

ALEUTIAN LIFE FORUM



Building Resilience in the Face of Change

Program and Abstracts

Third Aleutian Life Forum
August 16-20, 2016
Grand Aleutian Hotel | Unalaska, Alaska

Monday	Tuesday	Wednesday	Thursday	Friday		Saturday
Kodiak / Aleutians Subsistence Regional Advisory Council Meeting, Grand Aleutian	Opening Welcome Keynote: Jim Gamble and Arctic Youth Ambassadors	Welcome Keynote: John Gauvin	Welcome Invited Speaker: Karen Pletnikoff Coastal Resilience	Workshop 1: Promoting Coastal Resilience and Adaptation in Alaska	Workshop 2: Endangered and Declining Species in the Aleutians: Are the Declines Driven by Changes in the Ecosystem or Human Interaction?	Workshop 1: Promoting Coastal Resilience and Adaptation in Alaska (continued)
	Break	Break	Break			
	Sustainable Fisheries in a Changing Climate	Vessel Traffic Risks and Spill Response	Establishing Effective Local Environmental Observer Networks			
	Lunch on your own	Lunch on your own	Lunch on your own			
	Sustainable Fisheries in a Changing Climate	Coastal Hazards of Erosion, Inundation, and Contaminants	Stakeholder and Listening Synthesis			Heart of the Aleutians sK run
	Break	Break	Break			
	Ocean Acidification	Effective Science Communication	Stakeholder and Listening Synthesis			
	Barbecue and Unalaska Unangax Dancers	Seafood Feast! 6:00	Heart of the Aleutians Cultural Celebration and AYA Social			
Subsistence Public Advisory Committee						

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After the forum, please fill out the evaluation survey at <http://www.alieutianlifeforum.com/survey>

Steering Team

Nikita Robinson (Chair), Qawalangin Tribe, Unalaska, Alaska

Marianne Aplin, Alaska Maritime National
Wildlife Refuge, Homer, Alaska

Matthew Baker, North Pacific Research Board, Anchorage, Alaska

Douglas Burn, Aleutian and Bering Sea Islands Landscape
Conservation Cooperative, Anchorage, Alaska

Melissa Good, Alaska Sea Grant, University
of Alaska Fairbanks, Unalaska, Alaska

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Karen Pletnikoff, Aleutian Pribilof Islands
Association, Anchorage, Alaska

Aaron Poe, Aleutian and Bering Sea Islands Landscape
Conservation Cooperative, Anchorage, Alaska

Chris Price, Qawalangin Tribe, Unalaska, Alaska

Sponsors



Overview

The Aleutian Life Forum (ALF) is a conference gathering of national, state, and regional scientists, industry stakeholders, community leaders, and local knowledge holders to promote resilient coastal communities. At this conference, pressing conservation issues will be brought forward for discussion and action through informational sessions and community workshops.

Registration for the event will be available from 5 to 7:00 pm Monday, August 15, in the first floor lobby of the Grand Aleutian Hotel and from 7 to 8:15 am on Tuesday, August 16, in the Shishaldin Room at the Grand Aleutian Hotel for conference materials pick-up. Presentations will begin Tuesday, August 16 at 8:15 am.

A light breakfast and afternoon refreshments will be provided during the designated breaks each day from Tuesday to Saturday in the Shishaldin Room. All other meals are on your own.

Oral presentations and workshops will take place during the following sessions in the Makushin Room:

Session 1: Sustainable Fisheries in a Changing Climate

Session 2: Ocean Acidification

Session 3: Vessel Traffic Risks and Spill Response

Session 4: Coastal Hazards of Erosion, Inundation, and Contaminants

Session 5: Effective Science Communication

Session 6: Establishing Effective Local Environmental Observer Networks

Session 7: Stakeholder and Listening Synthesis

Workshop 1: Promoting Coastal Resilience and Adaptation in Alaska

Workshop 2: Endangered and Declining Species in the Aleutians: Are the Declines Driven by Changes in the Ecosystem or Human Interaction?

Additional Events to Be Held During the Forum

Monday, August 15, 9:00 AM-5:00 PM: Kodiak/Aleutians Subsistence Regional Advisory Council, Grand Aleutian Hotel

Tuesday, August 16, 5:15-6:30 PM: Barbecue featuring Unalaska's Unangax Dancers, Museum of the Aleutians (pre-registrants only)

Wednesday, August 17, 6:00-9:00 PM: Seafood Buffet, Grand Aleutian Hotel Makushin Room (pre-registrants only)

Thursday, August 18, 6:30-8:30 PM: Alaska National Geographic's Arctic Youth Ambassadors invite the local youth of Unalaska to attend a movie and ice cream social, Unalaska WWII Museum

Community Activities (on your own)

Sunday, August 14, 8:30 AM-6:00 PM: KUCB's Annual Aleutian Tundra Golf Classic, Pyramid Valley. Contact KUCB at (907) 581-1888 for more information.

Thursday, August 18, 5:00-10:00 PM: Heart of the Aleutians Cultural Celebration Evenings, Kelty Field.

Friday, August 19, 5:00-10:00 PM: Heart of the Aleutians Cultural Celebration Evenings, Kelty Field.

Saturday, August 20, 12:30 PM: Heart of the Aleutians Festival and 5K run, Kelty Field.

Keynote Biographies

The following professionals will give invited talks at the forum.

Aleut International Association

Jim Gamble, Executive Director, Aleut International Association and Permanent Participant in the Arctic Council

The Aleut International Association (AIA) (<http://www.aleut-international.org/>) promotes continuity of Aleut culture between Alaska and the Russian Federation and the natural resources needed to sustain it. Based in Anchorage, Alaska, AIA has member villages in Alaska and Russia and administers the Community Observation Network for Adaptation and Security (CONAS), a distributed network of eight Alaska and Russian villages working to develop a suite of adaptive capacity indicators. AIA is a Permanent Participant in the Arctic Council where it is active in the Arctic Contaminants Action Program (ACAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention Preparedness and Response (EPPR), Protection of the Arctic Marine Environment (PAME), and Sustainable Development Working Group (SDWG). AIA was also active in most of the Task Forces and Expert Groups of the Arctic Council. AIA is currently bringing forward projects on the creation of a tool for communities to map their marine use, the evaluation of community exposure to black carbon emissions, documentation of an endangered dialect of the Aleut language, and an examination of how solid waste is handled in small communities.

Jim Gamble has served as AIA's assistant director and executive director since starting with the agency in 2007. He was born in Anchorage, Alaska, and graduated from the University of Alaska Anchorage with a degree in biology, after which he turned his attention to administration and public policy. He is the current lead for AIA in the ACAP, PAME, and SDWG working groups as well as the Task Forces on Arctic Marine Cooperation and Scientific Cooperation. He also served on the Task Force on Short Lived Climate Forcers, the Task Force on Marine Oil Pollution Preparedness and Response, the Task Force on Marine Oil Pollution Prevention, and the Task Force for Action on Black Carbon and Methane. He has published articles and papers on topics such as the connection between subsistence and culture, subsistence use mapping as a tool for community empowerment, the Aleutians as a shipping crossroads, and the role of the Permanent Participants in the Arctic Council.



Arctic Youth Ambassadors Program, Alaska Geographic

Cade (Emory) Terada, Unalaska, Alaska

Cade Terada is a Japanese American from Unalaska. He attends Unalaska City School and is an active youth organizer for Alaska Youth for Environmental Action. He is a member of the local Teen Council where he works to empower youth in his community. His father always encouraged him to help others as much as he possibly could. Cade enjoys hiking, cross-country running, traveling and meeting new people, as well as drama, debate, and forensics. Cade is interested in representing his community because of its dependence on the seafood industry. Cade credits the seafood industry for making the Port of Dutch Harbor his home. He wants to represent his community as an ambassador, a place that is changing due to climate change.



Carter Price, Unalaska, Alaska

Carter Price was raised in Unalaska and is an Alaska Native, an Aleut, and the tribal youth representative of the Qawalangin Tribe. He is an honor student at the Unalaska City School and is vice president of his junior class. He enjoys cross-country, basketball, and traveling, especially around rural Alaska. Carter was taught to provide for the elders in his community. Whether to provide salmon, halibut, or crab, he always does his best to take care of elders in need. Carter feels fortunate to be a part of a resource-rich community where bountiful fisheries provide jobs and sustainable economic opportunities. He believes that oil spills and the impacts of climate change will severely curtail the resources and way of life. Carter wants to use his voice to advocate for the protection of resources and responsible sustainable development, such as clean alternative energy sources like wind, hydro, and geothermal.



Jannelle Trowbridge, Nome, Alaska

Jannelle Trowbridge is a musher from Nome, born in Grand Rapids, Michigan. She and her family of four sailed through the Northwest Passage on a 30-foot wooden sailboat, and by chance they landed in Nome. Jannelle was involved with the Nome Native Youth Leadership Organization and

Sister School Exchange. The Alaska Native Science and Engineering Program (ANSEP) coordinated with the United States Geological Survey to employ her as a summer intern to collect bivalves (clams) in the Chukchi Sea. The purpose of the research is to see how clam growth rings correlate with sea ice. Janelle is currently at the University of Alaska Anchorage, seeking a BS in biology. She is eager to develop her voice on the Arctic and her excitement grows as she imagines the opportunities of culture and science exchange, as well as being an advocate for her community. She feels that her dad's words of advice, "when you get the chance to dance, dance," ring true.



