

Pacific Marine Arctic Regional Synthesis (PacMARS)

Community Meetings during February-March 2013

ST. LAWRENCE I.
Gambell
Savoonga
JANUARY 28-29

BARROW
Barrow
Wainwright
Point Lay
Nuiqsut
Kaktovik
FEBRUARY 11

KOTZEBUE
Kotzebue
Point Hope
Kivalina
Buckland
FEBRUARY 22

NOME
Diomedede / Wales / King I.
Brevig Mission
Teller / Shishmaref
FEBRUARY 25

Regional meetings

Pacific Marine Arctic Regional Synthesis (PacMARS)

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1. Introduction

The Pacific Marine Arctic Regional Synthesis (PacMARS) is a \$1.45 million research synthesis effort funded by Shell Exploration and Production and ConocoPhillips but administered and managed by North Pacific Marine Research Institute through the North Pacific Research Board, and with oversight from the National Science Foundation Office of Polar Programs. This synthesis is assembling up-to-date written documentation that contributes to understanding the Pacific-influenced continental shelf ecosystem of the Arctic Ocean. This study area extends from Saint Lawrence Island in the Bering Sea through Bering Strait into the Chukchi and Beaufort Seas (Figure 1). The overarching objective is to compile the best available knowledge from local communities and peer-reviewed social and natural sciences, as well as less readily available knowledge sources. A key objective of the project is to identify future scientific needs and research gaps in the region. The expectation is that identification of such needs will assist stakeholders including agencies that support research for understanding this important ecosystem and its vulnerabilities.

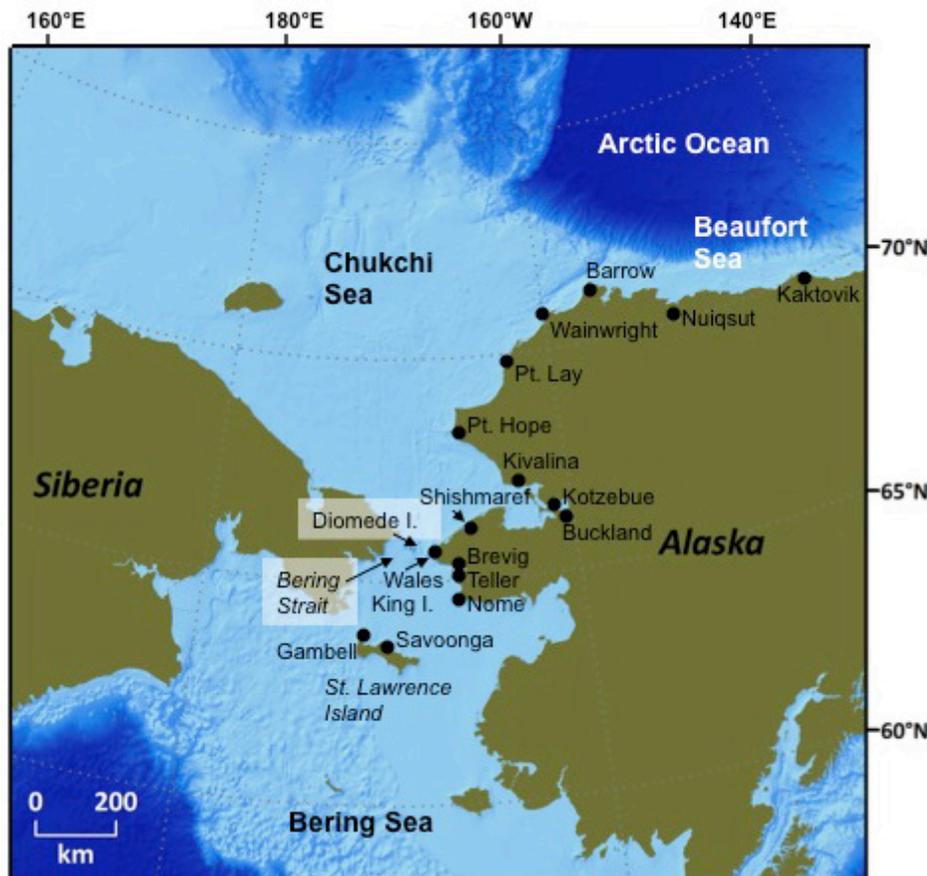


Figure 1. The region of the PacMARS synthesis effort in the Pacific Arctic.

As seasonal sea ice continues to decline in the Arctic, having reached a record minimum in 2012, oil and gas exploration and other industrial maritime traffic are increasing. Increasing ship traffic through Bering Strait has been occurring as part of the Northern Sea Route along the north coast of



Russia, which is beginning to provide a practical ice-free route between Asia and Europe with reduced shipping costs. The Northwest Passage (through the Canadian Arctic) has also become ice-free several times in recent summers, a significant change though the growth of ship traffic along the Northwest Passage has been less than the Northern Sea Route. In addition, all of the Arctic Ocean countries, including Russia, the United States, Canada, Norway and Denmark (Greenland) are exploring the limits of their arctic continental shelves in order to advance claims under the Law of the Sea Treaty.

Climate warming is occurring in the Arctic at a faster pace than at lower latitudes. In addition to shifts in seasonal sea ice coverage, socio-economic changes are also underway in the Arctic. For example, availability and accessibility of marine resources necessary for subsistence hunting in the Arctic has become less predictable, which stems from environmental variability. Many organisms, from plankton to top predators, will show changes in productivity, timing of migrations and foraging patterns as organisms adjust to shifting sea ice and seawater temperatures. Both wildlife populations and human communities will need to adapt to these changing conditions. Increased industrial development and transportation as more open waters occur seasonally will likely impact the ecosystem and the people that utilize those resources.

The PacMARS project has 6 research themes that serve as foci for the PacMARS synthesis effort:

1. Ice Cover (primary production relationships, currents, winds, bathymetry)
2. Phenology of Biological Production Cycles in Relation to Physical Environment
3. Benthic-Pelagic Coupling in Relation to Physical-Chemical Environment
4. Current State of Lower Trophic Prey-Base and Higher Trophic Feeding Hot Spots
5. Subsistence Lifestyles in Times of Climate Change
6. Chemical Contaminants in Sediment and Biota

As part of the overall goals of PacMARS and specifically addressing research needs under Theme 5: *Subsistence Lifestyles in Times of Climate Change*, the PacMARS team conducted five regional Alaskan community meetings on St. Lawrence Island, and in Barrow, Kotzebue and Nome (Table 1). The meetings provided a forum for feedback on research needs as they are perceived by local communities as well as for ecological insights from subsistence hunters specifically and local residents in general. Two of the community meetings (Gambell and Savoonga) were conducted as

Table 1. Date, location and communities served at PacMARS regional community meetings.

