

Alaska Sea Grant

2016–2017 Annual Report



YEAR IN REVIEW

Welcome to our 2016–2017 annual report! In the pages ahead, we share highlights of Alaska Sea Grant’s work this past year and invite you to share your feedback.

During the year, we’ve furthered our mission to sustain Alaska’s healthy coasts, ecosystems and economies, through research education and outreach. We continue to support future leaders in science and marine policy through our traineeship and fellowship programs and K-12 learning initiatives.

Five Alaska Sea Grant State Fellows began professional assignments in federal and state agencies, including one who is working in the Office of the Lieutenant Governor helping to craft Alaska’s new climate initiative. We also have two Alaskans working in Washington, DC, as Sea Grant Knauss Marine Policy Fellows, in the office of U.S. Senator Lisa Murkowski and at the NOAA Office of Legislative and Intergovernmental Affairs.

Our marine literacy program was highly successful this year, particularly in the state’s largest school district. Together with our marine education specialist, the Anchorage School District developed a fourth-grade STEM teaching kit that is now required curriculum for thousands of students in

Alaska’s population center. It focuses on helping students learn about the salmon life cycle and how watersheds work.

It was a busy year for research and workforce development efforts as well. You’ll read about some them in the following pages. Research funded by Alaska Sea Grant on humpback whales generated international headlines, including a story in the *New York Times*. The research documented for the first time that humpback whales feed on hatchery-raised salmon when the salmon are released into the ocean. Other research garnering lots of media attention includes our efforts to promote seaweed farming as a new industry in Alaska, and monitoring tools developed by Alaska Sea Grant–sponsored scientists being used to document coastal erosion in western Alaska, particularly in Alaska Native villages.

In faculty and staff news, Sunny Rice was promoted to lead the Marine Advisory Program from her office in Petersburg. Quentin Fong became a full professor, and our Nome-based agent, Gay Sheffield, was granted tenure. We also hired Paula Dobbyn as our new communications manager. Dobbyn has been focusing on growing Alaska Sea Grant’s name recognition through media outreach, social media, a new blog and a revamped *Fishlines* newsletter. Expect to see a new Alaska Sea Grant website in 2018.

Finally, we thank you—our many partners and supporters—who took the time to defend Alaska Sea Grant in the face of proposed elimination by the White House. In March 2017, the administration proposed cutting all funding to the National Sea Grant College Program. We immediately began hearing from fishing and maritime organizations, seafood processors, coastal leaders and residents, and many others concerned about Alaska Sea Grant's future. Dozens wrote letters in support of continued Sea Grant funding. We wholeheartedly thank the stakeholders that we serve and members of the Alaska congressional delegation for firmly backing our program. At the time of this writing, both chambers of Congress have passed budgets that will maintain Sea Grant funding in FY18. We look forward to a future of continued partnerships and service to Alaska's communities to enhance the wise use and conservation of Alaska's coastal resources.



Tracking whales and other marine mammals

Gay Sheffield is a champion for coastal residents of northwest Alaska who use marine mammals for food and cultural purposes. In her role as Marine Advisory agent in Nome, Sheffield routinely responds to conservation, food security and human health concerns about maritime ecological and industrial changes in the Bering Strait region. Sheffield coauthored two scientific papers this year—on bowhead whale scars and on algal toxins in mammals.

In partnership with Alaska Native coastal communities, Sheffield collected information on scars from bowhead whales recently harvested for subsistence to track frequency of line entanglements, ship strikes, and killer whale attacks, and to monitor overall whale health.

As part of Sheffield's work, algal toxins were investigated for the first time in several marine mammal species throughout Alaska. Collaborators detected the presence of algal toxins as far north as the Beaufort Sea. Sheffield helped coordinate and collect tissue from harvested, dead and stranded marine mammals for analysis, which led to the new information.

Beginning in 2011, when sick seals appeared in large numbers in the Bering Strait region, Sheffield served on a seal Unusual Mortality Event team. She provided samples from stranded seals, led education efforts and contributed to the decision to close the UME although the cause was never confirmed. She gave dozens of presentations to local and national audiences to help inform, alert and coordinate with coastal maritime subsistence food gatherers.