Keemuel Kenrud, Togiak, Alaska

Based in Togiak, Keemuel Kenrud is currently working for the U.S. Fish and Wildlife Service, Togiak National Wildlife Refuge. His grandfather, Pete Abraham, raised him from a young age to observe and respect the land and to keep his Native values. He was brought up in a subsistence lifestyle in which he was taught how to hunt and fish. Throughout his life, Keemuel has noticed many changes in Alaska, both major and minor. The changing climate has heavily affected Keemuel and his family and many others throughout Alaska.



Macy Rae Kenworthy, Kotzebue, Alaska

Originally from Kotzebue, Macy Kenworthy spent a majority of her childhood across Kotzebue Sound at her family's camp in Sisaulik, where her love for the outdoors began. She graduated from Mt. Edgecumbe High School in Sitka, where her passion for science grew. Macy had the opportunity to participate in internships with the National Park Service through the Alaska Native Science and Engineering Program (ANSEP) and Student Conservation Association (SCA). Macy is currently a sophomore at the University of Alaska Fairbanks pursuing a double major in chemistry and secondary education. In the future, she plans on teaching high school science and continuing her work in a conservation field.



Alaska Seafood Cooperative

John Gauvin, Science Projects Director, Alaska Seafood Cooperative and Representative of Bering Sea and Aleutians Fleet

John Gauvin has an MS in resource economics from the University of Rhode Island and is currently the fisheries science director for the Alaska Seafood Cooperative. Over the last 25 years he has worked in fisheries management as a fishery economist, and completed various consulting contracts with NOAA Fisheries, regional fishery management councils, FAO, and the Organization for Economic Co-operation and Development (OECD). Since 1997, Gauvin has focused on cooperative research to develop solutions to environmental issues such as gear modifications to reduce bycatch, and revamping flatfish trawls to reduce seafloor habitat effects. This work has involved extensive collaborations with scientists at the NOAA Alaska Fisheries Science Center and universities, and with fishing captains and vessel owners. Gauvin also serves on the board of directors of the North Pacific Research Board and is president of the Marine Conservation Alliance.



All sessions will be held in the Makushin Room of the Grand Aleutian Hotel. Presentations and times are subject to change.

Monday, August 15, 2016

9:00 AM-5:00 PM

Kodiak/Aleutians Subsistence Regional Advisory Council

5:00 PM-7:00 PM

REGISTRATION

Tuesday, August 16, 2016

7:15-8:15 AM

REGISTRATION AND LIGHT BREAKFAST

8:15-8:45 AM

Welcome

Thomas Robinson, President of Qawalangin Tribe of Unalaska

8:45-9:30 AM

KEYNOTE

Arctic Council and Youth Ambassadors

Jim Gamble, Alaska Geographic, Arctic Youth Ambassadors Program

9:30-10:00 AM

BREAK

SESSION 1: SUSTAINABLE FISHERIES IN A CHANGING CLIMATE (PART 1)

Session Chair: Matthew Baker

10:00-10:15 AM

Aleutians Research

Matthew Baker, North Pacific Research Board (NPRB)

10:15-10:30 AM

Updating the Aleutian Islands Fisheries Ecosystem Plan

Ivonne Ortiz, University of Washington and NOAA Alaska Fisheries Science Center

10:30-10:45 AM

Bridging Management Gaps for Important Ecological Areas in the Aleutian Islands

Jon Warrenchuk, Oceana

10:45-11:00 AM**Bottom Trawl Surveys of the Aleutian Islands Characterize Demersal Fish and Invertebrate Populations***Wayne Palsson, NOAA Alaska Fisheries Science Center***11:00-11:15 AM****Quantifying and Evaluating Implications for Trawlable and Untrawlable Habitat***Matthew Baker, North Pacific Research Board***11:15-11:30 AM****Fall/Winter Distribution of Legal Red King Crab in Bristol Bay Using Daily Fishing Logs***Leah Sloan, University of Alaska Fairbanks***11:30-11:45 AM****Plankton Population Variability Determined from a Ship of Opportunity Transect Through the Aleutians***Sonia Batten, Sir Alister Hardy Foundation for Ocean Science***11:45 AM-12:00 PM****Evaluating the Efficacy of Trawl Exclusion Zones for Protecting Steller Sea Lion Groundfish Prey: Examining Local Fish Abundance and Movement Around Steller Sea Lion Rookeries***Susanne McDermott, NOAA Alaska Fisheries Science Center***12:00-1:00 PM****LUNCH ON YOUR OWN**

SESSION 1: SUSTAINABLE FISHERIES IN A CHANGING CLIMATE (PART 2)*Session Chair: Matthew Baker*

1:00-1:15 PM**The Sustainable Future of Fisheries Through Utilization***Rick Fehst, Bering Sea Captain***1:15-1:30 PM****How Climate Change Is Affecting Alaska Fisheries and How Industry and Fisheries-Dependent Communities Can Adapt***Terry Johnson, Alaska Sea Grant, University of Alaska Fairbanks***1:30-1:45 PM****Graying of the Fleet in Alaska's Fisheries: Defining the Problem and Assessing Solutions***Paula Cullenberg, Alaska Sea Grant, University of Alaska Fairbanks*

1:45-2:00 PM

Coupling Fisher Behavior with the System That Drives It: Using Vessel Monitoring System Data to Track Fishing Characteristics in the Bering Sea Fishery for Walleye Pollock

Jordan Watson, University of Alaska Fairbanks and Pacific States Marine Fisheries Commission

2:00-2:30 PM

Group Discussion

2:30-3:00 PM

BREAK

SESSION 2: OCEAN ACIDIFICATION

Session Chair: Darcy Dugan

3:00-3:10 PM

Briefing on the New Alaska Ocean Acidification (OA) Network

Darcy Dugan, Alaska Ocean Observing System (AOOS)

3:10-3:45 PM

Introduction to Ocean Acidification and Integrated Ocean Monitoring in Coastal Alaska

Jessica Cross, NOAA Pacific Marine Environmental Laboratory

3:45-4:10 PM

Ocean Acidification and Shellfish Fishery Resources in the Aleutian Islands

Bob Foy, NOAA Alaska Fisheries Science Center

4:10-4:35 PM

Economic Risks to Alaska Communities from Ocean Acidification

Steve Colt, Institute of Social and Economic Research, University of Alaska Anchorage

4:35-4:50 PM

Q&A Session

Evening Events

Barbecue Featuring the Unalaska Unangax Dancers

5:15-6:30 PM | Museum of the Aleutians

Kodiak/Aleutians Subsistence Regional Advisory Council

7:00-9:00 PM | Grand Aleutian Hotel

Wednesday, August 17, 2016

7:15-8:15 AM

REGISTRATION AND LIGHT BREAKFAST

8:15-8:25 AM

ANNOUNCEMENTS

8:25-9:15 AM

KEYNOTE

Overview of the Bering Sea Groundfish and Crab Industry's Cooperative Research Projects and Initiatives to Improve Fisheries and Address Conservation and Management Mandates

John Gauvin, Alaska Seafood Cooperative and Bering Sea and Aleutians Fleet

9:15-9:30 AM

BREAK

SESSION 3: VESSEL TRAFFIC RISKS AND SPILL RESPONSE

Session Chair: Douglas Burn

9:30-9:45 AM

Bottom-up Approaches to Building Social-Ecological Resilience in Arctic Marine Ecosystems: The Open Water Season Conflict-Avoidance Agreement and the Arctic Waterways Safety Plan

Martin Robards, Wildlife Conservation Society

9:45-10:00 AM

Unified Oil Spill Contingency Planning

Lieutenant Commander Matt Hobbie, U.S. Coast Guard

10:00-10:15 AM

Understanding the Risks of Vessel Groundings in the Aleutian Islands

Douglas Burn, Aleutian and Bering Sea Islands Landscape Conservation Cooperative

10:15-10:30 AM

Aleutian Island Shipping Alternative Planning Criteria Program: "Fact v Fiction"

Steven Gabelein, Alaska Maritime Prevention and Response Network

10:30-10:45 AM

Integrating Local Resources into a Spill Response: How Alaska Chadux Uses Vessels of Opportunity

Christopher Burns, Alaska Chadux Corporation

10:45-11:00 AM

Programmatic Changes and Aleutian Assets

Lisa Krebs-Barsis, Alaska Department of Environmental Conservation

11:00-11:15 AM

NOAA Scientific Support for Incident Response

Catherine Berg, NOAA Office of Response and Restoration

11:15-11:30 AM

1-Call Alaska's Approach to Alternative Planning Criteria for Oil Spill Response in the Aleutians and Along the Great Circle Route

Todd Duke, Resolve Marine

11:30-11:45 AM

Enhanced Bering Strait Community Engagement for Arctic Marine Mammal Spill Planning and Response

Karla Dutton, Defenders of Wildlife

11:45 AM-1:00 PM

LUNCH ON YOUR OWN

SESSION 4: COASTAL HAZARDS OF EROSION, INUNDATION, AND CONTAMINANTS

Session Chair: Karen Pletnikoff

1:00-1:15 PM

Sea Level Rise: Alaska's Global Contribution and Local Effects

Lizz Ultee, University of Michigan

1:15-1:30 PM

Alaska ShoreZone: A Collaborative Successful Story with Implications for Improved Coastal Planning and Response in the Aleutians