Date	Meeting Location	Communities Represented
January 28, 2013	Savoonga	Savoonga
January 29, 2013	Gambell	Gambell
February 11, 2013	Barrow	Barrow, Wainwright, Point Lay, Nuiqsut, Kaktovik
February 22, 2013	Kotzebue	Kotzebue, Point Hope (representative unable to attend), Buckland, Kivalina
February 25, 2013	Nome	Nome, Diomedes, Wales (no representative attended), King Island (no representative attended) Brevig Mission, Teller, Shishmaref



formal open community style meetings. The other meetings were “hub” style meetings with representatives selected by the Indian Reorganization Act (IRA) Councils that serve as tribal governments for each village represented. Representatives from Wales, King Island, and Point Hope were unable to attend. Comments contributed at each village meeting contained in this report have been edited for clarity, but represent the opinions expressed at each meeting by participants.

The PacMARS community meeting objectives included:

- To provide an explanation of the PacMARS effort
- To give updates on research in the respective areas
- To discuss marine issues important to the communities including gaps for future study
- To discuss useful ways of communicating science results
- To identify good examples of regional knowledge and western science working together

The following report includes comments on marine issues and suggestions for future research needs and communications in Section 2. A composite summary of consensus topics that were heard at all of the community meetings is provided in Section 3. Appendix A lists all the participants for each community meeting and their affiliations.



2. Regional Community Meeting Summaries

Five Alaskan regional community meetings were held: two in the villages of Savoonga and Gambell on St. Lawrence Island and three “hub” meetings that included representatives from surrounding villages that met in the larger communities of Barrow, Kotzebue and Nome for group discussions. The following section provides summaries of each of these community meetings.

2a. Savoonga Community Meeting, St. Lawrence Island, AK (January 28, 2013)

Attendees:

David Akeya, James Akeya, Tom Akeya, Robert Annogiyuk (Native Village of Savoonga), Lee Cooper [University of Maryland Center for Environmental Science/Chesapeake Biological Laboratory (UMCES/CBL)], Arnold Gologregen, Jackie Grebmeier (UMCES/CBL), Dylan Iya, Hiram Kiyuthlook, Mitchell Kiyuthlook, Clinton Kogassagan, Chester Noongwook, Thor Noongwook (Native Village of Savoonga), Wilson Okoomealingok, Perry Pungowiyi, Bryan Rookok Jr., Elmer Rookok, Paul Rookok Sr. (Savoonga IRA Council), Gay Sheffield ([University of Alaska Fairbanks (UAF)], Sveta Yamin-Pasternak (UAF)

Brief Narrative:

There were 20 attendees at the Savoonga community meeting, including four PacMARS co-PIs (Cooper, Grebmeier, Sheffield, Yamin-Pasternak). Members of the community represented personal interests, the Savoonga IRA Council, and the Native Village of Savoonga. The meeting began with an introduction of participants. After a brief introduction by Gay Sheffield, Lee Cooper and Jackie Grebmeier provided an overview on PacMARS and regional science. Sveta Yamin-Pasternak provided a presentation on science, language and local foods.

During the meeting, attendees identified the marine issues of concern via comments and questions, and provided suggestions as follows:

Marine issues of concern:

- Negative impacts from increased ship traffic, especially noise and pollution events, on the essential marine subsistence resources.
- Ship noise and potential acoustic deflection due to the noise affecting the walrus’s ability to access their feeding grounds, areas where they would normally congregate, etc.
- Regionally specific information and/or issues that may be useful but are not considered for study (i.e. different sized walruses on different sides of the island).
- Connectivity between walrus populations around St. Lawrence Island in the northern Bering Sea and those around the North Slope Borough in the Chukchi Sea.



- What will be/are the effects of warmer water and less sea ice on the ecosystem?
- Comments were made about the health of southern walrus populations, which are skinnier than other walrus populations.
- Warmer water is allowing gray whales to move further north, same with dominant amphipods, thus both food/diet changes are occurring.
- People are also observing a northward movement of humpback whales.
- People would like to see the Sea Ice Walrus Outlook (SIWO) project be year-round.
- What are the impacts of trawling on the ecosystem? Will trawling cause benthic habitat degradation and subsequent effects on benthic foragers that are essential subsistence species (ex. walruses, bearded seals, eider ducks)?
- Shipping lanes are opening up, with increases in annual ship traffic. Related threats to marine mammals could include oil spills, industrial ship noise impacts, deflection of game from an area or their traditional migratory patterns, temperature changes, disruptions to wildlife physically from ships, and pollution.
- There is an issue of incomplete information about ship traffic and vessel whereabouts – it was estimated that only 10% of ships report to the Savoonga office, which is funded by Shell through the Bering Straits Native Corporation.
- Insufficient translation or interpretation of scientific research – for example, what is meant by synthesis?
- Evaluation of oil impacts on wildlife requires looking at whole migration pathways.
- What are the impacts to the marine waters from Red Dog Mine north of Bering Strait?
- Concerns that certain mammal species (i.e. whales) are getting too much focus from certain funders (ex. Shell Oil) – recommend that the scientists should study the “whole nine yards” – a comprehensive ecosystem approach is needed.
- Ship traffic: concerns about deflection of game/human safety, food security/health, food safety, human impact/danger to boaters/pollution, etc., physical safety issues for wildlife and humans, noise, spills /pollution, disease introduction.
- There is still uncertainty on cause of the Northern Alaskan Pinniped UME (Unusual Mortality Event).
- Lack of monitoring for Fukushima radiation in air, water, or wildlife.

**Community suggestions:**

- Study the still undetermined disease that is affecting the seals/walrus.
- Need to monitor for changes in the migratory patterns/timing of marine mammals, fish, and seabirds.
- Need to increase the knowledge regarding procedures, protocols, and science to mitigate effects and/or the effects of shipping to the Bering Strait wildlife and ecosystem, especially effects from pollution, noise, etc.
- Need to provide information about how to meet the nutritional, cultural, and economic needs of the peoples if animals move (prey change) or choose to move away, e.g. due to ship noise.
- People would like the scientific information to be presented in a way that the layperson could understand, including defining what a synthesis is.
- Translation/integration of local knowledge to science should be addressed.
- One Elder considers himself a predator as part of the island's ecosystem, therefore what he does through his subsistence lifestyle benefits and maintains the system.
- Need for integrated community participation in research via internships, shipboard research, and/or community involvement.
- Need better understanding regarding human use/needs on the Russian side of the Strait.
- Provide regular participatory public updates.
- Get Alaska Native youth/students involved regionally/locally.
- Study the ecosystem and wildlife but there is a need to relate results to public health and food security /food safety issues.



