field experience. One university credit is optional with completion of an assignment. The workshop will be led by Ray RaLonde, aquaculture specialist for the Alaska Sea Grant Marine Advisory Program. Sponsored by the Alaska Sea Grant Marine Advisory Program, with cosponsors Kachemak Bay National Estuarine Research Reserve, Kachemak Mariculture Association and Alaska Islands and Ocean Visitor Center in Homer. For more information and directions to register logon at:

<http://seagrant.uaf.edu/map/workshops/2015/shellfish-intro-homer/index.php>

June 6-8th (Sat-Mon) @ 8 am – 5 pm at AK Islands and Ocean Visitor Center

Introduction to Shellfish Aquaculture- Module 2 Join us for a comprehensive 3-day workshop that will teach you the essentials of shellfish farming in Alaska. This workshop is the second of two modules, and concentrates on enhancement of Alaska native species of clams, farming of scallop and mussels, and business management. The curriculum includes lectures, labs, guest speakers, and a full-day field experience. One university credit is optional with completion of an assignment. Sponsored by the Alaska Sea Grant Marine Advisory Program, with cosponsors Kachemak Bay National Estuarine Research Reserve, Kachemak Mariculture Association and Alaska Islands and Ocean Visitor Center in Homer. For information and registration visit:

<http://seagrant.uaf.edu/map/workshops/2015/shellfish-intro2-homer/index.php>