

THE NORTHERN BERING SEA  
*Our Way of Life*

A PROJECT OF THE  
BERING SEA ELDERS ADVISORY GROUP

*With support from Alaska Marine Conservation Council*

©  
LOMEN BROS.  
KOMA  
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## *The* BERING SEA ELDERS ADVISORY GROUP

The Bering Sea Elders Advisory Group was established in 2007 due to our concerns about the proximity of bottom trawling to some of our villages and the potential movement of industrial fisheries into northern Bering Sea waters. That year many tribes promoted a bottom trawl boundary that was adopted by the North Pacific Fishery Management Council.

The Elders Group formed to bring elders together across the Yukon-Kuskokwim and Bering Strait regions. We have one mind – to protect our traditional subsistence way of life, and the ocean web of life that supports the resources we rely on.

*David Bill Sr.*

David Bill, Sr., Chair

Fred Phillip, Executive Director  
beringsea.elders@gmail.com  
www.beringseaelders.org

### *The* ALASKA MARINE CONSERVATION COUNCIL

Alaska Marine Conservation Council (AMCC) is dedicated to protecting the long-term health of Alaska's oceans and sustaining the working waterfronts of our coastal communities.

Support from AMCC on *The Northern Bering Sea: Our Way of Life* –

Dorothy Childers, Editor  
Muriel Morse, Outreach Coordinator and Interviews  
Julia Beaty, GIS Services  
www.akmarine.org

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Graphic design by Nora Gecan



Participating tribes in the  
Bering Sea Elders Advisory Group

# THE NORTHERN BERING SEA

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2011

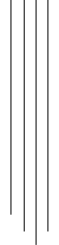
Opposite:  
Shaktoolik.  
Julia Beaty

Cover image:  
Eskimo hunter  
watching for seal  
- Nome.  
Alaska State Library  
George A. Parks  
Collection  
Lomen Bros.  
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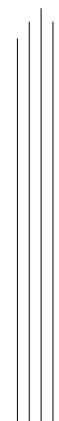






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*Inuuniagniqput* – the way we live as people (Inupiaq)  
*Yuungnaqsaraq* – our way of being (Central Yup'ik)  
*Key yaq tak tak* – way of life (St. Lawrence Yupik)<sup>1</sup>



Horsepower replaces  
dogpower in hauling  
a skin boat for whale  
hunting – Gambell.  
Anchorage Museum  
Ward Wells Collection  
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## A MESSAGE FROM *the* ELDERS

This report is a record of our ancestral connection to the ocean. The teaching of our ancestors was based on respect for what the ocean provides. Respectful actions are rewarded by hunting success; disrespectful actions have negative consequences. We were taught never to waste what the Creator has given us, to share our food with the community and to listen to our elders because they acquired wisdom over a long life and keen observation of the world around us. Today, while technology has changed and certain traditional practices have been left behind, knowing our family relations, sharing food from successful hunts, not wasting our catch and listening to elders' advice remain the foundation of our culture. Respect for the natural world and caring for our resources are the basis for continued opportunity to thrive on the bounty of the ocean and land. These are the values that the Elders Group is committed to transmitting to our younger leaders and to the outside world where decisions are made that affect us.

*This Island is small but there are names [for places] all around the island, bottom and top, from the waterline to the top. North, south, east, west. What we eat is seafood out of the ocean. Auklets feed out of the sea. Seals, walrus, crabs, bullhead, blue cods, and the birds are eating off of the sea. So that everything that we eat depends on the sea for their food too as well as ourselves here on the island. The sea is our food warehouse.<sup>2</sup>*  
From "Diomedes Island Names, Places and Stories"

*Our subsistence lifestyle IS our culture. Without subsistence we will not survive as a people...If our culture, our subsistence lifestyle, should disappear, we are no more and there shall not be another kind as we in the entire world.<sup>3</sup>*  
John Active – Bethel

## ON SHARING

*This sharing of food has always been a part of our value system. We believe that if we do not share with others, the food that is given us by our Creator will no longer be available. The more we give away, the more will come back.<sup>4</sup>*

Chevak Traditional Council – Chevak

*...That is an important piciryaraq (custom) down in our village, especially during the spring. When one goes down to the ocean and brings back a sea mammal, his wife divides it all up and, when done, calls all her neighbors out there to come take enough for a meal. She gives it all away. That is how coastal people are. Food and everything that can be divided is given to those one thinks about. They say that it will be replaced by more. They say because of the overwhelming gratitude they felt, they push the animals toward the hunter. That is why some say, 'Anirtaqqulluk, amllenninek cimingeciqlalria (Anirtaqqulluk, it will be replaced by more than was given).'*<sup>5</sup>

Frank Andrew, Sr. – Kwigillingok

*If it's our first catch, we give everything away to the elders and the people. Back in the day they would bring the liver to the elders in the sod houses, put on a stick. If it is somebody's first catch, somebody would sit with him while he tells the story to the old men in the sod houses. So those are Cup'ig customs that they don't practice any more, but giving away still exists.<sup>6</sup>*

John Pingayak – Chevak

*What we catch we share with elders and these young people they share with somebody that didn't catch one. They go up that way and around here. Around here when somebody goes hunting you know who they are, when they catch they share with us. And when we catch we share with them.<sup>7</sup>*

Gordon Westlock – Emmonak

*When you first catch, you give it away too, to elders. Even now, though it's not my first catch, I like to give to others that are less fortunate. Elders and people that can't go out, I try to fill their freezers with my own maklaks [bearded seal].<sup>8</sup>*

Stuart Orlun – Mekoryuk

Women conduct a seal party, in which a young man's first bearded seal is distributed – Tununak.  
James Barker





## ON GRATITUDE & RESPECT

*I take some snow and when I catch a bearded seal, I'll put some in my mouth, melt it, and put it in the mouth and the hand of the seal for its spirit to come to me again. Because whatever remains that I have I put it back in the water so that his spirit can go back to the spirit world and also come back to me.<sup>9</sup>*

John Pingayak – Chevak

*That was the first seal that I caught and my father told me to melt water in my mouth and to give him water. He said that the seal was thirsty and that's why he gave himself to me. I melted ice and snow in my mouth and I gave the water to the bearded seal.<sup>10</sup>*