2b. Gambell Community Meeting, St. Lawrence Island, AK (January 29, 2013)

Attendees:

Paul Apangalook, Preston Apangalook, Edmond Apassingok, Melvin T. Apassingok, Mr. Apatiki, Iver Campbell, Lee Cooper [University of Maryland Center for Environmental Science/ Chesapeake Biological Laboratory (UMCES/CBL)], Jackie Grebmeier (UMCES/CBL), Mark Nupowhotuk, Miriam Oseuk, Gay Sheffield [University of Alaska Fairbanks (UAF)], Eddie Ungott, and Sveta Yamin-Pasternak (UAF)

Brief Narrative:

The meeting opened at 9 AM. There were 12 attendees at the Gambell community meeting. After an introduction by PI Gay Sheffield on who we were and what the objectives were for both NPRB and PacMARS, the PacMARS PIs Lee Cooper, Jackie Grebmeier, and Sveta Yamin-Pasternak explained the PacMARS program from their disciplinary perspective and asked for input on what the key marine issues of concern were for the community. Community members asked for a poster regarding PacMARS and its results using terminology better suited for non-western scientists.

During the meeting, attendees identified the marine issues of concern via comments and questions, and provided suggestions as follows:

Marine issues of concern:

- Invasive species – what are they, are they coming here, and what will they do?
- Observing northward shifts of some species.
- Ice is important for determining where walrus drift, so changes in wind patterns and ice drift have impacts on walrus locations for subsistence hunting.
- Are scientists missing timing or spatial aspects of the sampling period?
- Study other animals that have human health/food security/ecosystem health potential than those that have the main focus. For example, the study of compound tunicates and beach greens that are consumed by people and that have their own role in the ecosystem were suggested.
- Disparities between existing regulatory framework within the context of ecosystem processes are an issue. For example, people are a part of the ecosystem in a predatory role – it should not be considered wanton waste to leave some animal parts behind after hunting – we share with human beings and we share with the other animals too.
- Input is needed from the elders to determine priorities.



- Study the present toxicity/contaminant levels of marine subsistence foods and relate that to public health and food safety issues.
- Lesions seen for seals and questions arose as to why is there this sickness? High priority to find the cause of the Northern Alaskan Pinniped UME.
- If populations of subsistence foods change in numbers and/or become too toxic to eat, what will be the alternative food source for our people?
- Study the impact/destructive forces on communities if the marine ecosystem is to be/will be affected by changes.
- The Bering Sea is said to be productive but the huge commercial fishing industry is fishing out the south and heading to the north. How will regional impacts be addressed? What will happen here near the Island?
- Local coastal monitoring of fish, invertebrates, and large game happens on a daily basis as the subsistence community observes the health of the organisms throughout the ecosystem – integrate that expertise in scientific studies.
- Where/how does our traditional knowledge fit with the future?
- The human use of shared marine resources is with our Russian neighbors too. Scientists need to study both sides of the Strait as well as the two sides of the oceans up north.
- Study where the toxic marine dump sites are in the ocean.
- Study the effects of melting ice on the changing environment.
- Preserving/acknowledging the critical habitat (subsistence) marine seascape of St. Lawrence I. to commercial trawl fisheries concerns.
- Commercial fishing impacts on the marine ecosystem (benthic and mid-water).
- Why are we seeing changes in different bird populations?
- Levels of contaminants in the marine environment are of concern for health as well as food safety/food security concerns.
- What are the impacts of real and perceived toxicity of subsistence foods?
- Observations mentioned of fall storms that wash up amphipods on the island shores.
- Ship traffic impacts:



- Acoustic deflections
- Human safety
- Food Security
- Physical safety issues for wildlife
- Physical safety issues for humans
- Spill events
- Invasive species
- Pollution/contaminants

Community suggestions:

- Contact the elders individually or through meetings to better understand their views on the the types of marine research that are needed in the future.
- Communicate results and ideas graphically/visually. Use visual types of communication.
- Document the disconnect between the role of people in the subsistence use/cultural practices framework and regulatory obligations/framework.
- Ground truth project results with community input. The government can have a head start for the problem/study since there is local knowledge available in coastal communities.
- Focusing just on zooplankton is not enough; instead there is a need for a broad scale approach to understanding the whole ecosystem.
- Use projects like the Sea Ice for Walrus Outlook (SIWO), Bering Sea Sub-Network (BSSN), etc. to better connect with the communities.
- Appreciate the economic value of traditional knowledge.
- How will you study the industrial impacts on marine foods – both the health of that food and the availability/accessibility of the marine foods (i.e. invertebrates, fish, mammals, birds)?
- Study the seabird population changes – the opinion was expressed that this marine resource has been overlooked.
- Involve Native coastal communities when scientists are at the proposal writing stage.
- The St. Lawrence Island marine habitat is the breeding/feeding grounds for all marine animals in the region – these waters need to be protected.
- Have face-to-face meetings to provide results of research/news in the area. Use multiple media sources including regional newspaper, radio, hub outreach/education outlets.



- Avoid conflicting communications regarding subsistence marine resources and contamination, e.g. different viewpoints regarding contaminant levels in bowheads, e.g. Alaska Community Action on Toxics versus North Slope Borough Department of Wildlife Management.
- Need to conduct similar studies on subsistence marine resources from Saint Lawrence Island to Barrow as similar measurements will be easier to compare/contrast over time and space.
- Concern about when and how Fukushima origin radioisotopes will reach Saint Lawrence Island.
- Concerns are great regarding the risks of oil spills on seals (and other marine wildlife) and the logistical challenges of spill response with future increases in industrial development and shipping.
- The ecosystem is changing at the same time commercial fishing, oil industry, and large vessel traffic is increasing.
- Ship noise and more Russian trawlers in the region are concerns.
- Concern for increased vessel traffic through the region and the potential for pollution on the marine ecosystem, subsistence wildlife populations, and human health risks.

Of note:

- Spiny king crab (Hanasaki; *Paralithodes brevipes*) are increasing in the area with many more caught during 2012 than before.
- Walrus hunting occurring further north than before; what does this observation say about any changes in walrus feeding and breeding areas?
- *Opilio* sp. of crab can wash up in numbers (thousands) at a time.
- Eider ducks have declined dramatically, as has the oldsquaw (long-tailed) duck.
- Look to the past before studying the future (supporting retrospective studies).
- Things are changing – and people are having to adjust.



2c. Barrow, AK Community Meeting (February 11, 2013)

Attendees:

Billy Adams [North Slope Borough/Dept. of Wildlife Management (NSB/DWM)], Lily Anniskett (Native Village of Point Lay), Carin Ashjian (Woods Hole Oceanographic Institution), Danielle Dickson [North Pacific Research Board (NPRB)], Craig George (NSB/DWM), Lee Kayotuk (Native Village of Kaktovik), John Nicholls (Native Village of Nuiqsut), Steve Okkonen [University of Alaska Fairbanks (UAF)], Hugh Olemaun (Barrow), Billy Blair Patkotak Jr. (Native Village of Wainwright), Gay Sheffield (UAF), Raphaela Stimmelmayer (NSB/DWM), Ellen Tyler [Alaska Ocean Observing System (AOOS)], Sveta Yamin-Pasternak (UAF)

Brief Narrative:

The meeting opened at ~9:15 AM. After a brief introduction by PI Gay Sheffield, Billy Adams offered an invocation. There were several presentations by the PacMARS team (Ashjian, Sheffield, Yamin-Pasternak), Danielle Dickson (NPRB), and Ellen Tyler (AOOS). The format was informal, with all participants welcome to, and frequently, offering suggestions and observations regarding important marine scientific questions and effective and novel means of communication of science activities and results to local communities. There was a lunch break from 11:45 AM-1:00 PM in the Ilisagvik College Cafeteria followed by resumption of presentations and discussion. The meeting concluded at 4:45 PM.