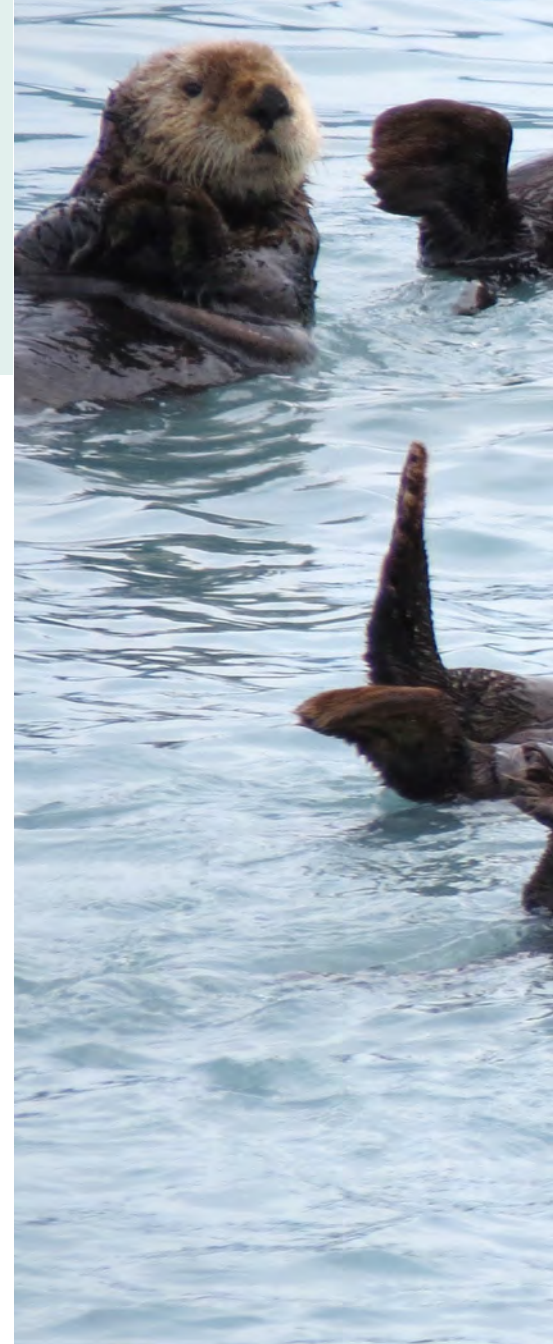
HEALTHY COASTAL ECOSYSTEMS

Voracious sea otters devastate shellfish

A project led by Ginny Eckert, our associate director of research, Stephen Langdon and Sonia Ibarra found that a booming sea otter population has caused a big drop in subsistence shellfish harvest in Southeast Alaska. Interviews with harvesters revealed economic hardships and a lack of access to shellfish—which sea otters eat voraciously—compared to the past.

“The issue is complex,” explained Eckert, University of Alaska Fairbanks fisheries professor. “Sea otters play a key ecological role, and yet they can have a devastating effect on shellfish resources that are important subsistence foods.”

PhD student Sonia Ibarra and Stephen Langdon, University of Alaska Anchorage anthropologist, interviewed residents and spent weeks at a time in rural communities harvesting clams with locals. Over the course of the project, Ibarra has mentored undergraduates and in 2017 was honored with the Meritorious Service award from the Alaska Chapter of the American Fisheries Society. The award recognizes her long commitment to mentoring, particularly of Alaska Native and rural Alaskan students, and her activities to increase diversity in the sciences. Ibarra is funded by a National Science Foundation fellowship.





Untangling whales



Marine Advisory agents Sunny Rice and Melissa Good helped coordinate training in Petersburg and Unalaska. "A good group of experienced people is needed to actually attempt any disentangling," Rice said.



RESILIENT COMMUNITIES AND ECONOMIES



Studying erosion with local students in Goodnews Bay

For two summers, Goodnews Bay students engaged in hands-on, professional science to benefit their community. They used ground-penetrating radar, peat corers and GPS to calculate the effects of climate change in their western Alaska village. They assisted researchers on a project to assess Goodnews Bay's ability to adapt to flooding, erosion and other hazards associated with a warming planet.

The researchers are Chris Maio, University of Alaska Fairbanks geoscientist, and PhD graduate student Richard Buzard. Buzard used decades-old military and NASA aerial surveys and modern geographic information system software to measure how the shoreline has changed over time. Maio focused on sediment cores, among other things.

Having local students and residents trained to measure coastal erosion will help the community down the road, said Maio. "They'll be able to do it all on their own prior to and after major storm events," he said. Maio and Buzard concluded that Goodnews Bay is fairly resilient to the effects of climate change.

Maio and Buzard are working on another Alaska Sea Grant-funded project in 10 villages in the Bristol Bay region. They have trained residents to use time-lapse video and survey stakes to measure coastal, river and lake erosion. The data they collect will help communities document and adapt to shoreline changes.

Adapt Alaska website launched

A changing climate poses unique challenges to coastal residents in Alaska and worldwide. To raise awareness and discuss law-based solutions, Alaska Sea Grant cosponsored the Symposium on Climate Displacement, Migration, and Relocation in Honolulu, attended by nearly 100 people.