Stuart Olrun – Mekoryuk

*The elders used to tell us, when we shoot anything, they always tell us not to say anything after you shoot it. They said you're never going to kill it after you say that word. They tell us not to say anything about it when we shoot anything. If you want to kill it, just shoot it without saying anything.<sup>11</sup>*

Joseph David – Mekoryuk

*Umyugaa-gguq tukniluni (They said that one's mind is powerful). They told us that a person's gratefulness is powerful, and their hurtful feelings are also powerful. If we cause that poor person to have hurtful feelings, they can shove us into negative circumstances. But if that person is grateful, it is like they are pushing us toward our own happiness. They make all things (all animals) more available to men, and every time they travel, something is available.<sup>12</sup>*

Theresa Moses – Toksook Bay

*When you are given a plate, you think of the ocean as your source of food and you take a little from your food and discard it some place where it won't get trampled on in the memory of those who have gone before us...And then you take the first little bite from your side of the plate thinking that soon as you get to the Bering Sea, a seal might come to you....<sup>13</sup>*

John Pingayak – Chevak

Top: Edward Kiokun butchering a seal – Mekoryuk.  
Archives, University of Alaska Fairbanks  
Robert W. & Elizabeth L. Stevens Collection  
UAF-2003-194-2028  
Bottom: Walrus hunter – King Island.  
Archives, University of Alaska Fairbanks  
Albert Johnson Photograph Collection 1905-1917  
UAF-1989-166-402-Print





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## ABOUT *the* PROJECT

The purpose of *The Northern Bering Sea: Our Way of Life* is to show extensive areas where Alaska Native hunters and local fishermen harvest ocean resources, and the marine waters important to the resources we rely on. It illustrates that the whole northern Bering Sea is the storehouse that supports our way of life. The quotations from elders and hunters are excerpted from interviews conducted for this project, other published material and oral history records. As we face threats to the northern Bering Sea, this report can support our leaders and inform outside decision-makers about how we depend on the ocean and how our way of life is inseparable from it.

This project was not an in depth inquiry into traditional ecological knowledge of the natural history of species and their environment. However, indigenous knowledge of such things as where to hunt and fish, how to be a successful hunter and fisherman, seasonal patterns, weather, ocean conditions, how to process and preserve fish and game, uses for fish and game, and customs underlie information provided to generate the maps.

Others have described the relationship between traditional knowledge and traditional practice:

*Indigenous knowledge is a comprehensive world-view. Information is classified and incorporated into a framework for understanding how the world operates. This provides the basis for not only hunting practices, but is also the basis for the cultural and spiritual aspects of indigenous society. The relevance of the system to life in the Arctic is clear from the simple fact that indigenous peoples of the Arctic have survived, and thrived, for centuries.*

*Indigenous ecological knowledge, or traditional knowledge, is that part of indigenous knowledge that addresses the natural environment. It is natural history, based on detailed observations sifted for their meaning, and relied upon for their predictive value. This knowledge is dynamic and evolving. Although parts of it can be documented, indigenous knowledge cannot be preserved on paper or computer disc. Its survival depends on the survival of the ways of life and the experiences upon which it is based. Without indigenous peoples and their way of life, indigenous knowledge cannot exist.<sup>1</sup>*

From "Traditional Ecological Knowledge of Beluga Whales:  
An Indigenous Knowledge Pilot Project in the Chukchi and Northern Bering Seas"

Opposite: Skin boat and  
aluminum boat, the old  
and the new – Gambell.  
Jon Nickles



## ON WEALTH


*We have learned from the early age where we often go along with those that are going dip-netting for sticklebacks and setting up blackfish traps. We learned that subsistence was the main factor for survival and this has been the advice to our people since time immemorial for all not to forget. The food resources have been considered as 'wealth' for a way of survival. Though a family may be in need of material items, as long as they have a food supply to survive through each season, they are well fitted in wealth for their survival. That's why we should not lose subsistence way of life as Native people.<sup>2</sup>*  
Paul John – Toksook Bay

*Our way of life, who knows, one day it will be more important. The cost of living is just going up. We won't be able to buy things from outside. Cost will be too high. But our resources are all around to survive with.*

*I'm here today because my forefathers depended on marine mammals. That's the source of food that we have. Everything my body needs is in the food chain. Fish, seals, walrus... it's good for you... So here in the cold climate, eating marine mammal matches our body needs.<sup>3</sup>*

Clement Ungott – Gambell

## ON STEWARDSHIP



*The women make clothing out of sealskins and make mukluks, boots, pants and parkas for winter use. The seal guts were blown and hung to dry. They were made into rain parkas. They also make waterproof gloves out of salmon skins. They used to take good care of the skins to work on them. All of what we used to wear for clothing was made out of animal skins and pelts, and sea ducks for parkas. Think of what a hard life they went through. The women made clothing for their husbands and children all with their skillful hands.<sup>4</sup>*

Alice Pitka – Toksook Bay

*There are habitats near St. Matthew Island where marine mammals stay in winter time... Seals, walrus, whales all spend their winters there. Then comes springtime, about March depending on how fast the ice melts, they start moving north from there... The important part is the migration patterns and the habitats. We don't want them to be disturbed regardless of how far they are from our hunting area.<sup>5</sup>*

Elders – Gambell

*I think we should continue holding on to our traditional knowledge and continue making our skin boats and preserving our culture... Like for whaling, I would like to continue using the skin boats because it's natural. I want to be able to continue doing this naturally, we go out with the wind and then the whale decides where he wants to be rather than going after it with a Lund boat and a motor... we have to work together. I guess that is why families stay a lot together because they work together, they help together in getting the animals, and then they come back and work together and divide it up, and they all eat together.<sup>6</sup>*

Edwin Noongwook – Savoonga

*You know when you look at Norton Sound, Stebbins is pretty lucky, we've got a pretty good area that we cover. We are right in the middle. Very rich. You know how they say, it's a migrating area, heavy migrating, for everything, everything, everything. We have everything in front, the ocean. Back there [tundra] we have all kinds of food to harvest. We don't have to go anywhere.<sup>7</sup>*