During the meeting, attendees identified the marine issues of concern via comments and questions, and provided suggestions as follows:

Marine issues of concern:

- Arctic marine mammals are known to have medicinal value. What are these natural products? Examples: beluga whales, seal oil is effective in killing bacteria, seal oil is used for several medicinal purposes; sea turtles in the Caribbean also have medicinal properties. Research is needed on the medicinal qualities of marine mammal oil and other marine mammal products.
- Research why Native foods keep you less hungry longer than processed “white man” foods.
- What natural products with medicinal value are present in the Arctic marine environment?
- Why are bowhead whales not seen close to shore near Barrow in recent years as they were frequently in the past? Is the increasing scientific and commercial marine activity influencing the whales’ behavior so they do not approach the shore?
- What are/will be the impacts of the oil companies 5-10 years from now? There is a need to monitor the impacts of the oil companies long-term, and not just for a few years.



- Long-term studies of the ecosystems are necessary to detect if impacts exist over time.
- What are the impacts of noise from all of the ongoing and future activities associated with oil/gas development, shipping, as well as research on animal behavior and other aspects of the ecosystem?
- Is there a physiological impact of industrial sound on marine animals such as mammals and plankton? For example, seismic noise impacts on different types of organisms..
- What would be the impact of a spill of a contaminant such as oil or drilling muds on the ecosystem and on the upper trophic level predators that serve as subsistence for local communities?
- What are the impacts of vessel discharges, either planned or accidental, on the marine ecosystem?
- What are the impacts on subsistence hunting of regulatory actions by government agencies (e.g., duck hunting seasons that may/may not coincide with availability of ducks)? How can these two competing interests be reconciled?
- Are there ongoing changes in migration timing and routes of important upper trophic level animals (birds, fish, and mammals) that are associated with climate change or with anthropogenic activities? What will the impact of these changes be on subsistence hunting of these resources?
- What starts the bowhead whale fall migration from Canada to the Bering Sea? Can the timing of this migration be predicted based on environmental or whale observations?
- How can communities retain their cultural identity, including utilization of traditional foods by the young members of the community?
- What is the impact of ongoing environmental changes on weather and local infrastructure? For example, concern was expressed about the integrity of ice cellars the shoreline and critical structures along the coast (e.g., roads and buildings).
- How much additional activity associated with research and other activities can communities and local ecosystems tolerate?
 - For example, it was stated that there is a negative impact of all the multiple research projects on the Southern Beaufort Sea population of polar bears.
 - Also, it is desirable for research to address local stakeholder needs.
- Research questions should be trans-boundary (e.g., across international boundaries) and Pan-Arctic (e.g., are there connections between the Beaufort and the eastern Arctic such as near Greenland?).



- What might the effects of ocean acidification and other environmental change mediated physiological responses be on populations of marine organisms?
- Why do walrus haul out at Point Lay vs. some other location that is closer to Hanna Shoal? (It might be learned behavior. “They hauled out there once and remembered the place”).
- What will be the availability and health of subsistence animals? Availability includes both abundance and migration behavior (timing and paths).
- What was the cause of the 2011 Northern Alaskan Pinniped Unusual Mortality Event (UME) seal disease?
- What is the impact of climate change on the abundance, composition (type), and availability of marine species? For example, fish species are showing an increase in diversity and there are songbirds seen on the North Slope that were not seen previously.
- What is the impact of climate change on polar bear populations and behavior? For example, polar bears near Kaktovik cannot get food because of the retreat of summer sea ice so they are near town, hungry, and having an impact on the activities of the local community.
- What would be the impacts of increased commercial activities such as commercial fishing, shipping, and oil exploration on bowheads? For example, commercial fishing might lead to entanglements and shipping could result in collisions between ships and whales (or ships and whalers).
- What might be the impact of contaminants or substances in air emissions on the marine ecosystem?
- What might be the impact of hydraulic fracturing (for natural gas) on water in rivers, fish in rivers, and discharge into the ocean?
- Coastal communities concerns include:
 - Noise from offshore industry and associated vessels
 - Oil spill/pollution effects
 - Current regulatory constraints vs. subsistence foods/needs
 - Changes in the weather impacting subsistence – i.e. melting ice cellars
 - Coastal erosion destroying communities
 - Does the oil industry really understand sea ice – need to research ice movements, etc. The behavior of oil under sea ice needs to be studied in a controlled environment.
- Research the cumulative impact on the few “popular” species that are being continually researched. e.g. Polar bears.



- Research the radiation concerns resulting from the Fukushima power plant disaster. Comprehensive research on the presence of contaminants from this source and/or impacts and including the animals on the seafloor.
- Ocean acidification is a concern – we need more research on its effects.
- Drilling muds – how will they affect wildlife/foods that are used in coastal subsistence communities food?
- Industrial shipping – unregulated water/sewage emissions – what are/will be the effects?
- Commercial fishery impacts on arctic species – what are the physical effects?
- Air emissions from industrial ship traffic, coastal communities, and drill platforms, etc. – need to understand the effects.

Suggested ways to more effectively communicate:

- Engage tribal governments in consultation. (NPRB wants to engage in such consultations regardless of whether there is a requirement by other funding agencies to do so).
- Need subsistence Advisor to coordinate research activities so as to not interfere with subsistence activities. Need to have a subsistence advisory person to communicate future studies in order to lessen conflicts with subsistence activities – would need to be regionally specific as each coastal region/community has different subsistence activities/timing/focus.
- Involve youth in research.
- Have community meetings with scientists to communicate planned research activities.
- Scientists should return to communities to communicate findings.
- Outreach and education are needed.
- Cultural education for research scientists and others.
 - A course, preferably taught in person, that would teach people about the cultures and practices of the communities in which they will be working. As an example, it would be helpful for scientists to understand in what seasons the local communities hunt for the different subsistence animals. The “students” should include teachers, researchers, oil field workers, and law enforcement, anyone who will be working in a community. There are regional differences in culture that will require different classes for the different regions.
- Communities need tangible products to document a range of information including state of the ecosystem, outcomes of meetings such as this one, outcomes of the NPRB study, and the importance of subsistence resources. (The reports from these community meetings will



be available to the communities. The reports from the PacMARS project also will be available to the communities).