Erin Shew, Alaska Sea Grant Knauss Fellow at the White House Council on Environmental Quality, was a key organizer. The symposium highlighted how climate change is influencing displacement of Pacific peoples because of sea level rise, including Alaska and the Marshall Islands.

In Alaska coastal communities, coastal resilience specialist Davin Holen cohosted many workshops on adapting to climate change effects such as warming, absence of sea ice, erosion and flooding. Hundreds of participants provided ideas and suggested materials.

“This is exciting as it will be a unique framework and tool for tribes as they decide how to move forward in building more resilient communities,” said Holen of the workshop outcomes.

A key result is the Adapt Alaska website, designed to help Alaskans monitor changes, mitigate impacts, and adapt to a changing ocean and terrestrial environment from Southeast Alaska to the Arctic. The new website is a place to share stories, adaptation solutions, and links to Alaska data.

Ocean acidification, one result of climate change, is of concern to Alaskans because of their heavy reliance on fisheries. Holen and several Marine Advisory agents, with 15 partners, established the Alaska Ocean Acidification Network this year. The network enhances monitoring and engages scientists, fishing and aquaculture industries, policy makers and coastal residents.





“We’ve noticed a need for better collaboration, a good website, a good partnership with people to address the issues of climate change. We created AdaptAlaska.org to help people learn about the resources and address these challenges.”

—Verner Wilson III, Bristol Bay Native Association, Dillingham

Battling toxins, inspiring students

Paralytic shellfish poisoning (PSP) and harmful algal blooms are a serious health risk in Alaska, and Alaska Sea Grant is deeply involved in keeping residents safe.

Some of the highest PSP toxin concentrations have been identified in the Kodiak region, where subsistence shellfish harvest is culturally and economically important. There is a strong testing program for commercial shellfish in Alaska, but no testing for personal harvest, leaving residents vulnerable to illness.

Marine Advisory agent Julie Matweyou is balancing several projects to address PSP risk in the Kodiak region. She conducted a study on shellfish toxicity in Old Harbor, which demonstrated high toxins at a popular subsistence site. Residents are now monitoring seawater there. She is coordinating development of a new rapid electrochemical field test kit for shellfish screening in remote locations. Matweyou has educated more than 760 students since 2012.

One of those students, Joan Barnowsky, a 6th grader from Old Harbor, won two awards for her science fair project on PSP. She was inspired by Matweyou.

"I was interested in clams 'cause she had a chart that shows the toxicity of the clams, and I saw that they were unsafe, so I decided to test clams myself and help the scientist," Barnowsky said in an interview with KMXT, referring to Matweyou.





In May 2017, when a severe PSP illness broke out, Matweyou coordinated with the state to warn the Kodiak region. It's likely that the outreach helped prevent more illnesses this year.

Harmful algal blooms (HABs) also have serious toxins, such as amnesic and diarrhetic shellfish poisoning. Alaska Sea Grant's Ginny Eckert co-led a workshop for researchers, resource managers, industry, and shellfish harvesters to form the Alaska Harmful Algal Bloom Network. The network provides a centralized place for information on strategy and public outreach about HABs in Alaska.



SUSTAINABLE FISHERIES AND AQUACULTURE



Testing seal oil for elder home residents

Seal oil, a nutritious and highly valued traditional food, is used as a dipping sauce in Native households in Alaska.

To provide state-certified traditional foods for elders living in senior facilities, the Kotzebue-based Maniilaq Association and the state formed the Alaska Seal Oil Task Force in 2015.

With about 27 members, including Alaska Sea Grant seafood specialists Brian Himelbloom and Chris Sannito, the team is exploring oil-rendering processes that avoid botulism, to meet state food safety requirements.

They brought in Eric Johnson, a world expert in food toxins at the University of Wisconsin, who tested the traditional process. After two years of lab work and meetings the team is getting ready to wrap up its work. They have one more set of experiments to do, said Sannito.

“The end result will likely mean that the same process that has been used for thousands of years can go on as usual, with a spoonful or two of food-grade acid added to the bucket in order to immediately lower the rendering pH to a safe level,” Sannito said. “We expect confirmation by late November 2017.”

“Chris and Brian have been invaluable in their work and suggestions, and it has been a pleasure working with them.”

—Valdeko Kreil, Maniilaq Association, Kotzebue

Seafood training

The Alaska seafood processing industry continues to seek professional development and technical training. In 2016 Alaska Sea Grant taught seafood processing classes that support industry-identified, high-demand occupations, leading to advancement of employees and reinforcement for this strong economic sector.