Elders and Active Hunters – Stebbins

*The custom [in my family] is we let ugruk [bearded seal] bleed, until most of their blood, the bulk of their blood has left their body... I can speak from the Bible, 'all spirits dwell in the blood.' Our pre-Bible Inupiaq wording was 'let the spirit have time to leave the body to go back to the ocean to where it come from.' The only one who can change habitat and ecosystem is mankind, the beluga and ugruk and fish won't do that. We're the only ones able to do that.<sup>8</sup>*

Wally Otton – Koyuk





## ON LEARNING

*Ever since I was born, we grew on walrus mainly. That is a large part of our consumption, seals also and other sea mammals, birds. But with walrus, everybody born is expected to learn along, just like learning in school. They are taught and it used to be where all the younger men would get together and talk about what they did today, how it was, how dangerous it was and what the current was to get to the walrus. So it was our elders, our fathers and mothers first, and the whole community would teach each other.<sup>9</sup>*

Phillip Ahkinga – Diomedes

*Children and youth are taught to remember stories and information accurately, to 'put it into your body,' by techniques such as keeping one's head still while listening.<sup>10</sup>*

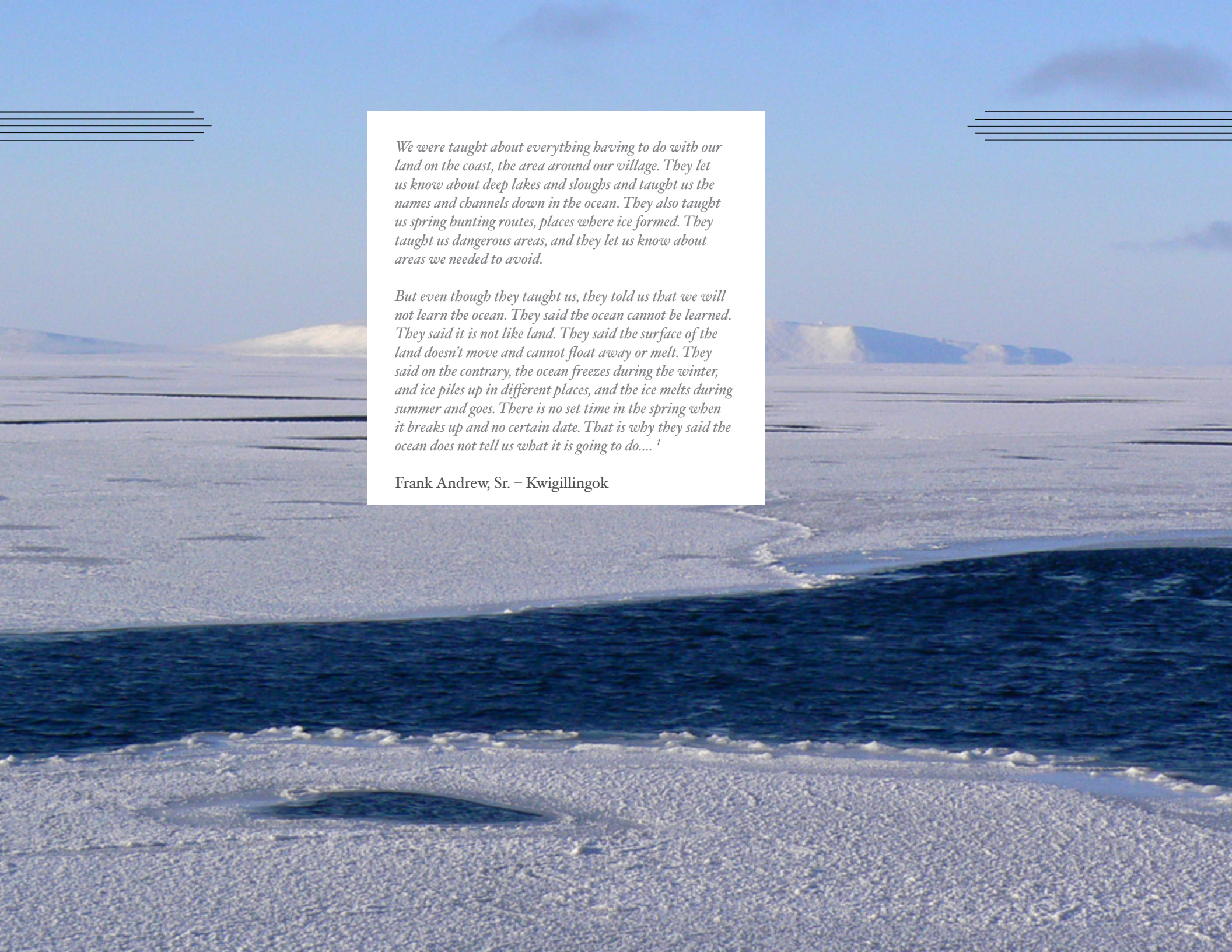
From "Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) around St. Lawrence Island, Alaska"



Arthur Lake and his son Cameron gillnet fishing for salmon - Kwigillingok







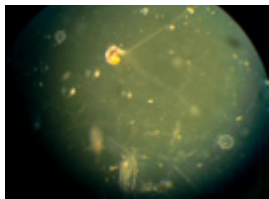
*We were taught about everything having to do with our land on the coast, the area around our village. They let us know about deep lakes and sloughs and taught us the names and channels down in the ocean. They also taught us spring hunting routes, places where ice formed. They taught us dangerous areas, and they let us know about areas we needed to avoid.*

*But even though they taught us, they told us that we will not learn the ocean. They said the ocean cannot be learned. They said it is not like land. They said the surface of the land doesn't move and cannot float away or melt. They said on the contrary, the ocean freezes during the winter, and ice piles up in different places, and the ice melts during summer and goes. There is no set time in the spring when it breaks up and no certain date. That is why they said the ocean does not tell us what it is going to do....<sup>1</sup>*

Frank Andrew, Sr. – Kwigillingok



## ABOUT *the* NORTHERN BERING SEA



Looking through a microscope at the tiny life that occupies sea ice. Diatoms (a single-celled algae) are a kind of microscopic plankton shown here.  
Brenna McConnell



These abundant amphipods, *Ampelisca macrocephala*, are about 30 mm (1.2 inches) in size. They live on the seafloor of the northern Bering Sea, where they build tubes into soft sediments and are an important part of the marine food web and prey for gray whales.  
Fisheries & Oceans Canada

How the ice comes in the fall, how thick it is, the location of open water leads, and how it goes out in the spring – these are some of the conditions that determine where the animals are and whether it is safe for hunting. The St. Lawrence Island Yupik language has 99 words for sea ice,<sup>2</sup> and 70 words for ice have been documented in the Central Yup'ik language<sup>3</sup> – precision in understanding ice conditions is a matter of survival.