- When in Barrow, arrange for a two-hour radio show on KBRW. Make sure to advertise the show to the communities that can receive the KBRW broadcast. Make sure that the title of the show reflects the content so people can decide whether or not to listen.
- Establish a really good coast-wide hunter reporting network. This would facilitate coordination between community observations/knowledge and scientific research. An excellent example of such coordination is the reporting of the Northern Alaskan Pinniped UME seal wasting disease in 2011 in which the first reports came from the seal hunters.
- Involve students. There are some good examples, such as the US Fish and Wildlife “Ambassador Students” program. “Follow the samples” would have students go to laboratories at the home institutions of scientists to see how samples are analyzed. Students might participate on research vessels/boats.
- Engage subsistence hunter(s) in collection of data.
- For meetings in villages at which you wish to communicate upcoming work, send the information to the village ahead of time and use comment forms to solicit input (Native Village Process).
- Work with the Native Village Tribal Government and other local entities to set up meetings, i.e. City Offices and Native Corporations. It was noted that villages vary in the extent to which of these entities work in a unified way.
- Engage the Fish and Game Management Committee or equivalent for each village to help communicate plans and results.
- Hold regional meetings, such as this one that are “hub” meetings, so that representatives from the different communities can communicate with each other as well as with the scientists and agency representatives.
- Have a presence at the Alaska Federation of Natives annual meeting. This would be a great thing for the NPRB to do. Piggyback on other forums.
- Currently there is not enough reporting to the coastal communities on Arctic research – by those whose projects are proposed and/or ongoing.

Additional comments:

- Currently not enough cultural training to researchers that are coming into a coastal region/community with respect to subsistence, regional sensitivities, timing, uses.
- Need to get the information/results back to the communities.



- Invite one representative for a meeting to hear the results of research (i.e. City Office, Tribal Council, and Native Corporation) – for EACH village where the research was undertaken.
- Coordinate with other agencies / forums i.e. Rural Advisory Committees, State and federal agencies, as well as University outlets/programs.



2d. Kotzebue, AK Community Meeting (February 22, 2013)

Attendees:

Earnest Barger Sr. (Native Village of Buckland), Lee Cooper [University of Maryland Center for Environmental Science/Chesapeake Biological Laboratory (UMCES/CBL)], Danielle Dickson [North Pacific Research Board (NPRB)], Jackie Grebmeier (UMCES/CBL), Richard Sage (Native Village of Kivalina), Damian Satterthwaite-Phillips [Northwest Arctic Borough (NAB)], Gay Sheffield [University of Alaska Fairbanks (UAF)], Zach Stevenson (NAB), Ellen Tyler [Alaska Ocean Observing System (AOOS)], Sveta Yamin-Pasternak (UAF). The Mayor of the NAB, Reggie Joule and staff from the NAB planning department attended the end of the meeting.

Brief Narrative:

The meeting opened at ~9:00 AM at the Northwest Heritage Center. Gay Sheffield provided an introduction to the project as well as the focus and goals of the meeting. Several presentations by the PacMARS team (Cooper, Grebmeier, Sheffield, Yamin-Pasternak), Danielle Dickson from NPRB, and Ellen Tyler from AOOS followed. The format was informal, with all participants frequently offering suggestions and observations regarding important marine scientific questions and effective and novel means of communication of science activities and results to local communities. There was a lunch break from 11:45 AM-1:00 PM and lunch was provided followed by resumption of presentations and discussion. NAB Mayor Reggie Joule, in the company of several staff members, provided an informal presentation that continued until the end of the meeting at 5:15 PM.

During the meeting, attendees identified the marine issues of concern via comments and questions, and provided suggestions as follows:

Marine issues of concern

- Lack of communication - communities do not understand the relevance of the research projects in their region.
- Translation issues with Native language to English as well as scientific English to layman English.
- Food security is a consistent issue for people in subsistence-dependent communities.
- Erosion of the coastline is a concern to communities and their cultural, physical, and economic survival as they are directly part of the marine environment.
- How do we balance concerns about lifestyle, social policy and vision, while allowing for adaptation?
- There are participatory processes for land issues – what is the participatory public process for marine/marine ecosystem/research/communication issues? Are there any?



- Concern about location of shipping lanes, oil development, future fisheries, roads connecting communities, and fast moving industrial developments in a time of environmental change.
- Offshore and onshore mining are concerns. Onshore mining that affect watersheds will have an eventual effect on the marine ecosystem through rivers and runoff.
- What is the participatory process that allows coastal communities and Alaskans to have a voice in the NANA region regarding marine issues?
- What effect does increased warm water coming northward along the Alaskan coast have as on food webs?
- How will results of hub meeting be provided back to the communities?
- Increase in large vessel traffic is a large concern – communities are concerned for the sea mammals and the prey it takes to sustain those animals. Will the ships scare off the game from their traditional migratory routes? Affect the timing of their movements? Affect the prey the marine mammals need to survive?
- Decrease in the thickness and timing of the sea ice is a concern – changes will affect the food chain – that includes humans. The sea ice thickness and timing is changing.
- Have the ocean currents changed – and if so, how? Where are the ocean fronts and are they changing, moving, or have they already moved?
- The ocean currents and the weather patterns and any changes to either of these are important to all coastal communities.
- Is fresh water runoff affecting the ocean waters – is it changing the currents and/or the types of seawater?
- What were the ancient currents like and how did they affect the marine ecosystem?
- What are the effects of research on our essential marine resources?
- What are the levels of contaminants throughout the marine ecosystem – the foods, the waters, etc.?
- There are concerns as to the impacts on marine resources, habitats, and the ecosystem from large-scale commercial fisheries moving north into the Northwest Arctic region.
- Concerns regarding regional allocation of resources vs. commercial interests. “Rich people will come and take what we have”. There is a real concern for the Urban/Rural divide in resource allocation, political voice, etc. with respect to marine resources.



- Increased marine transportation, offshore development, and commercial fisheries – all are marine concerns to the region due to how they will affect the marine environment, resources, and health of the peoples.
- Russia is a great concern due to our current lack of communications associated with oil spill response, wildlife events, etc.
- Sovereignty ending at the beach is a concern – a hunter may have a conflict with a large industrial vessel – what representation does the coastal community have with this issue?