Building on years of teaching food safety and hazard-control courses (also known as HACCP), Chris Sannito, Quentin Fong, Brian Himelbloom and others provided many opportunities for processor training. Classes included seafood processing quality control, thermal processing, smoking seafood, and processing roe.

Last year more than 100 people from 27 communities in Alaska completed seafood processing courses. Funding support came from industry fees and agency partners.

Turning fish waste into dog treats

Part of Alaska Sea Grant's core mission is to support Alaska's seafood industry, the state's largest private employer. This year seafood quality specialist Chris Sannito trained new industry leaders and supported emerging businesses in product development.

One of Sannito's pet projects was turning pollock skins into dog treats. Sannito took 500 pounds of skins to a testing and manufacturing facility in Tampa, Florida, to produce a semisoft paste with little odor but high in protein. Dogs loved it in informal taste trials.

"We have yet to find a dog that would turn them down," Sannito said.

As a result of this research, Sannito and Quentin Fong, seafood marketing specialist, received the 2017 Invent Alaska award from the UAF Office of Intellectual Property and Commercialization. The next step is to find industry partners to develop a commercialized product.





NORTH STAR
Homer, AK



Climate change and Alaska's fisheries

The effects of climate change on Alaskans, particularly fishermen, commercial or otherwise, is a major focus for Terry Johnson. This year he melded scientific research and observations by the public and industry into the 30-page publication *Climate Change and Alaska Fisheries*.

Johnson concluded that during the working lifetime of today's younger fishermen, effects of long-term climate change on the fish they target will be profound. Some species will be affected more than others but overall warming ocean temperatures will not be cataclysmic. In 30 years most existing fisheries will continue to be productive, Johnson found, with some changes. To survive and prosper fishermen and communities will need to develop adaptive strategies.

Johnson has presented his findings at more than 10 events. *Pacific Fishing Magazine*, with the largest industry circulation in Alaska, reprinted the publication, and Seafoodnews.com, a leading online industry news service, published a story on Johnson's presentations.



A one-stop-shopping resource for Bristol Bay

The Bristol Bay sockeye fishery is the world's most valuable wild salmon fishery, at \$1.5 billion. Our Dillingham-based Marine Advisory agent Gabe Dunham lives in the heart of this sockeye salmon capital of the world. From the docks to the classroom and in the field, Dunham educates hundreds of fishermen and others in everything from vessel safety to climate change to direct-marketing their catch.

At the Bristol Bay Fish Expo in Naknek this year, Dunham spoke about marine safety and business. "People wanted to talk about the upcoming fishing season, and fish forecasts," said Dunham.

Elsewhere in the state Dunham taught workshops on safety, fishing business, boat insurance, fish quality, and crew contracts. In six coastal Alaska communities, commercial, sport, subsistence, and pleasure boat users enrolled in Dunham's outboard engine maintenance workshop. The popular class has spread to Kodiak, Homer and Southeast Alaska where it is taught by other instructors.



NOAA Permit #14122

Groundbreaking research on humpback whale behavior

Alaska Sea Grant-funded researchers are the first to scientifically document that humpback whales eat juvenile salmon released from hatcheries.

Prompted by video taken by a hatchery owner, PhD student Ellen Chenoweth observed the whale feeding behavior from 2010 to 2015. The whales were hanging out in shallow water around a hatchery release site in Southeast Alaska and gobbling up young salmon, rather than their usual favorite food item, krill.

“It is part of a seasonal feeding strategy and, in some cases, they return year after year,” Chenoweth told *New Scientist* magazine. The research showed that humpback predation is significantly affecting the survival of hatchery-released salmon.

Chenoweth’s paper in the journal *Royal Society Open Science* received widespread media attention in the *New York Times*, *Science News*, *Food & Wine*, and the *Daily Mail*.

Do fishing locations change based on climate shifts?

Ocean changes can have dramatic implications for coastal communities and economies. How far north are fishermen willing to follow shifting fish populations? Are fishing trips longer during warmer years, causing fishermen to spend less time in port communities? Fishery managers, communities and industry players need answers to these questions and others so they can prepare for the environmental changes happening in our state.

Researchers Franz Mueter and Jordan Watson used data from 30,000 fishing vessel trips over seven years, considering items including ship locations, fishing landings and observer data to figure out how fishing trips varied. They found that larger pollock vessels may be more resilient to shifting pollock distributions because they can travel farther to follow the fish. However, during low abundance years large vessels were not immune to the lower catches per day experienced by smaller vessels.

This is the first study to use the satellite-signal vessel monitoring system, mandated on pollock vessels, to identify specific fisheries by gear, region, and target species in US fisheries. Their innovative approach has now been adapted for vessels in the Gulf of Mexico in various gear groups, indicating its broad utility.