Cindy Hartmann Moore, NOAA Fisheries

1:30-1:45 PM

The Risk of Rodent Introductions from Shipwrecks to Seabirds on Aleutian and Bering Sea Islands

Martin Renner, Tern Again Consulting

1:45-2:00 PM

Mercury Concentrations in Steller Sea Lions and Their Prey in the Aleutian Islands

Lorrie Rea, University of Alaska Fairbanks

2:00-2:30 PM

Prehistoric Human Resilience in the Aleutian Islands, Alaska

Kale Bruner and Virginia Hatfield, University of Kansas

2:30-3:00 PM

BREAK

SESSION 5: EFFECTIVE SCIENCE COMMUNICATION

Session Chair: Melissa Good

3:00-3:15 PM

Alaska Sea Grant Presentation

Melissa Good, Alaska Sea Grant, University of Alaska Fairbanks

3:15-3:30 PM

Alaska’s Largest Recorded Murre Wreck: 100,000s Estimated Dead

Liz Labunski, U.S. Fish and Wildlife Service

3:30-3:45 PM

Population Trends of Red-Faced Cormorants in the Bering Sea and Aleutian Islands of Alaska

Nora Rojek, Alaska Maritime National Wildlife Refuge

3:45-4:00 PM

Place Names of Unalaska Island

Jana V. Lekanoff, University of Alaska Anchorage

4:00-4:15 PM

The Impact of Climate Change on Human Health—An Alaska Perspective

Ann Nora Ehret, Iliuliuk Family Health Services

4:15-4:30 PM

Building Community Resilience in the Face of Climate Change

Karin Sonnen, U.S. Department of Agriculture

4:30-4:45 PM

Tribal/ANCSA Corporation Consultation

Orville Lind, Office of Subsistence Management

Evening Event

Seafood Buffet

6:00-9:00 PM | Grand Aleutian Hotel

Thursday, August 18, 2016

7:15-8:15 AM

REGISTRATION AND LIGHT BREAKFAST

8:15-8:20 AM

ANNOUNCEMENTS

8:20-9:15 AM

INVITED SPEAKER

Promoting Coastal Resilience

Karen Pletnikoff, Aleutian Pribilof Islands Association

9:15-9:30 AM

BREAK

SESSION 6: ESTABLISHING EFFECTIVE LOCAL ENVIRONMENTAL OBSERVER NETWORKS

Session Chair: Nikita Robinson

10:00-10:15 AM

Qawalangin Presentation: Environmental Initiatives

Chris Price and Nikita Robinson, Qawalangin Tribe of Unalaska

10:15-10:30 AM

LEO in the Aleutians

Mary Mullan, Alaska Native Tribal Health Consortium

10:30-10:45 AM

BeringWatch/Citizen Sentinel

Lauren Divine, Tribal Government of St. Paul Island

10:45-11:00 AM

Utilizing Community-Based Observation Networks to Maximize Resilience in a Changing Arctic

Grace Beaujean, Aleut International Association

11:00-11:15 AM

Aleutian Communities Participating in Coastal Community Ocean Observers (C202), a Regional Community-Driven Ocean Observation Network

Peter Winsor, University of Alaska Fairbanks

11:15-11:30 AM

Fisheries Resource Monitoring Program (FRMP) and Partners Program

Karen Hyer, Office of Subsistence Management, U.S. Fish and Wildlife Service

11:30-11:45 AM**What Can I Do Today? Monitoring Climate Change Impacts on Your Coastline***Jacquelyn Overbeck, Alaska Division of Geological & Geophysical Surveys***11:45 AM-1:00 PM****LUNCH ON YOUR OWN**

SESSION 7: STAKEHOLDER AND LISTENING SYNTHESIS*Session Chairs: Matthew Baker and Marianne Aplin*

1:00-4:30 PM**Environmental Changes, Risks, and Impacts***North Pacific Research Board and Alaska Maritime National Wildlife Refuge*

In this facilitated session, we will summarize your thoughts on the most powerful conclusions emerging from the previous two-and-a-half days of forum presentations. We then want to hear your views about information needs and management issues in the region and invite your perspectives specifically on the Alaska Maritime National Wildlife Refuge's review of their 15 year regional management plan, and the North Pacific Research Board's efforts to solicit and set priorities for regional research.

Evening Events**Arctic Youth Ambassador Social****6:30-8:30 PM | Unalaska WWII Museum****Heart of the Aleutians Cultural Celebration****5:00-10:00 PM | Kelty Field**

Friday, August 19, 2016

8:30-9:00 AM

MORNING SNACKS AND WORKSHOP BRIEFING

9:00 AM-4:30 PM

Workshop 1: Promoting Coastal Resilience and Adaptation in Alaska

Leads: Aleutian Pribilof Islands Association, Aleutian and Bering Sea Islands Landscape Conservation Cooperative, Agnew::Beck Consulting

This workshop builds on the week's discussions by bringing together Tribes, resource managers, researchers, and others leading efforts to promote coastal resilience and adaptation in the Aleutians and Bering Sea.

9:00 AM-4:30 PM

Workshop 2: Endangered and Declining Species in the Aleutians: Are the Declines Driven by Changes in the Ecosystem or Human Interaction?

Lead: Susanne McDermott, NOAA

Saturday, August 20, 2016

9:00 AM-12:00 PM

Workshop 1: Promoting Coastal Resilience and Adaptation in Alaska (*continued*)

Leads: APIA, ABSI LCC, Agnew::Beck Consulting

End of Forum

Aleutians Research

Matthew Baker

North Pacific Research Board, Anchorage, AK

The Aleutian Islands area is one of the least-studied marine ecosystems in Alaska. This is a shelf system dominated by oceanic processes and characterized by a high level of pelagic energy flow. Upwelling and downwelling occur on opposite sides of the island chain, oceanic habitats are in close proximity to nearshore habitats, and winds and ocean transport through Aleutian passes influence flow from the North Pacific into the Bering Sea. Prominent gradients in depth-defined habitats, variation across the longitudinal extent of the island chain, and localized patterns in species biomass and diversity structure interactions. Although the eastern Bering Sea (EBS) and Aleutian Islands (AI) are often linked for the purpose of fishery management, patterns in physical forcing, species composition and dominance, and ecological relationships differ greatly between the two ecosystems. Myctophids and other mesopelagic fish, squid, and grenadiers are prominent species. Atka mackerel, Pacific cod, and rockfish support economically important directed fisheries. Socioeconomically, the Aleutian Islands also differ from surrounding North Pacific ecosystems. The region has geographically isolated villages and communities highly dependent on nearshore marine environments. NPRB has supported research in the Aleutians, including physical and biological models, stock assessment, analyses of species distribution and interactions, habitat studies, and consideration of local and commercial fisheries and economics. This talk will detail that research and explore new areas for investment. NPRB is interested in leveraging this forum and its participants to further identify data, data gaps, important issues, and research priorities relevant to improving understanding of ecosystem processes and sustaining local communities and effective fishery management in the Aleutians.

Updating the Aleutian Islands Fisheries Ecosystem Plan

Ivonne Ortiz¹ and Stephani Zador²

1. Joint Institute for the Study of the Atmosphere and Ocean, University of Washington, Seattle, WA, ivonne@u.washington.edu

2. NOAA Alaska Fisheries Science Center, NOAA, Seattle WA, Stephani.Zador@noaa.gov

A Fisheries Ecosystem Plan (FEP) is a strategic policy and planning document to guide regional fisheries management councils (Council) in their management actions relating to the Large Marine Ecosystems under their jurisdiction. They are a tool that can serve as a framework for continued incorporation of ecosystem goals and actions into fisheries management. The Aleutian Islands FEP was among the first developed; since then other regions have developed FEPs with formats that have evolved to better serve within Council processes and timelines. FEPs have matured from compilations of ecosystem information and risks, to tools that deliver targeted evolving ecosystem evaluations that inform and guide improvements to fishery management. The Aleutian Islands FEP is reviewed every five years. In advance of the review next year, we present here a summary of key sections of the current Aleutian Islands FEP. We also present key features of more recent FEPs, including that being developed for the eastern Bering Sea, which is based on Conceptual Models and Themed Action Modules. Our aim is to raise awareness of FEPs as a policy tool and invite researchers, communities, industry, NGOs, agencies, and other interested parties to bring forth issues of concern, as well as new research and future plans that may be relevant to the upcoming review.

Bridging Management Gaps for Important Ecological Areas in the Aleutian Islands

Jon Warrenchuk¹ and Brianne Mecum²

1. *Oceana, Juneau, AK, jwarrenchuk@oceana.org*

2. *Oceana, Juneau, AK*

Practical approaches are needed to preserve the health, biodiversity, and resilience of marine ecosystems. Identification of Important Ecological Areas (IEAs) provides a systematic way to prioritize spatial conservation, response, and restoration efforts. We present an analytical method for identifying IEAs in the Aleutian Islands large marine ecosystem. Once identified, IEAs should be incorporated into management efforts to avoid unnecessary impacts associated with the exploitation of marine resources.