The Bering Sea is the transition between the Pacific Ocean and the Arctic Ocean. Atmospheric and oceanographic conditions from both the south and the north influence temperature, wind, and the timing of the annual formation and retreat of sea ice in the northern Bering Sea. Seasonal sea ice is physical habitat for species that use it as a surface for resting and from which to stage foraging trips to the seafloor. It also plays an essential role in the generation of primary production (plankton), the foundation for the entire food web. Ocean conditions are dynamic, with high year-to-year variability, and the platform for marine mammals and birds formed by seasonal sea ice is continually in motion.

Researchers measuring conditions in the Bering Sea reported an increase in water temperature and a reduction in sea ice in the southeast Bering Sea between 1977 and 2005. Leading oceanographers reported, “There is a preponderance of evidence that the ecosystem

of the Bering Sea is shifting in response to a northward retreat of cold ocean temperatures.”<sup>4</sup> They noted that a cold water mass – the cold pool – that extends into the southeast Bering Sea from the north had retreated during later years of that period. Timing of sea ice formation was delayed and spring melting was earlier. Biologists found that 45 fish species had shifted the center of their distribution northward.<sup>5</sup> Following this decades-long warming period, colder temperatures returned in 2006, sea ice extended far to the south, covering much of the eastern Bering Sea shelf, and southern Bering Sea fish species retreated.<sup>6</sup>

Despite the persistent loss of summer sea ice in the adjacent waters of the high Arctic, the same oceanographers surmise that winter sea ice in the northern Bering Sea will continue to form. The northern Bering Sea (north of 60° N) will remain cold enough in the winter and early spring to produce ice and the cold pool will persist in the north. Ocean temperatures and ice conditions will continue to vary greatly year to year in unpredictable ways, but the average temperature over time is expected to be warming.<sup>7</sup>

While the southeast Bering Sea is known for its large populations of fish, the northern Bering Sea ecosystem is dominated by dense aggregations of invertebrates living in and on the seafloor. Scientists have measured a high abundance of long-lived clams, amphipods and worms – a diversity of

*“We emphasize that the overall [management] strategy must be to maintain the integrity of the entire food web that supports these predators [bearded seal, walrus and spectacled eider].”*

–Letter to the North Pacific Fishery Management Council from scientists James Lovvorn, Jacqueline Grebmeier and Lee Cooper aboard the USCC *Healy*, June 6, 2007.



species forming a living seafloor - that is food for gray whales, bearded seals, walrus and eiders. The relative dominance among bottom species between St. Matthew and St. Lawrence Island is not the same as between St. Lawrence Island and Bering Strait, and these animals are unevenly distributed on the broad continental shelf.<sup>8</sup> How prey are distributed varies year to year and over decades with ocean conditions. Sea ice used as a platform by marine mammals (seals, walrus) and spectacled eiders must occur over productive feeding areas to allow those species access to the right prey in sufficient quantities. Sea mammals and birds congregate each year in response to the location of good food availability.<sup>9</sup>

Sea ice fulfills fundamental functions in the seasonal rhythm of the northern Bering Sea. Algae grows on its surfaces and in channels within the ice. In the spring when the ice melts, these nutrients are released into the sea fueling a bloom of tiny marine plants (phytoplankton). The timing of the ice retreat and subsequent bloom influences how nutrients are distributed throughout the benthic (seafloor) and pelagic (water column) food web with major consequences for the northern Bering Sea ecosystem as a whole.<sup>10</sup>

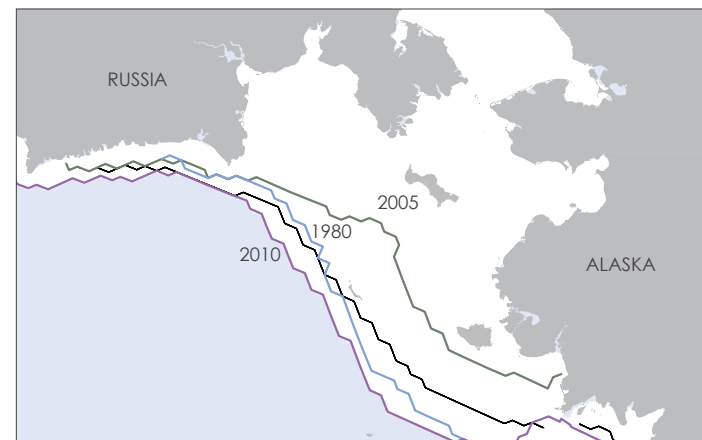
In spring and summer, the northern Bering Sea reaps the benefits of the productivity left behind by the retreating ice. Migratory birds arrive, southern whales move in, and belugas follow schools of fish into coastal waters. Hunters and families return to their camps for the subsistence harvest and local commercial fisheries commence for herring, crab, halibut and salmon.