Community suggestions:

- Coastal community members should be on the NPRB Board or the PacMARS Board in order to encourage/facilitate communication with scientific research, facilitate local hires, and implement mitigation measures for ship traffic, changing climate conditions, etc.
- Need to get the United Nations Law of the Sea treaty ratified by the United States.
- Need to prepare for the US chairing the Arctic Council in 2015. Take advantage of existing and upcoming policies and get ready/plan for the future.
- Start at the base by working with coastal communities – build relationships to achieve longevity and stability. Work with people in the field. Introduce yourself to coastal communities. It is better to go to the communities and introduce yourself. All the peoples from youth to elders will have a chance to understand. Share your research information with the coastal communities. We all need to partner together to study the ocean.
- Communities would like to know what researchers are doing. This would promote better communications – and more understanding of the marine environment and ecosystem – of which people are a part. The current lack of communication regarding marine issues is both economically and culturally stressful on communities.
- Inform the community Tribal Government of your pending arrival, meet with the Tribal Government Council, do your fieldwork once it gets approved by the Tribe.
- Recommend that team go to each village. Development of fact sheet and informational flyers are useful.
- Recognize that the tribes are a sovereign government. Ask for permission. Inform the tribal government and the community how your research results will be used, how this information will be applied, and assure (legally) that the data collected are in the best interest of the tribe/community. You will end up with a better product.
- Adhere to the Northwest Arctic Borough Ordinance 12.03 Standards of Research in the Northwest Arctic Borough – re. Informed Consent.



- Ask the community what they want – they will help drive the research. Each community has different needs/different timelines. Do not overlook the needs and interests of the tribes even though sovereignty ends at the coast. Communities rely on the ocean for their food, culture, and livelihood.
- How can the PacMARS project help the community – how to get the parts (research, agencies, co-management, etc.) working/moving in the same directions. When it comes to shared research priorities, a unified voice with, between, and among all stakeholders is best.
- Tribal government councils have monthly meetings and an annual membership meeting – come and present at these forums.
- Work with the elders and the locals – they know things that have been passed down over time. Find out what the people say about an issue or your data.
- Local people should be involved. Come and talk to us about your research and about your results – to the village. Need to train youth!



2e. Nome Community meeting (February 25, 2013)

Attendees:

Lee Cooper [University of Maryland Center for Environmental Science/Chesapeake Biological Laboratory (UMCES/CBL)], Danielle Dickson [North Pacific Research Board (NPRB)], Dolly Kugzruk (Teller Traditional Council), Gay Sheffield [University of Alaska Fairbanks (UAF)], Michael Sloan (Nome Eskimo Community), Edward Soolook (Native Village of Diomedea), Stewart Tocktoo (Native Village of Brevig Mission), Stanley Tocktoo (Native Village of Shishmaref), Ellen Tyler [Alaska Ocean Observing System (AOOS)], Sveta Yamin-Pasternak (UAF)

Brief Narrative:

The meeting opened at ~9:00 AM at the UAF Northwest campus. Gay Sheffield provided an introduction to the project, as well as the goal and focus of the meeting. Several presentations by the PacMARS team (Cooper, Sheffield, Yamin-Pasternak), Danielle Dickson from the NPRB, and Ellen Tyler from AOOS followed. The format was informal, with all participants welcome to, and frequently, offering suggestions and observations regarding important marine scientific questions and effective and novel means of communication of science activities and results to local communities. There was a lunch break from 11:45 AM-1:00 PM and lunch was provided at the Northwest Campus followed by resumption of presentations and discussion. The meeting concluded at 4:45 PM.

During the meeting, attendees identified the marine issues of concern via comments and questions, and provided suggestions as follows:

Marine issues of concern:

- Lack of communication from agencies, researchers, and institutions with coastal communities. Port Clarence is under consideration for port development and neither the villages of Brevig Mission or Teller were consulted during that process. How will the development of Port Clarence for ships affect marine subsistence resources? The local economy? Subsistence practices on essential marine resources?
- How do/will the coastal communities be able to participate in the decisions currently taking place regarding ship traffic, shipping routes, future development of marine areas and marine resources?
- What are the effects of cruise ships/industrial ships in general on water quality? Who will be monitoring potential effects? Wastewater discharge from passing large vessels – pollution, sewage, invasive species – these are all threats. Who will be studying/monitoring?



- Old military ordnance are still in the marine environment; How much is around and how to get it cleaned up?
- Marine debris from 2011 Fukushima tsunami event as well as debris from industrial ships – how will these affect the marine vertebrate and invertebrate resources?
- Pollution and contaminants from Russia’s coastline communities and ship traffic – what is the current status? How will monitoring be done to mitigate harm to shared marine resources?
- Sunken ships – in Alaskan and Russian waters of Bering Strait – has the fuel been removed? Contaminants? Who monitors these issues and their effects on marine resources? i.e. Sunken ship by Point Jackson ~5 years ago; sunken Russian processor trawler with 200,000 gallons of fuel onboard off Cape Navarin May 2012 (e.g. Kapitan Bolsunovski).
- What are the effects of offshore and nearshore gold dredging on the infauna, epifauna, benthic organisms, diving sea ducks, fish, and benthic feeding marine mammals –from noise pollution, to turbidity, as well as stirring up contaminants on the seafloor from 20th century mining techniques (i.e. arsenic/mercury)?
- Almost no communication from marine researchers to coastal communities regarding upcoming projects, ongoing projects, and/or results of completed projects. Why? How can this be?
- Federal and State projects typically do not include regional traditional knowledge from the coastal communities even though the projects are directly involving essential subsistence resources.
- Trawling impacts on the marine ecosystem and essential marine resources is a large concern for all coastal communities in the Bering Strait region – especially with its reliance on marine resources on the sea floor as well as those marine resources that are reliant on infauna, epifauna, and other benthic organisms as prey.
- We are told that commercial fish stocks are dwindling in the Bering Sea – what are we to expect as impacts on our subsistence harvests from the fisheries moving north?
- What is the participatory process that allows coastal communities and Alaskans to have a voice in the Bering Strait region in maritime issues?
- The Northern Alaskan Pinniped UME seal sickness is still an unknown disease – was it this being caused by radiation or a novel disease? This needs to be studied.
- Ocean acidification – this needs to be monitored/studied.



- There are concerns with coastal erosion as the tundra is falling into the ocean as well as permafrost thaw (affecting the preservation and storage of marine resources for subsistence purposes in coastal communities).
- How will changes in the marine ecosystem, the sea ice, and the weather affect the food chain – the human food chain? How will these affect subsistence uses?
- Use of local community knowledge to only verify shipboard data or mathematical modeling results is not an integrated use of regional expertise of the marine environment/ecosystem.
- The cost of living currently is very high in coastal communities, i.e. gas, store goods. The price increases changes the social structure of the harvest of marine resources. Agencies come and ask us if we would like to leave – NO is the answer. The ocean foods and land foods are nearby. There is no other place for us.
- Limited mobility of communities is a challenge (i.e. church, school, store) vs. migratory nature of the past subsistence livelihoods.
- Will marine mammals be deflected away from our coastal communities due to increased ship traffic?
- How will commercial fishing pressures affect the marine ecosystem and the human use of marine resources throughout Bering Strait region?
- How will shipboard studies be integrated with knowledge obtained locally by other means, e.g. beavers in rivers, sheefish migration, as well as appearance of Atka mackerel, skate, and shark wash ups, etc.
- Future financial constraints are a concern to coastal communities, especially in the face of climate and industrial change in reference to social change.
- Spill response is a concern, including the limited response infrastructure, communications, training, and finances – how will the needs be met by an appropriate level of readiness?