We define IEAs as geographically delineated areas which by themselves or in a network have distinguishing ecological characteristics, are important for maintaining habitat heterogeneity or the viability of a species, or contribute disproportionately to an ecosystem's health, including its productivity, biodiversity, functioning, structure, or resilience. As an exercise in valuation, determining "relative importance" requires a process for establishing and comparing values of individual or multiple ecological features on a similar scale, which is accomplished using standard deviates. Ecological features used in this case study included primary productivity, relative abundance of groundfish, marine mammals, seabirds, and habitat-forming invertebrates for which data sets were available. Given the escalating stresses placed on marine habitats generally, a compelling case may be made for assigning the priority to preserving the ecological services provided by IEAs.

Bottom Trawl Surveys of the Aleutian Islands Characterize Demersal Fish and Invertebrate Populations

Wayne A. Palsson

NOAA National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, WA, Wayne.palsson@noaa.gov

Every two years, NOAA scientists conduct a comprehensive bottom trawl survey of marine waters surrounding the Aleutian Islands. The purpose of the survey is to provide a fishery-independent time series of fish abundance that began in 1980, and to characterize the distributions and biological conditions of important benthic fishes and invertebrates. The survey area extends from Unimak Pass to west of Attu Island, and 420 stations are sampled based on a stratified-random design of previously sampled stations. Two commercial fishing vessels are chartered and fitted with research bottom trawls, and the survey is stratified based on region, sub-region, and depth to 500 m. The bottom trawl is for 15 minutes, and precise data are taken on distance traveled, net width, depth, and temperature. The catch is brought on board, identified, and measured, and biological samples are removed for laboratory analysis. The densities of fishes and invertebrates are calculated, averaged among stations, and used to estimate the relative abundance for the stratum. Estimates are incorporated in groundfish stock assessments that are used to define species statuses and trends, demography, and fishery potential. In addition, the survey results are used to describe the Aleutian ecosystem including temperature patterns and population trends for forage fish, benthic invertebrates, and miscellaneous fish species. The trawl survey also serves as a platform for special studies and collections for the scientific community, and these collaborations have resulted in descriptions of new fishes and invertebrate species, habitat characterizations, and understanding food webs.

Quantifying and Evaluating Implications for Trawlable and Untrawlable Habitat

Matthew Baker

North Pacific Research Board, Anchorage, AK

NOAA bottom trawl surveys provide crucial fishery-independent data on the relative abundance of stocks and life history parameters for a wide range of marine taxa. Survey data are used to assess species abundance and distribution, understand physical conditions and biological interactions, support retrospective analyses, and better inform ecosystem structure and manage marine resources. Despite the broad coverage and high utility of these data, not all bottom types or oceanographic conditions accommodate this survey method. Understanding what bathymetric features, substrate types, and physical conditions preclude successful trawls is important to efforts to determine potential biases in survey data and the relative accessibility of various habitat types and species to this survey method. Using soundings and sediment observations from National Ocean Service smooth sheets, we evaluated physical attributes associated with habitat that has supported bottom trawl surveys versus habitat designated untrawlable. This approach has been applied in the Gulf of Alaska and is now applied to data representing 2.1 million soundings and 25,000 sediment observations from 290 smooth sheets in the Aleutian Islands. Random forest methods were used to evaluate the relative influence of a suite of benthic terrain and oceanographic predictors. We examined the marginal importance of each physical predictor, quantified the response gradient, and applied a piecewise regression to determine threshold breakpoint values. On the basis of these thresholds and their interactions, predictive maps of trawlable habitat have been developed.

Fall/Winter Distribution of Legal Red King Crab in Bristol Bay Using Daily Fishing Logs

Leah Sloan¹ and Sarah Hardy²

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Spatial distribution of fisheries species must be well characterized in order to avoid local depletions during fishing seasons and to identify closure areas that minimize bycatch in other fisheries. The Bristol Bay red king crab (BBRKC) fishery is one of the largest crab fisheries in Alaska. One important component of BBRKC management is the existence of no-trawl zones, which protect crabs from trawl fisheries. Recently there has been concern that these no-trawl zones are in the wrong locations and are not sufficiently protecting king crabs. However, these concerns are difficult to evaluate because the survey that measures crab abundance and distribution occurs during the summer, while crab bycatch in trawl fisheries primarily occurs in winter. Daily fishing logs (DFLs), kept by skippers in the king crab fleet since 2005, contain detailed information on the spatial distribution of catch and effort in the fall/winter; however, the data within these hand-written logbooks has not been readily accessible. We are digitizing DFLs and using catch per unit effort (CPUE) to elucidate fall/winter distributions of BBRKC. This should aid managers in evaluating whether current locations of no-trawl zones are effective in protecting BBRKC. These data also allow for the comparison of crab distributions between years and seasons, furthering our understanding of crab movement, especially under different temperature regimes. DFL data will help us understand if and how no-trawl zones should shift as the climate changes in the North Pacific.

Plankton Population Variability Determined from a Ship of Opportunity Transect Through the Aleutians

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Continuous Plankton Recorders (CPR) have been towed behind commercial ships on their transit from the North American west coast to Asia, a great circle route that transits through the Aleutian Islands. The ship almost always enters through Unimak Pass, with the western exit being more variable but usually around Agattu or Attu Islands. Sampling began in 2000 and since 2002 sampling has occurred in spring, summer, and fall each year.

The data collected provide taxonomically resolved abundance information on the base of the food chain, specifically hard-shelled phytoplankton and robust zooplankton. For the last 10 years the CPR has been instrumented to also collect temperature, salinity, and chlorophyll fluorescence data along the transect. With a 16-year plankton time series now available, which includes warm and cool years experienced in the region, the data can be used to assess the impacts of climate variability on the plankton.

This presentation will provide details on the project and an overview of the data, including regional and interannual variability so far revealed. The intent of the presentation is to increase awareness of this project, which could provide data that are of use to resource managers in the region.

Evaluating the Efficacy of Trawl Exclusion Zones for Protecting Steller Sea Lion Groundfish Prey: Examining Local Fish Abundance and Movement Around Steller Sea Lion Rookeries

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Groundfish stocks in Alaska are managed at large scales; however, important ecological interactions such as predation, spawning, and habitat selection occur on local scales. Furthermore, commercial fishing is an activity with potential for localized effects. Improved understanding of the local abundance of fish is critical to understanding the potential for localized depletion by fishing. In 1997, the western stock of the Steller sea lion population has been declared endangered. One of the hypotheses for this decline was competition between the commercial groundfish fishery and Steller sea lions for prey. In order to understand the effects of fishing on a local scale, we need to assess abundance and distribution of the prey fields in local areas.

This study assesses Steller sea lion prey distribution around rookeries and haulouts in the Aleutian Islands in summer and winter. A multiyear tagging study examined the movement and abundance of Atka mackerel relative to trawl exclusion zones. In addition, catch per unit effort indices during a NMFS chartered research cruise were used to examine small scale patterns in prey composition of Steller sea lion prey—Pacific cod, rockfish, and pollock. Distribution patterns differed on a local scale in areas near Steller sea lion rookeries. This study represents a multiyear, multi-area effort to improve our understanding of interactions between sea lions, their prey, and the commercial fishery.

The Sustainable Future of Fisheries Through Utilization

Rick Fehst

*Bering Sea Captain, Fisherman, USCG Master Ton Inspected License;
citizen scientist in fishing industry for over 25 years*

Captain Rick will discuss innovations in increased utilization of fish from firsthand exposure with Icelandic groups and U.S.-based consultants of innovative “cluster-house” organizations. These models are directly applicable to improving sustainability and food security in the Alaska fisheries as climate change affects these precious resources in our heat-stressed ocean.

How Climate Change Is Affecting Alaska Fisheries and How Industry and Fisheries-Dependent Communities Can Adapt

Terry Johnson

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In recent years a great deal of research has focused on specific oceanographic and marine biological effects of the changing atmospheric and oceanic climate. Results of this research suggest that profound changes are coming to the species that support Alaska's commercial fisheries, and understandably the industry and the public are concerned. To date, however, few actual impacts have been documented.

This report summarizes and synthesizes the current state of knowledge on effects of long-term climate change on fisheries. It addresses temperature and currents, invasive species, hazardous algal blooms, disease-causing pathogens, ocean acidification, and changes to fisheries resource abundance, distribution, and behaviors. Since relatively few significant fisheries effects have been recorded in Alaska waters, the report also looks at changes in the Pacific Northwest states and British Columbia, where temperatures are higher and consequences more dramatic. And it looks at effects of transitory climate phenomena in Alaska waters, including El Niño and oceanic regime shift probably related to Pacific decadal oscillation (PDO). These observations and those from the Northwest provide indications of what long-term warming in the North Pacific and Bering Sea will bring to Alaska's fisheries.

This report also explores adaptive strategies and measures that individuals, communities, and the industry can apply to lessen the impact and possibly even benefit from coming changes. These adaptations can be technological, operational, and financial. The intent of this presentation is to promote discussion among stakeholders about planning effective adaptation.

Graying of the Fleet in Alaska's Fisheries: Defining the Problem and Assessing Solutions

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The average age of state fishery permit holders in Alaska has increased by 10 years within the past few decades. Older people are retaining permits, and far fewer young people are becoming permit owners. We report here on our findings from a mixed-methods ethnographic study of the dynamics creating this “graying of the fleet.” Specifically we will report on our efforts to: (1) document and compare barriers to entry into, and upward mobility within, fisheries among youth and young fishery participants in the Bristol Bay and Kodiak regions; (2) examine the factors influencing young people's attitudes toward, and level of participation in, Alaska fisheries; (3) identify models of successful pathways to establishing fishing careers among young residents; and (4) identify potential policy responses to address the graying of the fleet and develop specific recommendations consistent with state and federal legal frameworks.