ENVIRONMENTAL LITERACY AND WORKFORCE DEVELOPMENT





Partnering with school districts

Thousands of Alaska's K-12 students statewide are learning more about seas and watersheds after increased investment and innovation solutions by Alaska Sea Grant and partners. Marilyn Sigman, marine education specialist, worked with the Anchorage School District on a three-year \$10,000 grant to the district—Alaska's largest—to improve marine literacy instruction.

With her assistance, the district developed a fourth-grade science-technology-engineering-mathematics (STEM) teaching kit with emphasis on the salmon life cycle. The classroom teaching kit was implemented in January 2017 as the required fourth-grade curriculum in 150 classrooms, reaching 3,750 students annually.

Sigman extended the grant program statewide to help districts upgrade their science curriculum to meet new national standards. Three-year \$10,000 grants also paid for field trips and equipment and supplies.

Beginning in 2014, Alaska Sea Grant committed \$113,000 to 10 of Alaska's 56 school districts in 19 communities. Professional development was provided to 171 K-8 teachers who reach 3,500 students. More than 1,000 students participated in field trips in spring 2016. Sigman helped school districts engage dozens of community partners allied with education, stewardship and celebration of the local environment.

National Ocean Sciences Bowl

In September 2017 Unalaska high school students enjoyed working with “charismatic megafauna” after being invited by Alaska Sea Grant to help necropsy a dead northern fur seal.

The students, who are members of the 2018 Unalaska National Ocean Sciences Bowl team, assisted Melissa Good as she trimmed tissue from the seal carcass for a national marine mammal stranding data bank.

“Involving students in these strandings gives them a sense of place and belonging to the ecosystem and their community, and fosters stewardship for conserving the natural environment,” said Good, Marine Advisory agent.

The student team will spend the next five months studying marine science to prepare for the Alaska competition in February, when they will participate in a quiz bowl and present a research project. As team coach, Good plans to do a lot of hands-on outdoor projects with the students this year.





Good coached the team “Lucky Pollucky” last year, which placed 9th out of 18 teams. Marine Advisory agent Sunny Rice coached the “Higher Porpoise” team in Petersburg, who came in 8th, and Julie Matweyou assisted with many training activities for Kodiak’s “Team Squidoodly.”

NOSB encourages students to lean toward the sciences and gives them opportunities to experience hands-on science in the field, labs and classrooms. Each team will have different experiences prior to coming together, but they are all wholly engaged in ocean sciences by the start of the competition, said Good.

Exploring undersea forests

“Underwater Forests of the Aleutians” is a traveling exhibit displayed in Unalaska and St. Paul Island, and destined for more Alaska venues. It has 10 freestanding displays, hands-on natural artifacts and an iPad with videos on kelp research. The “instant museum” is the result of a National Science Foundation–supported collaboration with Melissa Good, UAF College of Fisheries and Ocean Sciences professor Brenda Konar and US and international partners.

“The Aleutian Islands harbor this beautiful, dynamic and productive system that many people currently rely on but seldom can picture,” Good said. “This exhibit brings people into the kelp forests and tells a story about our past and present.”



ADVISORY COMMITTEE

James Balsiger Alaska Region Administrator
NOAA National Marine Fisheries Service

Kaja Brix (alt.) Arctic Program Director
NOAA Fisheries Alaska Region

Peggy Cowan
Juneau

Pete Esquiro
Sitka

Diana Evans Deputy Director
North Pacific Fishery Management Council

Jeff Kauffman Vice President
Central Bering Sea Fishermen's Assoc.

Lea Klingert President
Commercial Fishing and Agriculture Bank

Molly McCammon Executive Director
Alaska Ocean Observing System

Vera Metcalf Director
Eskimo Walrus Commission at Kawerak, Inc.

Kris Norosz
Petersburg

Amanda Painter Operations Manager
Allen Marine

Mary Pete Director
UAF Kuskokwim Campus

Dave Reggiani
Unakwik Aquaculture Group, LLP

Alice Ruby Mayor
Dillingham

Ralph Samuels Vice President of
Government & Community Relations
Princess Cruises/Holland America

Fred Schlutt Director
UAF Cooperative Extension Service

Chris Siddon Marine Fisheries Scientist
Alaska Department of Fish and Game

Greg Siekaniec Regional Director
USFWS Alaska

Jeff Stephan Manager
United Fishermen's Marketing Association

Five state fellows begin 2017 positions

We have five new Alaska Sea Grant State Fellows—Genevieve Johnson, Chelsea Clawson, Danielle Meeker, Kim Ovitz, and Sara Cleaver. All have completed or will soon earn master's degrees. Johnson and Clawson are graduate students at the University of Alaska Fairbanks College of Fisheries and Ocean Sciences. Meeker is from Scripps Institution of Oceanography, Ovitz from the University of Maine, and Cleaver from Duke University.