Community suggestions:

- When will the NPRB have a comprehensive report of their multi-faceted integrated Bering Sea project – will that be available to the public/layman?
- Provide results of your research in multi-media formats – posters for public viewing in the communities, use the radio for call-in shows or public service announcements, provide interviews or press releases to the regional newspapers, use the outreach/education outlets (i.e. UAF-MAP, UAF Northwest campus) to assist in regional communications, come to the communities and have face to face meetings, invite community members to the regional hubs for “hub” meetings, etc.



- Communicate frequently, communicate consistently, communicate effectively to be understandable.
- Communities need to understand and/or weigh in on science that is “pure science” vs. science motivated for commercial gain. Can’t stop all projects from happening but communities need to understand the impacts – positive and negative – from science underway in the region.
- Include coastal community members in the conduction of marine research where possible, including youth (youth leaders) and students.
- Include Elders in decision-making for meetings such as this and utilize Elder Advisory Committees. This helps to bring forward voices for the community issues of greatest concern.
- More tribe to tribe unified regional communications.
- Piggyback communication opportunities on other opportunities i.e. Regional conferences, etc.
- We need consistent and effective communication with our Russian neighbors.



3. Key Science Themes and Topics from All Community Meetings

A consensus set of topics that were brought forward in all the community meetings included two overarching themes: a. Security and Stability of Subsistence Resources, and b. Communications and Engagement. Within the subsistence resources theme, marine mammals and seabirds, fishing, and hunting were key sub-topics. In addition, concerns involving oil development and mining, shipping and ship traffic, and environmental changes (ice, physics & contaminants) were identified. The second theme of communication and engagement between local communities and scientists are also clearly important topics for joint efforts moving forward.

3a. Security/Stability of Subsistence Resources

3a.1. Marine Mammals & Birds

All 5 communities expressed concerns related to marine mammals and birds. Bowhead whales, beluga whales, walruses, seals, ducks, geese and polar bears were specifically mentioned. The communities were interested in knowing how changes in sea ice, shipping noise and traffic, contaminants and increased fishing pressure will affect movement and health of these marine mammals. The communities would like monitoring of changes in the migratory patterns and timing of marine mammals, fish and birds. All 5 community meetings brought forward concern about the disease that has recently produced lesions on seals. Communities would like to know what is comprehensively known about the disease.

3a.2. Fishing, Hunting & Food

All 5 community meetings brought forward concerns about trawling and large-scale commercial fishing operations. While the Bering Sea is considered productive, commercial fishing is beginning to move into more northern areas according to our community representatives. There was general concern about not only the species being fished, but also the impact of trawling on benthic communities and the organisms that depend on them for food. Local community authority through sovereign tribal governments ends at the water edge, so subsistence communities are concerned about how conflicts with industrial-scale fishing will be resolved. During all five community meetings, concerns were also expressed about toxins in local foods and how the toxicity and contaminant levels would be studied in subsistence foods now and in the future.

3a.3. Oil & Mining

During all five community meetings, concerns were expressed about oil drilling and both offshore and onshore mining activities. Communities are concerned about the spill response infrastructure, and related communications, training and finances.

3a.4. Shipping & Ship Traffic

During all five community meetings, concerns were expressed about shipping traffic through the Northwest Passage and Northern Sea Route. Concerns included increased noise, pollution, human safety (boaters), wildlife safety and introduction of disease. There was general concern that marine subsistence resources would be impacted by both industrial and cruise ship traffic. The



communities wanted to know how the ship traffic would impact migratory patterns, prey availability and if the animals would be deflected away from the coastal communities. They were also concerned about pollution, sewage and invasive species in water discharge from passing vessels.

3a.5. Ice, Physics & Contaminants

During all five community meetings, concerns were expressed about the effects of warmer water temperatures and retreating seasonal sea ice. Community representatives were specifically concerned about how greater open water was increasing erosion and how that was affected the integrity of critical structures (roads, buildings, ice cellars), as well as loss of tundra to the ocean. The communities were also concerned about changes in current patterns and ocean fronts. They asked that these processes be measured in similar ways in order to compare and contrast conditions in time and space. All 5 community meetings brought forward concerns about contaminants in the environment and how changes in physical features (sea ice, erosion, melt run-off, rainfall) would affect transport of contaminants.

3b. Communications and Engagement

In all five community meetings the idea was expressed that regionally specific, community-based input is valuable and under-utilized. They would like studies on the impact of marine ecosystem change on local regional communities, but it should take a more integrated view. These communities consider themselves to be predators integrated into the regional ecosystem, taking and contributing to ecological processes. These communities work to minimize impacts on the environment and adjust social behavior accordingly. The community representatives pointed out the disparities between the existing regulatory framework and their perceived roles in ecosystem processes.

Many meeting participants expressed interest in the idea of synthesis. They wanted to know more about the PacMARS project and suggested that flyers distributed in villages would help explain PacMARS and give updates on the project. The communities asked for tangible products to document a range of information including the state of the ecosystem, outcomes of meetings, outcomes of studies and the importance of subsistence resources. They suggested that clear labels be placed on scientific maps and that scientific information on slides be presented in layperson terms. The meeting participants suggested that information be conveyed in graphical format.

Meeting participants also said that explanations were needed for the relevance of research being conducted. They suggested that regular research updates be provided on marine issues of interest at an announced time and location. The opinion was generally expressed that education and outreach should be explicitly included in research programs. Local communities would like to see their students included in scientific research programs, research cruises and fieldwork.

Community representatives recommended that elders be contacted directly at meetings and individually for input on scientific studies and research needed. They also suggested that when researchers go out in the field, they should exchange information with local residents.



The importance of communication was brought up repeatedly, and some representatives pointed out that there needs to be a long-term communication effort between scientists and local community members. However, this request on a scientist-specific basis is inherently at odds with the current science funding structure, which is dominated by short-term research grants that really do not lend themselves to long-time communication. When multiple projects are supported to the same scientist, the arrangements can permit longer-term communication. Funding agencies need to consider how to maintain a long-term communication channel with local communities in the Arctic while having to rotate funding support among different scientists as well as only supporting 2-3 yr. grant cycles. NPRB, NSF and BOEM, along with other federal and state funding agencies should strategically consider how to maintain continuity of community interactions within the funding limitations of their organizations.

The findings from the PacMARS community meetings were informative and facilitated a better understanding of issues facing local Alaskan communities on the northern Bering, Chukchi and Beaufort sea coasts. We expect to incorporate these insights into the final report of the PacMARS project to be provided to NPRB in summer 2014.