Coupling Fisher Behavior with the System That Drives It: Using Vessel Monitoring System Data to Track Fishing Characteristics in the Bering Sea Fishery for Walleye Pollock

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In the last two decades, the Bering Sea pollock fleet has seen many changes, including the creation of catch shares, spatial closures for Steller sea lion conservation and salmon bycatch protection, and the development of a hard cap and incentive measures to reduce Chinook bycatch. Meanwhile, numerous studies have either examined or predicted large-scale changes in the Alaska marine ecosystems as a result of regime shifts and longer-term changes in climate. Using observer, fish ticket, and vessel monitoring system data, we reconstructed the paths of nearly 50,000 trips made by catcher vessels that fished for pollock in the Bering Sea from 2003 to 2013. We divided fishing trips into those targeting pollock in the Bering Sea or those targeting other species or other regions of the North Pacific. By then characterizing trip durations and distances, we were able to quantify catch per unit effort (CPUE) for observed and unobserved fishing trips, as well as vessels' time and distance traveled from port. This fisher-centric effort was compared with the stock-centric version of CPUE, which bases effort on haul durations instead of trip durations, to better understand how these factors are related over time. We were also able to examine the impact of warm and cold years on vessel behavior, and how targeting behaviors varied with changing economic conditions, bycatch, and total allowable catch (TAC).

Briefing on the New Alaska Ocean Acidification (OA) Network

Darcy Dugan

Alaska Ocean Observing System, Anchorage, AK

Alaska is joining other regions around the country in launching an ocean acidification (OA) network. The Alaska OA Network is designed to expand the understanding of ocean acidification processes and consequences in Alaska, as well as potential adaptation and mitigation actions. The network will help connect scientists and stakeholder communities, identify knowledge gaps, recommend regional priorities, share data, and determine best practices for monitoring in Alaska. We would welcome your involvement. Please check out the website or join the monthly list serve: <http://www.aos.org/alaska-ocean-acidification-network/>

Introduction to Ocean Acidification and Integrated Ocean Monitoring in Coastal Alaska

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Over the last several years, ocean acidification (OA) has emerged as one of the most prominent issues in marine research. In Alaska, the scientific community has been working together for nearly 10 years to collect critical OA data in coastal areas to identify the duration, intensity, and extent of OA events that could pose a serious threat to vulnerable Alaska subsistence communities and commercial fishing. Global and regional observations and climatological models show that OA on the Alaska coast will create some of the most rapid environmental transitions in the world, putting additional stress on ecosystems that are already responding to other stressors. Parts of the Bering Sea are exposed to corrosive conditions for at least four months each year, and conditions are also worsening in the Aleutian Islands and Gulf of Alaska. Precise monitoring and accurate forecasts of OA conditions can help Alaskans to better prepare for the future. New ways of collecting and integrating environmental intelligence and identifying OA risks are currently being developed for the Gulf of Alaska and the Bering Sea, with the ultimate goal to help build resilience and design adaptation strategies for dealing with OA.

Ocean Acidification and Shellfish Fishery Resources in the Aleutian Islands

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Increases in atmospheric carbon dioxide (CO₂) concentrations have accelerated substantially since the Industrial Revolution. With the world's oceans absorbing 30–50% of the new CO₂, mean surface ocean pH declined by 0.1 (equivalent to 30% greater acidity), reducing calcium carbonate saturation and compromising calcium and carbonate extraction by shell building organisms such as crabs. The effects of ocean acidification on commercial crab and groundfish species have been the focus of NOAA laboratory studies since 2009. Response variables include embryological development; larval and juvenile survival, morphology, growth, and calcium content; and adult calcium content and hemocyte function. Red king crab embryo development was significantly changed under acidified conditions while larval and juvenile survival was the variable most significantly and negatively affected. Similar results were found for southern Tanner crab but only after the oocyte developmental stage was exposed to corrosive conditions. The combined effects of increased *p*CO₂ (lower pH) and temperature were additive in decreasing juvenile survival in red king crab. Laboratory survival results were subsequently used to inform stock assessment models and bioeconomic models, which predicted lower recruitment success and negative fishing community effects as a result of ocean acidification. Although it is likely that some shellfish resources in coastal Aleutian Islands communities will be affected, other studies suggest that species such as walleye pollock, rock sole, and Dungeness crab may be more resilient to ocean acidification.

Economic Risks to Alaska Communities from Ocean Acidification

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The highly productive fisheries of Alaska are located in seas projected to experience rapid transitions in temperature, pH, and other chemical parameters. Many of the marine organisms that are most affected by ocean acidification (OA) contribute substantially to the state's commercial fisheries and traditional subsistence way of life. This study evaluates patterns of dependence on marine resources within Alaska that could be negatively affected by OA, as well as community economic characteristics, to assess the potential risk to the fishery sector and to local economies from OA. We used a risk assessment framework developed by the Intergovernmental Panel on Climate Change to combine projections of ocean chemistry, fisheries harvest data, and demographic information. The fisheries examined were shellfish, salmon, and other finfish. The final index incorporates all of these data to compare overall risk among Alaska census areas. The analysis showed that regions in Southeast and southwestern Alaska that are highly reliant on fishery harvests and have relatively lower incomes and employment alternatives likely face the highest risk from OA. There are also some surprising results. For example, Anchorage has a relatively high index of risk, while Kodiak's is lower than might be expected.

Bottom-up Approaches to Building Social-Ecological Resilience in Arctic Marine Ecosystems: The Open Water Season Conflict-Avoidance Agreement and the Arctic Waterways Safety Plan

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Numerous reports and scholarly publications extol the need for and virtues of progressive governance approaches in the Arctic. Driving this need is the imperative to respond to rapidly changing environmental, social, and cultural conditions, as well as the unique economic and food security needs of indigenous peoples. Many reports and publications also note the significant efforts to formalize pan-arctic, bilateral, and cross-cultural policies and agreements. However, effective implementation of these higher-level policies and guidelines requires a complementary approach that is built from the ground up. Here, we describe two such efforts: the Open Water Season Conflict Avoidance Agreement and the Arctic Waterways Safety Plan. We present several take-home messages from the two processes that led to agreements promoting local resilience in the face of change: (1) the importance of beginning all discussions of this type in collaboration with affected local communities; (2) the importance of setting clear goals and objectives and reaching consensus; (3) recognition that boundaries among the health of the physical environment, wildlife, and human communities are seamless; (4) recognition of the significant length of time required to engage in a meaningful process; and (5) the value of informal processes of problem solving to support more formal laws and policies. Both the Conflict Avoidance Agreement and the Arctic Waterways Safety Plan are highly successful processes that started informally at the local level, and are now succeeding at addressing local, national, and international maritime conflicts between development, traditional practices, and wildlife.

Unified Oil Spill Contingency Planning

Lieutenant Commander Matt Hobbie

United States Coast Guard

Alaska's environment is not protected by any one agency or organization alone. Rather, it is only through a unified effort that we can adequately prepare for a disaster that may threaten our land, waters, and air. Within Alaska, federal and state agencies have merged various planning requirements into a cooperative Unified Plan whereby planning and preparedness activities are performed in a unified manner and intended to be inclusive of all relevant stakeholders. The Unified Plan contains information applicable to pollution response within the entire state of Alaska and, when combined with Aleutian Sub-area Plan, meets federal and state planning requirements. The intent of these documents is to provide for a unified response to oil and hazardous substance spills that address the needs, concerns, and capabilities of all federal, state, local, and tribal entities.

Understanding the Risks of Vessel Groundings in the Aleutian Islands

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Each year, thousands of ships transit through the vicinity of the Aleutian Islands, mostly without incident. In December 2004, however, a 740-foot bulk carrier, the MV *Selendang Ayu*, lost power and ran aground on Unalaska Island leading to the loss of six crewmen. The resulting oil spill impacted 86 miles of shoreline habitat, killing seabirds and marine mammals. Since that maritime disaster, advances in AIS (Automatic Identification System) technology have dramatically improved the ability to monitor vessel traffic in this region. We analyzed a three-year archive of satellite AIS data to determine major shipping routes. Based partly on our results, five ATBAs (Areas to Be Avoided) were established in the Aleutians by the International Maritime Organization. Using the routes, we conducted risk assessments for seabirds and marine mammals and estimate that these ATBAs would reduce potential exposure by 17-22%, while adding less than 1% to the overall voyage between North America and Asia. We then conducted a simulation of where container ships using these major routes would most likely run aground should they lose power and drift. The probability of grounding is inversely correlated with the distance to the closest island, and is highest in the winter and fall seasons. We will next model the drift trajectories for tankers using different current and windage parameters. The results can help inform decisions about vulnerabilities associated with vessel routing and oil spill response plans, with the ultimate goal of reducing the likelihood of future oil spills in the Aleutians.

Aleutian Island Shipping Alternative Planning Criteria Program: “Fact v Fiction”

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On January 30, 2014, federal regulations began requiring nontank vessels (NTV) over 400 gross tons to submit federal vessel response plans to meet national planning and response standards. The regulations provided that an owner/operator could submit an Alternative Planning Criteria (APC) when the national planning standards were “inappropriate.”