In the northern Bering Sea, ice usually comes in mid to late fall. First, shorefast ice forms along the coast. In the past, ice floes made of multi-year ice were observed coming down through the Bering Strait with the wind, but this no longer occurs because most multi-year ice has disappeared from the Chukchi Sea.<sup>11</sup> As the water

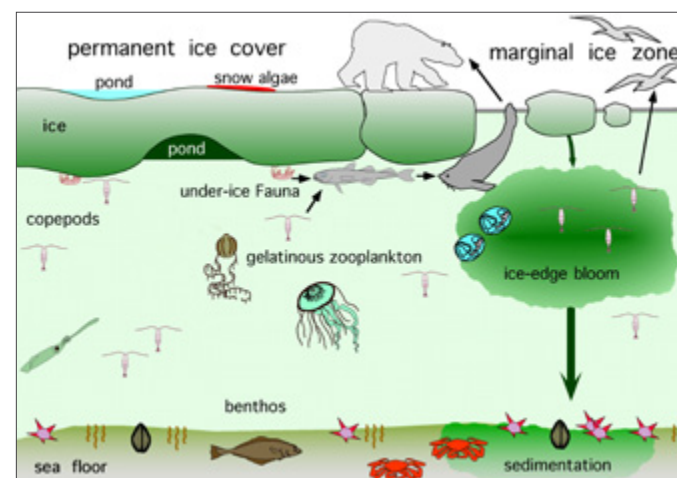
temperature of the Bering Sea drops, more ice forms until the winter ice pack covers the ocean. Shifting currents and wind drive the ice, creating open water leads and polynyas (persistent

areas of open water maintained by currents, upwelling or prevailing winds). A persistent north wind will push the ice edge southward. Local conditions and ice movements are dynamic and powerful, making knowledge about them a fundamental skill for hunting. When the ice breaks up and goes out in the late spring, large numbers of seals, walrus and whales follow it north into the Chukchi Sea. In the fall, they return in front of the advancing ice edge and the cycle begins again.

*Birds are flying, after ugruk [bearded seal]  
hunting we put away herring roe and kelp...  
Couple weeks after ugruk hunting, right when  
grass is green and birds are flying over.<sup>12</sup>*  
Allan Sagoonick – Unalakleet



The year-to-year variability of winter ice extent in the Bering Sea influences the southern extent of the cold pool. The black line denotes the median extent during the month of January, between the years of 1979 and 2000.<sup>23</sup>



The arctic food web connects productivity from the sea ice with fish, marine mammals and the living seafloor.  
Arctic Ocean Diversity Project, University of Alaska Fairbanks

## ON MARINE MAMMALS & SEA ICE

*Around Thanksgiving, that's when the ice comes in from the north. When it gets here, there's ice all over. It drives all the seals at the same time from up north when the ice comes in.*<sup>13</sup>

Edward Shavings – Mekoryuk

*Etolin Strait, that's where they [walrus] travel and they stay on the ice while they're traveling back and forth.*<sup>14</sup>

Joseph David – Mekoryuk

*There used to be walrus northeast to Nunivak Island. We would have to wait awhile, there were so many of them, but today that doesn't happen. Before- to mid 1980's...ice would be black from walrus in Hazen Bay. You used to not be able to hear the camp stove burning – that loud of noise from walrus passing through on migration.*<sup>15</sup>

David Bill, Sr. – Toksook Bay

*Seal and maklaks [bearded seals] here are almost the same as walrus. My grandfather used to call it katawhsaqa - which means "pouring out," referring to all the things that come to us with the ice. Ice moves in here with all these animals.*<sup>16</sup>

Chester Noongwook – Savoonga

*Spotted seals are here all summer. Hair seals [long-haired ringed seals] come with the ice. Same time walrus are coming by too. Walrus come with the ice. All marine mammals heading to this big habitat for the winter [points to St. Matthew area]. Other route in the springtime, comes from down there to the north.*

*When ice hits the island, it comes with lots of seals. They stay all winter somewhere on the ice. About March they start giving birth. They make a little house for their babies [pupping lairs]. After winter, ice breaks and lots of seals are coming up for breathing.*

*Large cake ice pushes in from the north. If it's thick enough for walrus to haul on, we'll see them here and there... And if we see something, we go after it...Game is not always on the edge. Sometimes way inside the ice. So we have to maneuver around some larger cake ice, sometimes a long way to get to the game. Sometimes it's a long way to get around the ice floes.*

*We use this ice out here to feed us. Current and wind brought them in and we can eat walrus meat and their clams in their stomachs. That's the way it is.*<sup>17</sup>

Elders – Gambell

## ON ICE DYNAMICS

*This fall [2009] ice was not late but ice came in early and it was very cold. But a few years ago, ice didn't come until January. Old ice never comes around anymore... Even this year when it was real cold, no more old icebergs came.*<sup>18</sup>

Elders – Savoonga

*A lot of northeast winds in winter creates thin ice and open water (especially large polynyas in the lee of land such as St. Lawrence Island and parts of the mainland of Alaska and Chukotka), so in spring, the ice retreats quickly...Hunters know that winters with sustained NE winds will result in rapid ice retreat the following spring when a south wind blows.*<sup>19</sup>

From "Notes from a Savoonga interview for the local & traditional knowledge component of the Bering Sea Integrated Ecosystem Research Program (BSIERP)"

*If there's a female winter there's less ice and if it's a male winter there's more ice. Always the grass are thick, with the female, they're tall. A male winter means there's going to be plenty of snow. With warmer climate, there'll be lots of mice, that's a female winter. Elders used to see that if the grass is kind of thick, you could tell. Now, the grasses are tall.*<sup>20</sup>

Steven Billy – Chefornek

*When I was younger, usually it was real flat and smooth. No rough ice on the shore. Maybe just a little bit here and there. Thick ice you know. It seems like it is thinning out and thinning out every year, it's not too thick. It's mostly young ice...and not old ice.*<sup>21</sup>

Herbert Milligrock – Diomedea

## ON RESPECT FOR ICE & CURRENTS

*Even if it's complete fog, we're told to go around, and I practiced it, go around an iceberg. One side of it will be darker than the other because the sun is up there someplace on the opposite side. That way you know which way to go towards the land. The ray of the sun that penetrates through the thick fog that you didn't notice, is amplified by a big ice flow. On the opposite side of the sun, the ice flow is darker than the other.*<sup>22</sup>

John Pingayak – Chevak





*It's critical to have all this knowledge written down so we can show it to those marine scientists. We need to show them that our people along the coast, we have to have our food from out in the ocean.<sup>1</sup>*

Charles Seccheus, Sr. – Elim





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# THE MAPS

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## INTRODUCTION

The maps on the upcoming pages describe:

- › Areas used for hunting walrus, seals and whales, combined with important habitat areas for each species.
- › General areas for harvesting fish and shellfish for subsistence in marine and coastal waters.
- › General areas used for local small-scale commercial fisheries for halibut, herring, salmon and crab.
- › Important habitat areas for eiders. Although not all eiders are currently hunted to the extent they used to be due to population declines and restrictions, eiders were discussed in interviews with hunters and elders. As sea ducks, eiders seasonally occupy the same marine habitats as marine mammals. Spectacled eiders were emphasized because they winter in large aggregations in the ice between St. Lawrence Island and St. Matthew Island, an area noted by elders and hunters as having particular ecological importance.