The fellowship program, now in its third year, offers graduate students early career opportunities in marine and coastal policy. The program matches fellows with hosts in state or federal agencies in Alaska for a 12-month paid fellowship. Alaska Sea Grant shares costs with agency hosts.

Genevieve Johnson is at the NOAA Alaska Fisheries Science Center in Juneau, working on arctic ecosystem monitoring and a salmon genetics project. The US Geological Survey in Anchorage selected Chelsea Clawson to address hazard mitigation with an emphasis on coastal flood mapping.

Danielle Meeker is working at the Office of the Lieutenant Governor in Juneau, on climate change and fisheries. Sara Cleaver is a fishery analyst for the North Pacific Fishery Management Council in Anchorage. The National Marine Fisheries Service Alaska Regional Office in Anchorage recruited Ovitz to assess management needs for Cook Inlet beluga whales.



Genevieve Johnson



Chelsea Clawson



Danielle Meeker

"I'm really looking forward to this opportunity! This will be my first time in Alaska and working on marine mammal/protected resources conservation. I'm really honored to have been selected as a Sea Grant fellow," said Ovitz.

2016 fellows: Jane Sullivan, who worked for NOAA Sustainable Fisheries in Juneau, was recently hired as a biometrician at the Alaska Department of Fish and Game. Jen Marsh spent a year working for NOAA Fisheries Habitat Conservation, and Sara Apsens was with the National Park Service.

Alaska student awarded marine policy fellowship in DC

Maggie Chan, graduate student at the University of Alaska Fairbanks, will head to Washington, DC, next

year as a Knauss Marine Policy Fellow. She is in a select group of 61 fellows nominated by Sea Grant programs nationwide who will start fellowships in February 2018.

Chan is a PhD candidate in the UAF College of Fisheries and Ocean Sciences, studying the effects of regulations on subsistence and sport halibut fishing. If given the option, Chan would work in the legislative branch. "A legislative fellowship would help me synthesize our national perspective toward marine resources, and I hope to take that perspective to the international fisheries management stage," she said.

Alaska Sea Grant is sponsoring two Knauss Fellows in 2017. Charlotte Regula-Whitefield works in the DC office of Sen. Lisa Murkowski, and Kelly Cates is at the NOAA Office of Legislative and Intergovernmental Affairs.



Kim Ovitz



Sara Cleaver



Maggie Chan

Graduate students working on Alaska Sea Grant–funded research projects

Amanda Blackburn MS OCEANOGRAPHY
Application of Seafloor Geology to Benthic Habitat Research

Richard Buzard MS GEOLOGY
Developing Long-Term Records of Sea Level Fluctuations and Barrier Beach Evolution to Enhance Understanding of Ongoing and Future Coastal Change

Ellen Chenoweth PHD FISHERIES
Recovering Humpback Whales and the Future of Alaska's Hatcheries, Fisheries and Coastal Communities

Jesse Coleman PHD FISHERIES
Graying of the Fleet in Alaska's Fisheries: Defining the Problem and Assessing Alternatives

Douglas Duncan MS FISHERIES
Navigating the Predator Gauntlet: Impacts of Nearshore Marine Fishes on Hatchery and Wild Juvenile Salmon in Southeast Alaska

Thomas Farrugia PHD FISHERIES
Economic Viability of a Directed Skate Fishery in the Gulf of Alaska

Sonia Ibarra PHD FISHERIES
Sustainability of Coastal Communities and Sea Otters: Harvest and Future Management of Sea Otters

Jillian Jablonski MS INTERDISCIPLINARY
Incorporating Environmental Change in Planning for Healthy Coastal Ecosystems and Economies

Wendel Raymond PHD FISHERIES
Sustainability of Coastal Communities and Sea Otters: Harvest and Future Management of Sea Otters

Marta Ree MS FISHERIES
Exploring Linkages Between Marine and Freshwater Ecosystems to Predict Sockeye Salmon Responses to Climate Change and to Inform Enhancement Options on Kodiak Island, Alaska

Danielle Ringer MA INTERDISCIPLINARY (GRADUATED)
Graying of the Fleet in Alaska's Fisheries: Defining the Problem and Assessing Alternatives

Alicia Schuler MS FISHERIES
Assessing the Costs and Benefits of Whale Watching in Juneau, Alaska