An APC request must use specific criteria in regulation to frame the basis and rationale for the APC and any related program to reduce risk and provide response services for vessels that use the APC. APC administration and program sustainability presents many challenges. Interpretation of applicable regulations, and administering vessel coverage for numerous international shippers and constraints on the planning horizon, make APC program implementation a challenge. Lack of long-term approval for an APC program makes costs higher, threatening APC sustainability for the vessels and communities that rely on practical prevention and response systems in remote Aleutian Islands.

This presentation will explore the APC “fact v fiction” from the perspective of the first and only NTV APC that covers the entire WAK COTPD (Captain of the Port Zone) including the Aleutian Islands.

Integrating Local Resources into a Spill Response: How Alaska Chadux Uses Vessels of Opportunity

Christopher Burns

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In remote Alaska, with limited locations to stage dedicated oil spill response resources, it may be useful to employ nontraditional response assets that operate in the region. Locally sourced equipment and personnel can support pollution response efforts during the early stages of an incident. However, the process of employing non-dedicated resources in this ad hoc manner may lead to potential safety and liability issues for the response organization. To minimize such concerns, a response organization must take a patient approach to identifying and working with local vendors and be prepared to invest additional time and energy to prepare the resources for deployment in the event of a spill.

Over the past 15 years, the Alaska Chadux Corporation has successfully used vessels of opportunity during responses and to support the contingency planning needs of its membership. This has prompted Chadux to implement a formalized program to identify, vet, track, train, and employ vessels of opportunity as spill response resources. The program currently includes about 30 vessels in several remote communities and is a cost-effective way to meet contingency planning requirements and maintain a fleet of vessels ready to respond.

This presentation will examine the issues associated with employing local, nontraditional resources during a spill response, using Chadux's Vessel of Opportunity program to illustrate key points, including:

1. Selection of vessels
2. Vetting of vessels
3. Training of crewmembers and response team members
4. Tracking of vessels
5. Response-related issues including management and oversight of deployed vessels and demob of resources

Programmatic Changes and Aleutian Assets

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In 2015 the SPAR Industry Prevention and Preparedness (IPP) and the Prevention and Emergency Response Programs (PERP) merged to become the Prevention, Preparedness, and Response Program (PPR). The PPR program is a holistic approach, organized by geographical units to maximize efficiency and combine expertise from both former programs. PPR has assets for response staged in several Aleutian communities. Going forward, PPR will continue to coordinate with partner agencies, stakeholders, local communities, and industry to prepare for and respond to incidents in the logistically challenging Aleutians.

NOAA Scientific Support for Incident Response

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Thousands of incidents occur each year in which oil or chemicals are released into the environment as a result of accidents or natural disasters. Spills into our coastal waters, whether accidental or intentional, can harm people and the environment and cause substantial disruption of marine transportation with potential widespread economic impacts.

The Emergency Response Division (ERD) of NOAA's Office of Response and Restoration (OR&R) provides scientific expertise to support an incident response. Under the National Contingency Plan, NOAA has responsibility for providing scientific support to the Federal On-Scene Coordinator (FOSC) for oil and hazardous material spills. When spills occur, NOAA Scientific Support Coordinators (SSCs) coordinate scientific information and provide critical information to the FOSC. A multidisciplinary team of ERD scientists, including oceanographers, modelers, biologists, chemists, and geologists, is based in Seattle and support the SSCs during spill events, as well as for drills, exercises, and contingency planning.

This presentation will cover the SSC role and highlight ERDs tools, guidelines, job aids, and standard techniques for addressing resources at risk, observing oil, assessing shoreline impact, and evaluating and selecting cleanup technologies during an oil spill incident.

1-Call Alaska's Approach to Alternative Planning Criteria for Oil Spill Response in the Aleutians and Along the Great Circle Route

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The Oil Pollution Act of 1990 requires that vessels over 300 gt have in place a plan to respond to oil spills. These regulations require a certain amount of equipment to be on-scene within a given amount of time. Due to the vast amount of area that the Aleutians cover with very little infrastructure, vessels sailing the Great Circle Route cannot fully meet the requirements of OPA 90. This presentation discusses the current requirements for APCs (Alternative Planning Criteria) for oil spill response, 1-Call Alaska's response-based approach to meeting those requirements for spill cleanup, as well as methods and equipment to prevent vessels in distress from spilling oil. The presentation will also address new requirements for APCs that will be coming out for public comment this summer. Additional approaches to meeting an APC are also explored.

Enhanced Bering Strait Community Engagement for Arctic Marine Mammal Spill Planning and Response

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Increased Bering Strait vessel transits due to sea ice loss coupled with increasing interest in travel through the Northwest Passage make a spill impacting arctic marine wildlife and the coastal communities that depend on them all but inevitable. Current Bering Strait maritime vessel transit routes overlap one of the largest migratory marine wildlife corridors on the planet (AMSA 2009). Despite agency efforts, effective community spill response and preparedness engagement for arctic marine wildlife is at best mixed in the Bering Strait and across northwest Alaska. Defenders of Wildlife (Defenders) and its partners are working with communities and agencies charged with spill response to increase local knowledge in spill drills, plans, and spill events.

Defenders will host participatory regional workshops for tribal and municipal leaders and key stakeholders. The workshops will discuss scientific and technical information and indigenous knowledge about effective marine wildlife spill preparedness and response strategies. These workshops will inform the design of a hands-on marine wildlife spill 101 training for local leaders addressing incident command, hazardous material handling, and pathways to spill response training in the region. The 101 training will include a visual teaching tool called the Bering Strait Response Teaching Tool or BSRTT. This interactive tool will provide communities opportunities to share local information to improve state and federal spill preparedness and responses.

Sea Level Rise: Alaska's Global Contribution and Local Effects

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Glaciers on Alaska's south coast shed ice into the ocean and contribute directly to global sea level, but coastal communities elsewhere in Alaska feel most of the effects. Speaking broadly, sea level rise is a global hazard that coastal and island communities worldwide will face in a changing climate. However, the effects of a change in global average sea level can differ substantially from one local area to another. In this presentation, I will discuss one recent effort to model Alaska glaciers' contribution to global sea level rise. I will also comment on some of the earth system processes that modulate global effects into local effects, with special emphasis on dominant processes in the Aleutian-Pribilof region. Most importantly, I will listen and seek to understand what information is most important for local residents and decision-makers.

Alaska ShoreZone: A Collaborative Successful Story with Implications for Improved Coastal Planning and Response in the Aleutians

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ShoreZone is a coastal marine habitat mapping system in which spatially referenced aerial imagery is collected specifically for classification. The resulting data set includes imagery with mapped geomorphic and biological attributes in a searchable geospatial data set. The imagery provides a useful baseline and visual reference. Approximately 117,000 km of ShoreZone imagery exists for the Pacific Northwest coastline including the entire shoreline of Oregon (1,340 km), Washington (4,933 km), British Columbia (37,619 km), and approximately 73,000 km of the Alaska coastline. The Alaska ShoreZone imaging and mapping project is ongoing with about 89% of the coast imaged and mapped or with mapping in progress and about 11% (about 9,000 km) of the coastline remaining to be imaged. The Alaska imagery can be viewed online at <http://alaskafisheries.noaa.gov/shorezone/>. ShoreZone imagery for the eastern Aleutian Islands/Fox Islands was collected in April 2016. This imagery is available for free to be used by anyone. The imagery can be used for many purposes including oil spill contingency planning, habitat research, coastal resource management, community monitoring, and recreational boating. As funding becomes available the imagery will be mapped. The mapped features include shoreline morphology, substrates, and biotic resources such as eelgrass, canopy kelps, salt marshes, and other habitat descriptors. The Alaska ShoreZone program is built on a foundation of multiple funding and contributing partners, including federal agencies, state agencies, nonprofit organizations, and private industry. The multi-organization program provides a framework to build on and supports a contiguous, integrated coastal resource database that extends from Oregon to the Beaufort Sea. The program goal is to have all of the Alaska shoreline imaged and mapped using the ShoreZone protocol and to make the data web accessible.

The Risk of Rodent Introductions from Shipwrecks to Seabirds on Aleutian and Bering Sea Islands

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Accidental introductions of rodents present one of the greatest threats to island sanctuaries. On uninhabited remote islands, such introductions are most likely to come from shipwrecks. Here we use a comprehensive database of shipwrecks in western Alaska to model the likelihood of shipwrecks near Aleutian and Bering Sea islands. Shipwrecks were particularly common in the 1980s to early 2000s, with a major peak of occurrence in the late 1980s. We find the amount of fishing activities within 5 km of an island to be the strongest predictor of shipwrecks, followed by the strength of tidal currents and density of large-vessel traffic. Islands with the highest likelihood of shipwrecks are all in the eastern Aleutians, including Unimak, Unalaska, and Akun Islands. By contrast, the largest seabird colonies are in the western Aleutians and Pribilof Islands, including Buldir, Kiska, and Saint George Islands. Multiplying the number of seabirds breeding per island by the likelihood of a shipwreck, we get a measure of risk. The risk of rodent introductions from shipwrecks is greatest for Saint George Island, followed by Buldir and Saint Matthew Islands. Most islands with a high predicted risk of shipwrecks already have rodents established. Keeping these high-risk islands rodent free into the future should be a high conservation priority.