The use area maps contain data from interviews conducted with experts from 18 tribes and key local commercial fishermen for this project, as well as maps created by the two Coastal Resource Service Areas (Cenaliulriit CRSA in 2002 and Bering Straits CRSA in 1984). We did not conduct interviews in every village, but the CRSA data is inclusive of all villages. The three data sources differ from each other, but the aggregation of all the information shows a composite picture of general lifetime use of the people represented by the combination of all sources.

Elders noted that the ecosystem is naturally dynamic and also sensitive to disturbance; it is not possible to know what the future holds. Marine mammal movements may change, ice conditions may become increasingly more variable, harvesting needs may be different today than they will be in future years and so on. Elders and hunters emphasize that patterns of use must remain flexible.

*Please see Appendix for a full description of methods.*

Opposite:

Top Left: Fred Phillip conducting a mapping interview with Teddy Kugstun for Bering Sea Elders Advisory Group – Kipnuk.  
Muriel Morse

Top Right: Nick Pavilla of Atmautluak and Henry Parks of Nunapitchuk in a map review session for the Bering Sea Elders Advisory Group – Bethel.  
Muriel Morse

Bottom Left: Roger Nassuk, Sr. in a mapping interview for Bering Sea Elders Advisory Group – Koyuk.  
Muriel Morse

Bottom Right: Mala Otton, Sheldon Nagaruk and Charlie Saccheus in an interview for Bering Sea Elders Advisory Group – Elim.  
Muriel Morse

# PACIFIC WALRUS

## SUBSISTENCE USE

Central Yup'ik: *Asveq*  
 Cup'ig: *Kaugpag*  
 St. Lawrence Island Yupik : *Ayveq*  
 Inupiaq: *Asvuiq*  
 Scientific: *Odobenus rosmarus divergens*

Walrus hides stretched and meat drying – Gambell. Archives, University of Alaska Fairbanks  
 Dorothea Leighton M.D. Collection 1940-1982  
 UAF-1884-31-41



*Skin boats [on St. Lawrence Island] are made with walrus, not maklaks [bearded seal] skin, because St. Lawrence boats are bigger than mainland boats – and walrus hides are bigger than maklaks. Bearded seal skins are used for boats by mainland Eskimos.<sup>1</sup>*  
 Elders – Gambell

### NOTES:

The area offshore Cape Newenham (extending northwest to the Cenaliurrit CRSA marine mammal subsistence area and southeast into Bristol Bay) combines hunting with walrus migration and foraging based on local knowledge. During interviews conducted for the Bering Sea Elders Advisory Group the distinction between hunting and migration/foraging in this area was not explicit.

Walrus subsistence use area from Bering Strait northeast into Chukchi Sea was drawn for this report from a description in Bering Straits CRSA Resource Inventory stating that walrus hunting here occurs out to an estimated 40 miles.

Bering Strait CRSA area around St. Lawrence Is. – Straight western edge represents the end of the page on which data was drawn in the original source.

Cenaliurrit CRSA area near Emmonak –The right angle represents the edges of USGS base maps used in the documentation process.

### Cultural Practices

Pacific walrus is a seasonal resource for villages along the Bering Sea coast, Nunivak, St. Lawrence and Diomed islands. The primary hunting season is in the spring as walruses migrate north with the pack ice.<sup>3</sup> Where hunting occurs depends on the location of the ice and varies with ice conditions and weather.<sup>4</sup>

Landing a walrus provides a substantial amount of meat, which is customarily shared among many households. It is not unusual for the entire community to be offered a share. Walrus flippers are a delicacy. Clams found in walrus stomachs are also eaten.<sup>5</sup>

A walrus provides more than food. The hides of female walruses (preferred because their skins are smoother than those of the males) are used for

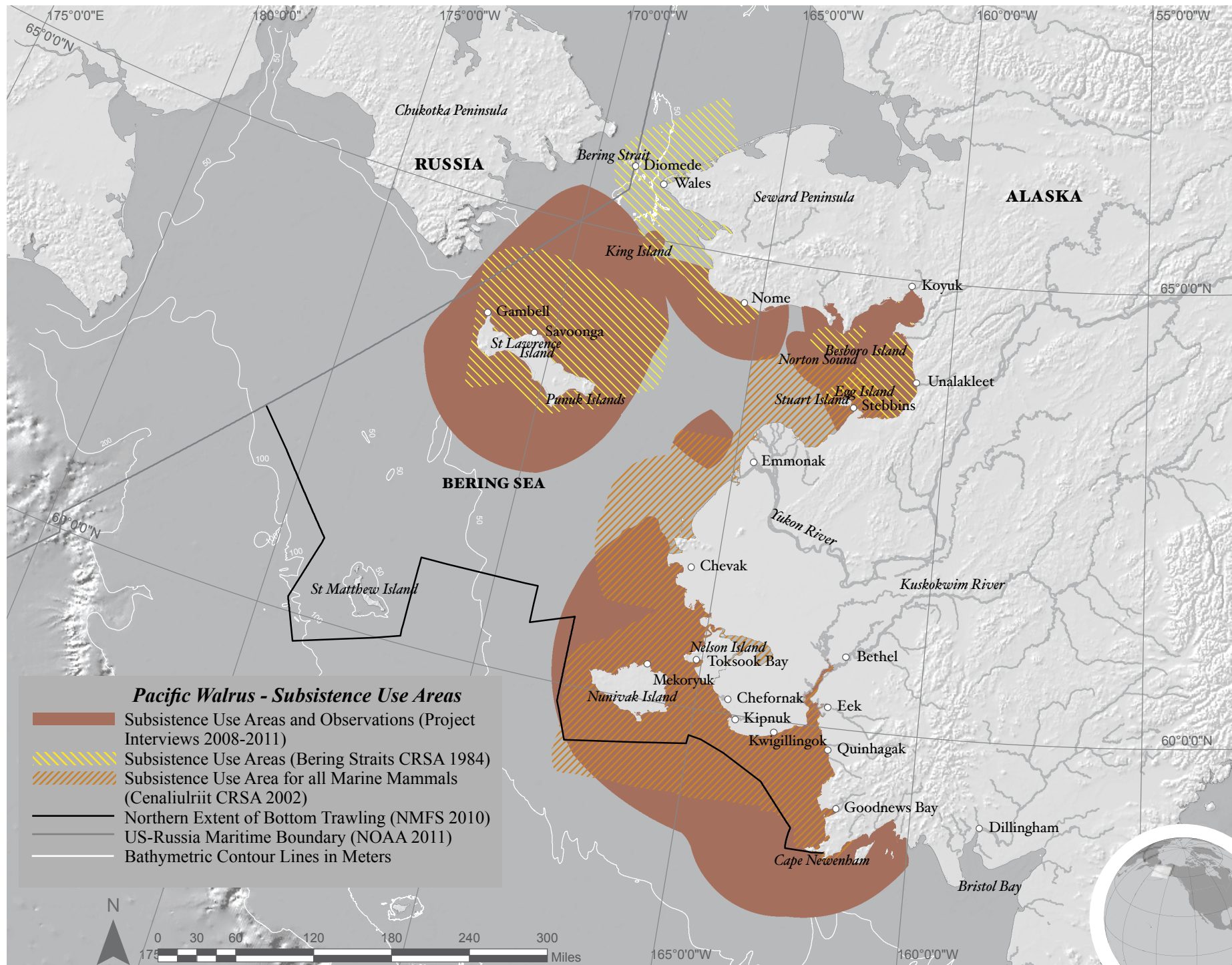
making *umiaks*, traditional open skin boats.<sup>6</sup> Hides are used to create products such as rawhide lines.<sup>7</sup> Elders sharing their experience and artifacts found throughout the region reveal a long history of ivory carving for making tools such as harpoon and spear points and fish hooks.<sup>8,9</sup> Ivory carving of sculpture and jewelry is an important source of income.