Sarah Traiger PHD MARINE BIOLOGY
Habitat Degradation Due to Melting Glaciers: Effects of Glacial Discharge on Kelp Bed Community Recruitment and Succession in Kachemak Bay

Jordan Watson PHD FISHERIES
Capturing Spatial Behaviors of Observed and Unobserved Fishing Over Time Using Vessel Monitoring System Data

Benjamin Williams PHD FISHERIES
Parallel and Divergent Fishery Management Structures in State and Federal Waters

Factors Influencing Waterbird Abundance and Distribution on the Copper River Delta, Alaska

Jillian Jablonski*¹, Audrey Taylor¹, Erin Cooper², Martin B. Berg³, Jennifer Piacente³, Gary A. Lambert⁴ and Amelia McReynolds⁴

Introduction

- Over 10 million waterfowl and shorebirds use the Copper River Delta (CRD) as a stopover or breeding site.
- Main drivers of waterbird distribution and breeding chronology on the CRD are largely unknown.
- Alaska has warmed over twice as fast as the rest of the U.S. in the past 60 years due to global climate change¹, and will continue to warm at an accelerated rate.
 - How will waterbirds respond to this environmental change?
 - How might these changes affect opportunities for nature-based tourism on the Copper River Delta?

Objectives

- Evaluate the relative importance of potential biotic and abiotic drivers of waterbird distribution and breeding chronology on the Copper River Delta.
- Investigate how two climate-induced changes may be exerting influences on this aquatic system:
 - Invasion of the aquatic plant *Elodea canadensis*
 - Warming pond water temperatures

1) Warming of Ponds

CHANGES IN WATERBIRD FOOD SOURCE
Earlier aquatic invertebrate emergence, smaller size?



Shifts in waterbird distribution and/or breeding?

2) *Elodea canadensis*

CHANGES IN AQUATIC HABITAT
Alters native vegetation and invertebrate communities?

WATERBIRD ABUNDANCE



A total of 738 individual birds were observed on the Copper River Delta in 2016. Each species was categorized into "early" or "late" nester categories based on breeding chronology and field observations.



Histogram of early versus late nester hatch dates observed for successful nests and back-dated broods.



*The Copper River Delta experienced high winds and heavy rain during our final sampling visit in late July. The majority of cold ponds were sampled in the days prior to this weather event, but the temperature recalcitrancy seen in this sampling event.

Results

TEMPERATURE

Ponds were categorized as "cold" or "warm" based on pond water temperatures mid-May through late June (i.e. the nesting period).

During the nesting period, the warm ponds were an average of 2.3°C warmer than cold ponds ($p < 0.001$).

Average temperature of cold ponds for this period: 16.8°C

Average temperature of warm ponds for this period: 19.1°C

Mean waterbird abundance per visit	All waterbird density	Shorebird density	Waterfowl density
7.5 ± 6.3	2.2 ± 2.4	0.2 ± 0.4	1.7 ± 1.9
11.2 ± 15.8	4.5 ± 3.2	1.0 ± 1.6	2.7 ± 2.2

Ponds with *Elodea*

Ponds without *Elodea*

Mann-Whitney U Test for significant differences

p -value = 0.95

p -value = 0.18

p -value = 0.27

p -value = 0.41

Discussion

Relationship between pond water temperature and relative waterbird abundance and distribution on the CRD is largely unknown.

Methods

- Surveys conducted May 24 – July 25, 2016
- Ponds visited every two weeks
- 18 study ponds representing a spectrum of habitat conditions and waterbird abundance
- Natural temperature gradients
 - Colder to the east due to the influence from Copper River winds
 - Colder in areas with glacial groundwater influence on glacial outwash plains
- Ongoing infestation of *Elodea canadensis*
 - Five study ponds infested with *Elodea*



Variables sampled

- Waterbird abundance, nest density, nesting chronology
- Aquatic invertebrate community structure
- Pond area, perimeter length
- Aquatic and terrestrial vegetation communities
- Water quality and chemistry

Winter marine bird distribution in Prince William Sound: spatial and temporal patterns



Mary Anne Bishop¹, Kathy Kulev², Jessica Vlecking³, Anne Schaefer⁴
¹Princess Sound Science Center, Cordova, AK 99574, ²USGS Wildlife Service, Anchorage, AK 99508

Background

Approximately 250,000 marine birds (including 100,000+ gulls) winter in Prince William Sound (PWS). The most abundant species include the common goldeneye, Kinglet, and PWS grebe. PWS provides a critical period for seabird nesting, and relative abundance of species varies among years. The PWS grebe population has declined significantly since 2000.