Mercury Concentrations in Steller Sea Lions and Their Prey in the Aleutian Islands

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Total mercury concentration ([THg]) was measured in hair collected from 722 Steller sea lion (*Eumetopias jubatus*) pups on 15 rookeries across Alaska and western Russia (Southeast Alaska to the Kuril Islands, with emphasis on Aleutian Islands). Hair sampling is minimally invasive to live captured pups. Hair [THg] closely parallels the relatively lower [THg] in circulating whole blood samples in young rookery pups. Hair [THg] ranged from less than 1 part per million (ppm) to over 70 ppm, with some of the highest concentrations in pups from Agattu Island in the western Aleutian Islands. [THg] and total selenium concentrations ([TSe]) in pup whole blood indicated significantly lower selenium to mercury ratios from the western and central Aleutian Islands compared to pups sampled in the eastern Aleutian Islands and the Gulf of Alaska. Selenium is an essential antioxidant that can help protect from Hg toxicosis. Thus some of these animals in the Aleutian Islands may lack adequate dietary selenium to protect them from the potentially harmful effects of mercury. We measured [THg] in 12 species of finfish, squid, and octopus that are known prey for Steller sea lions. There was evidence of increasing [THg] with increasing size of the fish (e.g., fork length) in some species. With the exception of some larger yellow Irish lords (*Hemilepidotus jordani*), [THg] in muscle of fish was less than 1 ppm on a wet weight basis.

Prehistoric Human Resilience in the Aleutian Islands, Alaska

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Worldwide, stakeholders, scientists, policy makers, and the public are experiencing and studying a rapidly changing Circumpolar North. In the twentieth century we have seen (1) declines in key marine mammals and arctic birds; (2) rising sea level and erosion swallowing coastal villages; (3) rapid ocean warming and ice melt; and (4) ocean acidification. As we study this current climatic furor and attempt to predict what is in store for Earth's future, it is vital to recognize that the past North Pacific has not been static. This region experienced slow (climatic) and rapid (geological and human induced) impacts influencing indigenous peoples and the North Pacific ecosystem. Interdisciplinary geological, biological, and archaeological research in the Aleutians provides meaningful scientific data about Holocene climate change, habitat shifts, and potentially catastrophic geological disruptions. Deep time Aleutian research demonstrates that for 9,000 years prehistoric humans adapted in remarkable ways to advancing and retreating glaciers, volcanic eruptions and ash fall, periodic tsunamis, climatic fluctuations, and ecosystem shifts.

Alaska's Largest Recorded Murre Wreck: 100,000s Estimated Dead

Liz Labunski¹, Barb Bodenstein², Hillary Burgess³, Heather Coletti⁴, Robin Corcoran⁵, Robb Kaler¹, Kathy Kuletz¹, Julia Parrish³, John Piatt⁶, Heather Renner⁷, and Sarah Schoen⁶

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An ongoing mass seabird mortality event of unprecedented duration, geographic scope, and magnitude has been recorded based on observation of tens of thousands of dead marine birds across Alaska (mostly common murres, *Uria aalge*). During summer 2015, complete reproductive failure of murres at several colonies in the Gulf of Alaska was reported for the first time in over 25 years of monitoring. Reports of dead murres continued into fall and winter and ranged from Southeast Alaska to the eastern Aleutian Islands and north to Saint Paul Island in the Bering Sea. Following severe winter storms in December and January, over 17,000 dead murres were counted at-sea and on beaches in Prince William Sound for a total estimated mortality of about 25,000-60,000 birds.

Results from necropsies indicate birds were emaciated and died of starvation. Federal and state agencies and partners continue to collaborate on field and laboratory efforts aimed at collecting data on (i) abundance and distribution of beach-cast carcasses; (ii) body condition, age, stomach contents, and sex of intact specimens; and (iii) laboratory evaluation and testing for diseases and toxins on a subset of collected carcasses. Proximate or ultimate causes for this unprecedented die-off are speculative, but include oceanographic events that created anomalously warm waters in Alaska (the “Blob” and El Niño) which affected prey such as low recruitment of juvenile walleye pollock, as well as harmful algal blooms. The murre mortality event in Alaska is the most significant on record with potential statewide impacts on breeding populations.

Population Trends of Red-Faced Cormorants in the Bering Sea and Aleutian Islands of Alaska

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Red-faced cormorants (*Phalacrocorax urile*) are a prominent, but little-studied, nearshore dwelling species for which we lack basic breeding biology information. Distributed from southcentral Alaska to the Kuril Islands, their center of abundance is found in the Aleutian and Pribilof Islands of Alaska. There is often large annual variation in the number of individuals attending colonies, and movement patterns between colonies are almost entirely unknown. The Alaska Maritime National Wildlife Refuge has conducted marine bird surveys in the region over the last four decades. Using whole island groups as our sample unit to account for possible movement, we compare historic counts from the 1970s and 1980s with more recent counts to describe the current distribution and abundance of red-faced cormorants in the Bering Sea and Aleutian Islands. There have been substantial declines in numbers of red-faced cormorants within the range surveyed, driven primarily by an order of magnitude decline in the western Aleutian Islands. No system-wide causes are yet known to account for these observed declines.

Place Names of Unalaska Island

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The Place Names of Unalaska Island project seeks to produce an intersection between archival materials and the experiences of Unangan people and other local traditional land users with the goal of creating and strengthening Unangan identity and cultural revitalization.

Indigenous and Unangan identity can be created and realized through physical interaction with traditional landscapes and traditional natural resources. Unangan and other local people have a strong sense of the geographic layout of Unalaska Island and the surrounding waters through activities such as hiking, camping, and subsistence fishing. Merging this embedded local knowledge with GIS technology creates a multifaceted and accessible resource for Unangan people and traditional land users.

In addition to highlighting the indigenous language, Unangam Tunuu, the Place Names of Unalaska Island online map features place names in Russian and English languages. Many features on or around Unalaska Island have multiple names, which are representative of the colonial governments that exerted power over the region. By returning the focus of our place names from colonial languages to Unangam Tunuu, we take back control of our landscapes, natural resources, and cultural heritage and revitalization.

The project's online resource, unalaskaplacenames.commonswaa.alaska.edu, incorporates visual media, both traditional and contemporary oral histories, as well as other cultural knowledge. The incorporation of oral histories from elders and local traditional land users is central to this project, and, in conjunction with my own Unangan heritage, these personal oral histories will make certain this project is a form of indigenous self-representation.

The Impact of Climate Change on Human Health—An Alaska Perspective

Ann Nora Ehret¹ and Barbara Doty²

1. Medical Director, Iliuliuk Family Health Services, Unalaska, AK

2. Center for Global Health Initiatives, American Academy of Family Medicine, Solstice Family Care Clinic, Wasilla, AK

These two Alaskan physicians have been studying and speaking about the impact of climate change on population health since the summer of 2014, when they were invited speakers for Western Kentucky University’s “Toppers at Sea” climate science program visiting northern Europe via the Semester at Sea ship. Presentations have included climate change workshops in Dubrovnik, Croatia, in April 2015 at the World Organization of Rural Family Doctors, where Dr. Doty also gave the keynote address. They presented in Akureyri, Iceland, with a multidisciplinary team of science and health professionals from the U.S. and Iceland in June 2015, working on a climate readiness health professional curriculum. Dr. Doty spoke at the United Nations Center for Climate Change in Belize in spring 2015, the Arctic Council meeting in Iceland in October 2015, and at the Family Medicine Residency Directors meeting in April 2016.

Building Community Resilience in the Face of Climate Change

Karin Sonnen¹ and Molly Voeller²

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The USDA-Natural Resources Conservation Service is a federal agency that helps people understand their lands' natural resources. NRCS helps landowners best use and conserve the soil, water, animals, and plants on their property. All programs are voluntary and offer science-based solutions that benefit both the landowner and the environment. One of the services we provide are cost-share contracts through the Environmental Quality Incentives Program (EQIP). An option available for cost-sharing through a contract is a high tunnel. These plastic-covered frames work similarly to a greenhouse by increasing the temperature inside the high tunnel, allowing crops that would otherwise not grow, to thrive. High tunnels are extremely popular in Alaska and they could be used in the remote communities of the Aleutian Islands to produce local, healthy food.

Tribal/ANCSA Corporation Consultation

Orville Lind

Office of Subsistence Management, U.S. Fish and Wildlife Service, Anchorage, AK

The Federal Subsistence Board (Board) recognizes that indigenous Tribes of Alaska are spiritually, physically, culturally, and historically connected to the land, the wildlife, and the waters. To effectively manage the Federal Subsistence Management Program, the Board consults with federally recognized Tribes in Alaska whenever its actions may affect a Tribe, its members, or resources. Government-to-government consultation undertaken through the Board's process is a direct two-way communication conducted in good faith to secure meaningful participation in the decision-making process. Highlights of this enhanced form of communication will be shared, as well as the why, who, and when of Tribal and ANCSA (Alaska Native Claims Settlement Act) corporation consultation on federal subsistence issues. Helpful tips for being effective before, during, and after consultation will also be offered.