4. Acknowledgements

The PacMARS team members gratefully acknowledge input from all the community representatives who participated in the 2013 community meetings, and those who assisted in facilitating all in the networking and logistics efforts. Individually acknowledgements are made to Lily Anniskett (Native Village of Point Lay), Billy Adams [North Slope Borough (NSB)/Dept. of Wildlife Management (DWM)], Craig George (NSB/DWM), Lee Kayotuk (Native Village of Kaktovik), John Nicholls (Native Village of Nuiqsut), Hugh Olemaun (NSB/DWM), Billy Blair Patkotak Jr. (Native Village of Wainwright), Raphaela Stimmelmayer (NSB/DWM), Edmond Apassingok, Mr. Apatiki, Melvin T. Apassingok, Mark Nupowhotuk, Eddie Ungott, Paul Apangalook, Preston Apangalook, Iver Campbell, and Miriam Oseuk (Gambell), Bryan Rookok Jr., Paul Rookok Sr., James Akeya, Chester Noongwook, Robert Annogiyuk, Arnold Gologregen, Thor Noongwook, Hiram Kiyuthlook, Wilson Okoomealingok, David Akeya, Dylan Iya, Clinton Kogassagan, Mitchell Kiyuthlook, Perry Pungowiyi, Elmer Rookok, and Tom Akeya (Savoonga), Stanley Tocktoo (Native Village of Shishmaref), Edward Soolook (Native Village of Diomed), Stewart Tocktoo (Native Village of Brevig Mission), Dolly Kugzruk (Native Village of Teller), Mike Sloan (Native Village of Nome), Ernest Barger Sr. (Native Village of Buckland), Richard Sage (Native Village of Kivalina), Damian Satterthwaite-Phillips [Northwest Arctic Borough (NAB)], Zach Stevenson (NAB), Ellen Tyler (Alaska Ocean Observing System), Danielle Dickson (North Pacific Research Board), along with PacMARS PIs Carin Ashjian, Lee Cooper, Jackie Grebmeier, Steve Okkonen, and Sveta Yamin-Pasternak who participated in some or all of the community meetings. The Mayor of the NAB, Reggie Joule and staff from the NAB planning department attended the end of the meeting.

Special thanks are extended to Gay Sheffield for leading organizational support for the community meetings. Carin Ashjian also provided critical support for organizing the Barrow meeting. Also, thanks are provided to Nok Aker and Glenn Sheehan of the Barrow Arctic Science Consortium (BASC) and Eric Barnett (Umiaq, LLC) for logistical assistance in Barrow. Meeting notes for this report were collated by Gay Sheffield, Carin Ashjian and Jackie Grebmeier. Eva Bailey at UMCES also provided assistance preparing for the hub meetings and editing an early edition of this report. Logistical and travel support for community participants and PIs to attend the meeting was provided via the North Pacific Marine Research Institute, supported through funding by Shell Production and Exploration and ConocoPhillips. We thank PacMARS co-PI Carin Ashjian for handling the travel arrangements.



APPENDIX A: Participants

Acronym list: AOOS=Alaska Ocean Observing System, CBL/UMCES=Chesapeake Biological Laboratory University of Maryland Center for Environmental Science; Native Village of = Tribal Government; NPRB=North Pacific Research Board, WHOI=Woods Hole Oceanographic Institution; UAF=University of Alaska Fairbanks

January 28, 2013 Savoonga Community Meeting

SAVOONGA	
David Akeya	Savoonga
Tom Akeya	Savoonga
James Akeya	Savoonga
Robert Annogiyuk	Native Village of Savoonga
Lee Cooper	CBL/UMCES
Arnold Gologregen	Savoonga
Jackie Grebmeier	CBL/UMCES
Dylan Iya	Savoonga
Hiram Kiyuthlook	Savoonga
Clinton Kogassagan	Savoonga
Mitchell Kiyuthlook	Native Village of Savoonga
Chester Noongwook	Savoonga
Thor Noongwook	Native Village of Savoonga
Wilson Okoomealingok	Savoonga
Perry Pungowiyi	Native Village of Savoonga
Elmer Rookok	Savoonga
Bryan Rookok Jr.	Savoonga
Paul Rookok Sr.	Native Village of Savoonga
Gay Sheffield	UAF Marine Advisory Program
Sveta Yamin-Pasternak	UAF

January 29, 2013 Gambell Community Meeting

GAMBELL	
Paul Apangalook	Sivuqaq Native Corporation
Preston Apangalook	Native Village of Gambell
Edmond Apassingok	Sivuqaq Native Corporation
Mr. Apatiki	Gambell
Melvin T. Apassingok	Native Village of Gambell
Mark Nupowhotuk	Native Village of Gambell
Eddie Ungott	Native Village of Gambell
Iver Campbell	Native Village of Gambell
Lee Cooper	CBL/UMCES
Jackie Grebmeier	CBL/UMCES
Miriam Oseuk	Native Village of Gambell
Gay Sheffield	Marine Advisory Program
Sveta Yamin-Pasternak	UAF



February 11, 2013 Barrow Community Hub Meeting

BARROW	
Billy Adams	North Slope Borough, Dept. of Wildlife Management
Lily Anniskett	Native Village of Point Lay
Carin Ashjian	WHOI
Danielle Dickson	NPRB
Craig George	North Slope Borough, Dept. of Wildlife Management
Lee Kayotuk	Native Village of Kaktovik
John Nicholls	Native Village of Nuiqsut
Steve Okkonen	UAF
Hugh Olemanu	Native Village of Barrow
Billy Blair Patkotak Jr.	Native Village of Wainwright
Gay Sheffield	UAF Marine Advisory Program
Raphaella Stimmelmayer	North Slope Borough, Dept. of Wildlife Management
Ellen Tyler	AOOS
Sveta Yamin-Pasternak	UAF

February 22, 2013 Kotzebue Community Hub Meeting

KOTZEBUE	
Earnest Barger Sr.	Native Village of Buckland
Lee Cooper	CBL/UMCES
Danielle Dickson	NPRB
Jackie Grebmeier	CBL/UMCES
Richard Sage	Native Village of Kivalina
Damian Satterthwaite-Phillips	Northwest Arctic Borough
Gay Sheffield	UAF Marine Advisory Program
Zach Stevenson	Northwest Arctic Borough
Ellen Parry Tyler	AOOS
Sveta Yamin-Pasternak	UAF

February 25, 2013 Nome Community Hub Meeting

NOME	
Lee Cooper	CBL/UMCES
Dolly Kugzruk	Teller Traditional Council
Danielle Dickson	NPRB
Gay Sheffield	UAF Marine Advisory Program
Michael Sloan	Nome Eskimo Community
Edward Soolook	Native Village of Diomede
Stanley Tocktoo	Native Village of Shishmaref
Stewart Tocktoo	Native Village of Brevig Mission
Ellen Parry Tyler	AOOS
Sveta Yamin-Pasternak	UAF