Results

Species	Year	Abundance
Common Goldeneye	2010	150,000
	2011	140,000
Kinglet	2010	100,000
	2011	90,000
PWS Grebe	2010	50,000
	2011	40,000

Ms. Jillian Jablonski
University of Alaska Anchorage

ALASKA SEA GRANT BY THE NUMBERS



1,376

K-12 students educated in marine science

506

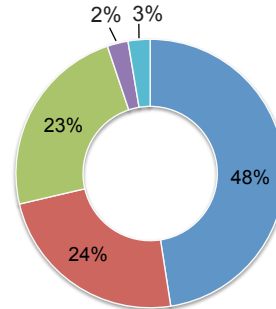
K-12 educators trained



175

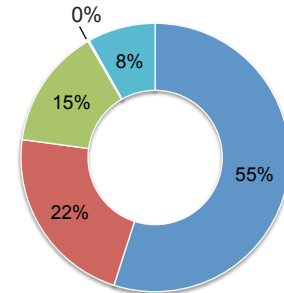
Businesses sustained or created

Operating Revenue



- ASG Core Funds (federal and match)
- University of Alaska Funds
- Grants
- Donations (cash and in-kind)
- Program Income

Expenditures



- MAP and Communications
- Research and Student Fellowships
- Education and State Fellowships
- Program Development
- Program Administration



338

Fishermen/processors trained



207

Jobs sustained or created



11

Graduate students worked on Alaska Sea Grant-funded research



18,000

Publications distributed

Operating Revenue, Year 3 Omnibus (partial FY17)

ASG Core Funds (federal and match)	\$2,860,003
University of Alaska funds	\$1,431,396
Grants	\$1,412,973
Donations (cash and in-kind)	\$151,056
Program Income	\$159,215

Expenditures

MAP and Communications	\$3,332,910
Research and Student Fellowships	\$1,343,954
Education and State Fellowships	\$880,067
Program Development	\$10,733
Program Administration	\$495,221



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Program Administration

Paula Cullenberg, Director
 Tara Borland, Program Manager
 Beverly Bradley, Marine Advisory Program Coordinator
 Jared Jeffery, Fiscal Coordinator
 Astrid Rose, Program Assistant
 Terri Schimmack, Administrative Assistant

Research

Ginny Eckert, Associate Director for Research
 Michele Frandsen, Research Coordinator

Education and Communications

Paula Dobbyn, Communications Manager
 Sue Keller, Publications Manager/Symposium Coordinator
 Dawn Montano, Publications Specialist
 Dave Partee, Communications and Web/Database Developer
 Marilyn Sigman, Marine Education Specialist

Marine Advisory Program

Sunny Rice, Program Leader/Marine Advisory Agent, Petersburg
 Torie Baker, Associate Leader/Marine Advisory Agent, Cordova
 Gabe Dunham, Marine Advisory Agent, Dillingham
 Quentin Fong, Seafood Marketing Specialist, Kodiak
 Gary Freitag, Marine Advisory Agent, Ketchikan
 Melissa Good, Marine Advisory Agent, Unalaska
 Brian Himelbloom, Retired, Kodiak
 Davin Holen, Coastal Community Resilience Specialist, Anchorage
 Terry Johnson, Marine Recreation and Tourism Specialist, Anchorage
 Julie Matweyou, Marine Advisory Agent, Kodiak
 Chris Sannito, Seafood Technology Specialist, Kodiak
 Gay Sheffield, Marine Advisory Agent, Nome

Marine Advisory Program Affiliate and Emeritus Faculty

Jerry Dzugan, Affiliate	Bree Witteveen, Affiliate
Alexandra Oliveira, Affiliate	Chuck Crapo, Emeritus
Susan Sugai, Affiliate	Ray RaLonde, Emeritus
Patricia Tester, Affiliate	Kate Wynne, Emeritus

Photographers (pictured). Front cover Emily Whitney (L-R UAF associate professor Anne Beaudreau, UAS undergrad Zach Johanson, UAF MS student Douglas Duncan). P 5 Gay Sheffield (whalers St Lawrence I). P 7 Dawn Montano (sea otters). P 7 Kelly Bakos. P 8 Gabe Dunham (R Alice Julius). P 11 Lauren Frisch (Golovin). P 13 Julie Matweyou (intern Mandi Cox). P 14 Valdeko Kreil (L-R Chris Dankmeyer, Chris Sannito, Brian Himelbloom, Cyrus Harris). P 17 Chris Sannito. P 18 Terry Johnson. P 20 Clark Fair (R Gabe Dunham). P 21 Ellen Chenoweth. P 23 Jordan Watson. P 24 Paula Dobbyn. P 28 Brenda Konar. P 33 Audrey Taylor. Back cover Deborah Mercy.