LEO in the Aleutians

Brian Berube (presented by Mary Mullan)

Alaska Native Tribal Health Consortium, Anchorage, AK

This talk will provide an introduction to the Local Environmental Observer (LEO) Network, and tell what it is, how it works, how you can participate, and how you can apply the information for local benefit. The presentation will also provide a review of past observations in the region, an analysis of what these observations can tell us about environmental change, and the related implications in the Aleutian and Pribilof region.

BeringWatch/Citizen Sentinel

**Lauren Divine¹, Pamela Lestenkof¹, Paul Melovidov¹,
Dakota Walker², Bruce Robson³, and Steve Insley⁴**

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The Bering Sea/Aleutian Islands has been the focus of intensive research in recent decades; however, the rapid pace of climate change has increased scientific uncertainty regarding future productivity and resilience of this and other arctic ecosystems. There is an urgent need to increase the seasonal breadth and spatial resolution of monitoring efforts to track changes in Arctic-influenced regions. This is where community-based ecological monitoring can play a valuable role. The goal of the BeringWatch/Citizen Sentinel program is to enable community members to collect reliable local environmental data in order to support and inform decisions that affect the region. The value of this approach and the proven competence of communities to collect these data have been demonstrated through various projects conducted over the past decade by Alaska tribal organizations such as the Aleut Community of St. Paul Island Tribal Government Ecosystem Conservation Office, the St. George Traditional Council Kayumixtax Eco-Office and the Agdaagux Tribe of King Cove, the villages of False Pass and Akutan, and most recently in Unalaska. In order to facilitate our community monitoring efforts, the BeringWatch program has just released a Citizen Sentinel app that allows local residents to engage in citizen science and record observations using their mobile devices. Citizen Sentinel data and observations may be accessed from the BeringWatch Facebook page and the BeringWatch website (<http://www.beringwatch.net>), and will soon be synced with the LEO website hosted by ANTHC. Come learn how to become a Citizen Sentinel in your community and strengthen local observer networks in Alaska!

Utilizing Community-Based Observation Networks to Maximize Resilience in a Changing Arctic

Grace Beaujean¹, James Gamble², Leah Bower³, and Jessica Veldstra⁴

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Local observing networks utilize human observers as sensors to systematically observe changes in their local environment through direct interaction, providing alternative perspectives to ecological change and biodiversity to those derived through instrument-collected data alone. Monitoring change on the local level holds significance in terms of understanding the social processes that relate to the sustainability of biodiversity, as well as vulnerabilities inherent with change, including environmental, socio-economic, and changes brought about by increasing development. Current and predicted changes will require increased data from local observations in order to enhance resiliency at the community level.

The Aleut International Association (AIA) is currently operating the Community Based Observation Network for Situational Awareness (CBONS-SA) and the Arctic Marine Indigenous Use Mapping (AMIUM) programs through collaborative relationships with communities in the Bering Sea ranging from Sand Point to Wales. CBONS-SA is providing community observers with telecommunication tools to incorporate locally observed environmental and globalization changes into a larger observational data suite to improve maritime awareness. AMIUM will co-develop and introduce self-guided subsistence mapping and data-gathering tools enabling communities to create scientifically sound products of their marine environment. Both programs increase local research capacity and provide products and tools that can be used in the policy-making arena.

AIA will share lessons learned and best practices for establishing observing networks including assurances that the research is relevant to community needs and culturally appropriate, and that proper relationships are established and maintained. Tips will also be shared for enhancing community participation in tracking changes in order to enhance their ability to respond effectively.

Aleutian Communities Participating in Coastal Community Ocean Observers (C2O2), a Regional Community-Driven Ocean Observation Network

Peter Winsor¹ and Tuula Hollmen²

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The Coastal Community Ocean Observers (C2O2) is a network observation program of the nearshore marine environment, shaped and carried out by participating Alaska coastal communities from the Gulf of Alaska to the Arctic. The core objective of C2O2 program is to organize a community-linked marine observational network to collect and share information on coastal marine conditions through mutually beneficial community-scientific partner engagements. The participating communities operate independently at local scales (estuary, continental shelf) and collectively at regional scales (the perimeter of Alaska). The fundamental goal is to demonstrate that by using a relatively simple suite of techniques and engaging closely with knowledgeable community members, a distributed network of observers can collect scientifically valuable data, and that the act of collecting these data will help stimulate commitment to the program and further engage local communities in environmental observation. The C2O2 strategy is to provide community members with tools and training to measure key oceanographic and biological parameters relating to ocean warming, freshening, productivity, and marine health, and return data to local communities in near real-time. All communities will measure a set of network-wide standard parameters in a coordinated manner, and each community may develop additional goals and site-specific measurements based on local conditions and research interests. The observations will be accessible to the local community through a project website interface, and community visits by scientists will assist in the interpretation of the time series data made at the local observation site. Efforts are coordinated and communicated with other regional observing programs that could benefit from the C2O2 nearshore measurements, such as Canada's Three Oceans (C3O), the Distributed Biological Observatory (DBO), the Bering Sea Sub-Network, BeringWatch, and the Local Environmental Observers (LEO) program. C2O2 also has a strong emphasis on outreach and education through classroom visits and development of educational tools available for schools in communities. The C2O2 program has been initiated in two locations from the Bering Sea–Aleutian Islands region. In St. Paul, weekly measurements of nearshore oceanographic parameters have been conducted since 2014, and Cold Bay and King Cove in the western Alaska Peninsula were engaged in 2015.

Fisheries Resource Monitoring Program (FRMP) and Partners Program

Karen Hyer

Office of Subsistence Management, U.S. Fish and Wildlife Service, Anchorage, AK

The Fisheries Resource Monitoring Program provides up to \$2 million in annual funding for subsistence fisheries research and monitoring projects throughout Alaska. This session will provide an overview of how research priorities are identified, the project selection process, and current operating projects. It will also provide details on the Partners Program, which funds six fisheries research biologist/anthropologist positions at various rural and tribal organizations, as well as student intern programs.

What Can I Do Today? Monitoring Climate Change Impacts on Your Coastline

Jacquelyn Overbeck

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Many projections for impacts on the coastal environment arising from processes that are linked to climate change trends can paint a bleak picture of doom and gloom. Although long-term predictions show the potential for extreme circumstances, the question of “what can I do today?” is most relevant to people living in coastal communities. For Alaska specifically, there are key gaps in oceanographic, topographic, and extreme event information that contribute to large model uncertainties and make many predictions either vague or impossible to scale down to the local level (for example, sea level rise scenarios). Residents of communities located in coastal Alaska are keen observers of changes in the environment in and near the communities where they live, and spend considerable time in the coastal environment and on the land harvesting wild resources as part of the subsistence way of life. By connecting local observers with a scientific community that can provide the tools necessary for quantitative data collection and assistance in formatting observations to best improve models, local residents can improve climate change research with their own hands and local observers can fill the gaps in knowledge that presently limit localized predictions. Scientists can act as facilitators (rather than drivers) for local community efforts so that individual needs and concerns are intrinsically built into project objectives to generate findings that can enhance community resilience to climate change impacts.

Promoting Coastal Resilience and Adaptation in Alaska: Workshop Description/Abstract

Leads: Aleutian Pribilof Islands Association, Aleutian and Bering Sea Islands Landscape Conservation Cooperative, Agnew::Beck Consulting

What does “resilience and adaptation” mean for communities and natural resource managers on the Alaska coast? This workshop at the Aleutian Life Forum is one of a series of four workshops in coastal Alaska hub communities hosted by a cross-disciplinary group of partners including the Aleutian Pribilof Islands Association, Inc. (APIA), the Aleutian Bering Sea Islands Landscape Conservation Cooperative (ABSI), Western Alaska Landscape Conservation Cooperative, and the Arctic Alaska Landscape Conservation Cooperative. The workshops are designed to find out through a collaborative dialogue among tribal and local government, state and federal agencies, scientists and local experts what it means to promote resilience (the ability to bounce back to normal after a disturbance) and adaptation (how to adjust to new conditions) in western and arctic Alaska. The workshop discussions will go beyond textbook definitions to set big picture goals and define practical climate change response strategies, locally and region-wide.

Thursday afternoon listening sessions with the Alaska Maritime National Wildlife Refuge and NPRB will set the stage for the Promoting Coastal Resilience and Adaptation workshop with focused discussions on current and anticipated issues faced by the Refuge as well as identifying the areas of research needed to fill critical data and information gaps.

The Friday workshop will build on the presentations and listening sessions hosted throughout the Aleutian Life Forum with a synthesized comprehensive look at existing and anticipated environmental changes, their impacts, and potential responses at the individual and local level. Participants will have the opportunity to dialogue about the real-world experiences and consequences of climate change as well as work together to set goals and identify effective responses that can be carried out by individuals and collectively.

Saturday morning, the workshop will culminate in a discussion to identify regional climate change response strategies that require cooperative and coordinated action throughout the Aleutian and Bering Sea region or with other Alaska regions and state and federal agencies.

The four scheduled resiliency workshops include a Bering Strait workshop in Nome (May 2016), this Aleutian Islands workshop at the Aleutian Life Forum (August 2016), a Bristol Bay workshop in King Salmon (September 2016), and a Northwest Arctic workshop in Kotzebue (December 2016). The project will culminate in the creation of a reference “toolbox” for Alaska communities, management agencies, and others to better understand the dynamic changes Alaska is experiencing, their impacts on our lives, as well as tools and information that can help us bridge this time of transition.

Aleutian Life Forum

August 16-20, 2016

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