*We eat clams that are still hard in the stomachs of walrus and bearded seals. Eat the clam tongues. They're very tasty. We eat them when they're new. We have always done this.<sup>2</sup>*

Walter Lewis – Chefornak



Leonard Raymond of Stebbins butchers a walrus. James Barker





# PACIFIC WALRUS

## IMPORTANT HABITAT AREAS

Central Yup'ik: *Kaugpag*  
St. Lawrence Island Yupik: *Ayveq*  
Inupiaq: *Asevret*  
Scientific: *Odobenus rosmarus divergens*

*The way I understand, when the walrus hit the island from the south, they split. Some go between Nelson Island and some go on the west side of Nunivak Island and go up north.*<sup>11</sup>

Edward Shavings  
– Mekoryuk



Andrew Trites

### Biology

Pacific walrus are gregarious animals, widely distributed throughout the waters of the continental shelf in the Bering and Chukchi seas.<sup>12</sup> Adult females average 1,900 pounds and males 2,700 pounds.<sup>13</sup> Walrus feed mostly on benthic invertebrates in waters that are usually less than 100 meters (300 feet) deep. Clams make up the majority of their diet, but they also feed on other invertebrates such as worms, snails, crabs, amphipods, shrimp, sea cucumbers, and tunicates. They also occasionally prey on small seals.<sup>14</sup> They use powerful suction to extract large clams from their shells and ingest small clams whole.<sup>15</sup> Walrus graze the seafloor using sensitive vibrissae (whiskers) to locate their prey. Tusks are not used in feeding but as a dominance display in their social hierarchy. They also thrust their tusks into the ice to assist in hauling out onto ice floes and sometimes to abrade or break ice.<sup>16</sup>



Loss of summer sea ice in the Chukchi Sea is causing walrus to crowd onto remnant ice floes for resting and as a platform from which to forage for clams and other food on the seafloor.  
NOAA

*We eat the clams in the stomachs when they're fresh. They're good. They're already cooked.*<sup>10</sup>  
Joseph David – Mekoryuk

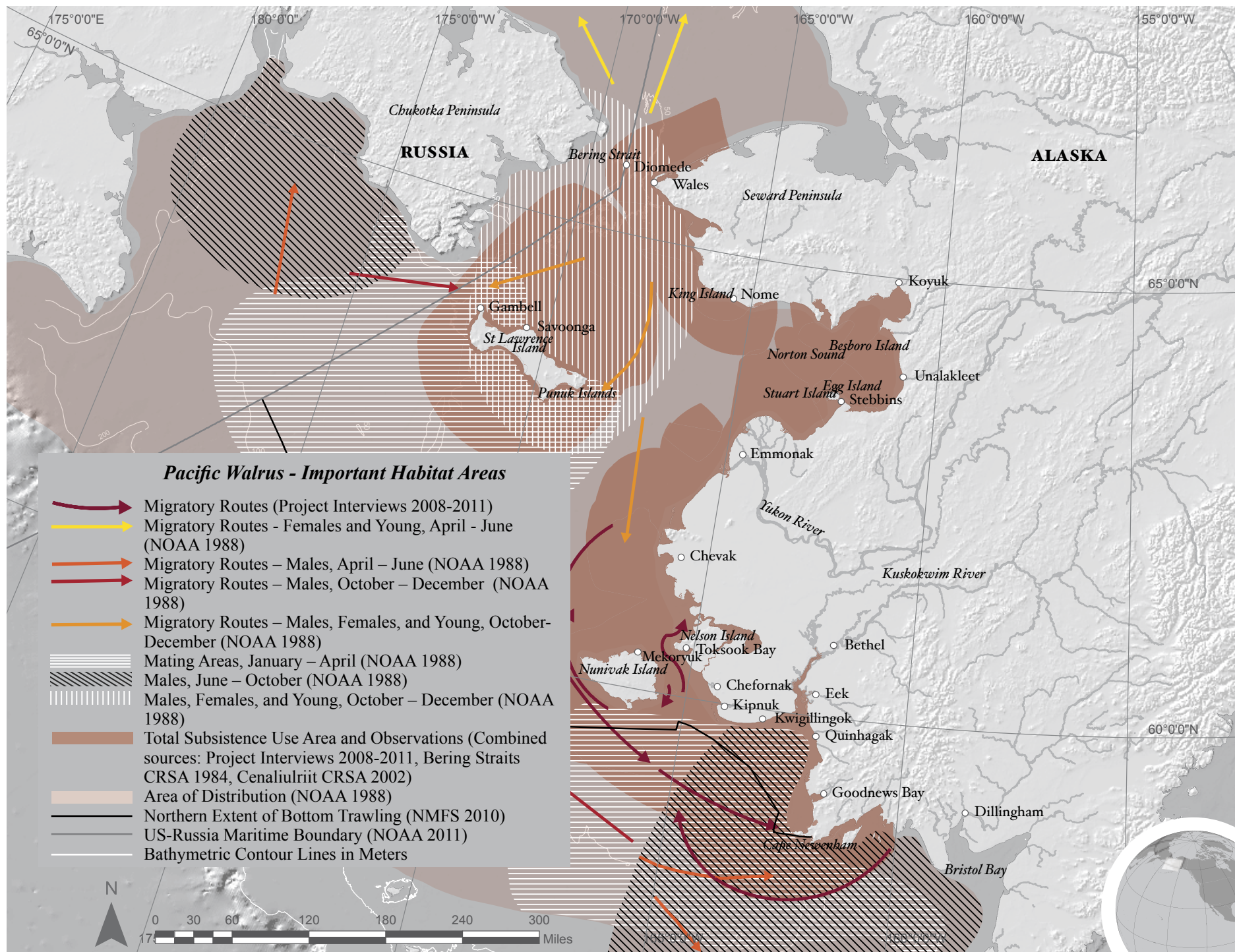
### NOTES:

Area offshore Cape Newenham – Bristol Bay hunters indicate migration and foraging out to 75 miles from Cape Newenham and regard this area as important for the vitality of the walrus population (Qayassiq Walrus Commission 2009).

The shape for Total Subsistence Use Area is partly made up of Cendliurrit CRSA data that represents all marine mammals collectively.

Walrus are closely associated with the movements of sea ice throughout the year. During the summer months male and female walrus are mostly segregated into different areas. As the ice begins to melt and recede northward in the late spring, female walrus and their young move into the Chukchi Sea while adult males migrate either into outer Bristol Bay or along the Russian coast. In the winter both sexes return to the pack ice in the northern Bering Sea and congregate south of St. Lawrence Island to mate.<sup>17</sup>

The Eskimo Walrus Commission shares in management of walrus through a cooperative agreement with the U.S. Fish and Wildlife Service.





## ALL SEALS

### SUBSISTENCE USE

#### BEARDED SEAL

Central Yup'ik: *Maklak*  
 Cup'ig: *Maklag*  
 St. Lawrence Island Yupik:  
*Maklak*  
 Inupiaq: *Ugruk*  
 Scientific: *Erignathus barbatus*

#### RINGED SEAL

Central Yup'ik: *Naciq*  
 Cup'ig: *Nacir*  
 St. Lawrence Island Yupik:  
*Nazigbaq*  
 Inupiaq: *Natchiq*  
 Scientific: *Phoca hispida*

#### RIBBON SEAL

Central Yup'ik: *Qasruliq*  
 Cup'ig: *Qasruleg*  
 St. Lawrence Island Yupik:  
*Kukupak*  
 Inupiaq: *Qaigullik*  
 Scientific: *Phoca fasciata*

#### SPOTTED SEAL

Central Yup'ik: *Issuriq*  
 Cup'ig: *Suuri*  
 St. Lawrence Island Yupik:  
*Gazigyaq*  
 Inupiaq: *Qasigaiq*  
 Scientific: *Phoca largha*

*Seal hunting depends on the ice. Depending on ice conditions, if the ice is farther out, we have to go farther out too to get to the ice, that's where the seals are. They haul out on the ice.*<sup>1</sup> Edward Shavings – Mekoryuk

#### Cultural Practices

When and where seals are hunted is opportunistic but depends mostly on the location, condition and movement of ice, weather and the habitats that seals utilize during different times of the year.<sup>2</sup> For example, bearded seals are most often hunted in the spring when the pack ice is receding.<sup>3</sup> Ringed seals occupy shorefast ice and thus tend to be caught in greatest numbers during the winter.<sup>4</sup>

Seal hunting brings community members together, not only by the cooperative nature of the hunt, but also through the distribution of meat and oil. When a seal is taken, its meat, oil, and organs are shared with extended families, the larger village community, and often to neighboring and distant villages as well.<sup>5</sup> Seal products are usually shared first with elders in the community and then with family members and those who do not have a



Simeon and Paul John pull a bearded seal onto an ice pan – Nelson Island.  
 James Barker

hunter who can provide for them.<sup>6</sup> When a young hunter catches his first seal the entire animal is shared among the community and the hunter does not keep any portion for himself. In some villages, various festivities are held.<sup>7,8</sup>

Seal meat, blubber, and oil make up a significant proportion of village diets, especially during winter months. Oil rendered from seal blubber is used as a condiment, preservative, and medicine.<sup>9</sup> Seal oil is an excellent food for the demanding Bering Sea winters because it is packed with calories, fat, and vitamins. Seal oil is pure fat, but it does not predispose to coronary vascular disease because it is poly-unsaturated. The iron content of seal oil and other marine mammal products is also extremely high and can be 10 to 11 times that found in an equivalent measure of beef.<sup>10</sup>

Seal skins serve a variety of purposes. They are used to make parkas, pants, boots, boot soles and seal gut rain coats, which are exceptionally warm and waterproof. Bearded seal hides are used to cover traditional skin boats.<sup>11,12</sup> Although today people are using more store-bought clothing, the time may come to return to traditional materials.<sup>13</sup>

There are traditional customs followed by hunters to show respect for the seal so that future hunting will be successful. Some hunters or women processing seals pour fresh water in the seal's mouth or put Labrador tea in the nose.<sup>14,15</sup> Another custom after a seal is taken is to put the seal on the ice and face it out toward the sea "where it once belonged."<sup>16</sup>

#### NOTES:

Arrows west of St. Lawrence Is. – Elders indicated that the location of hunting is influenced by strong currents and especially dynamic ice conditions in this area (Project Interviews 2008-2011).

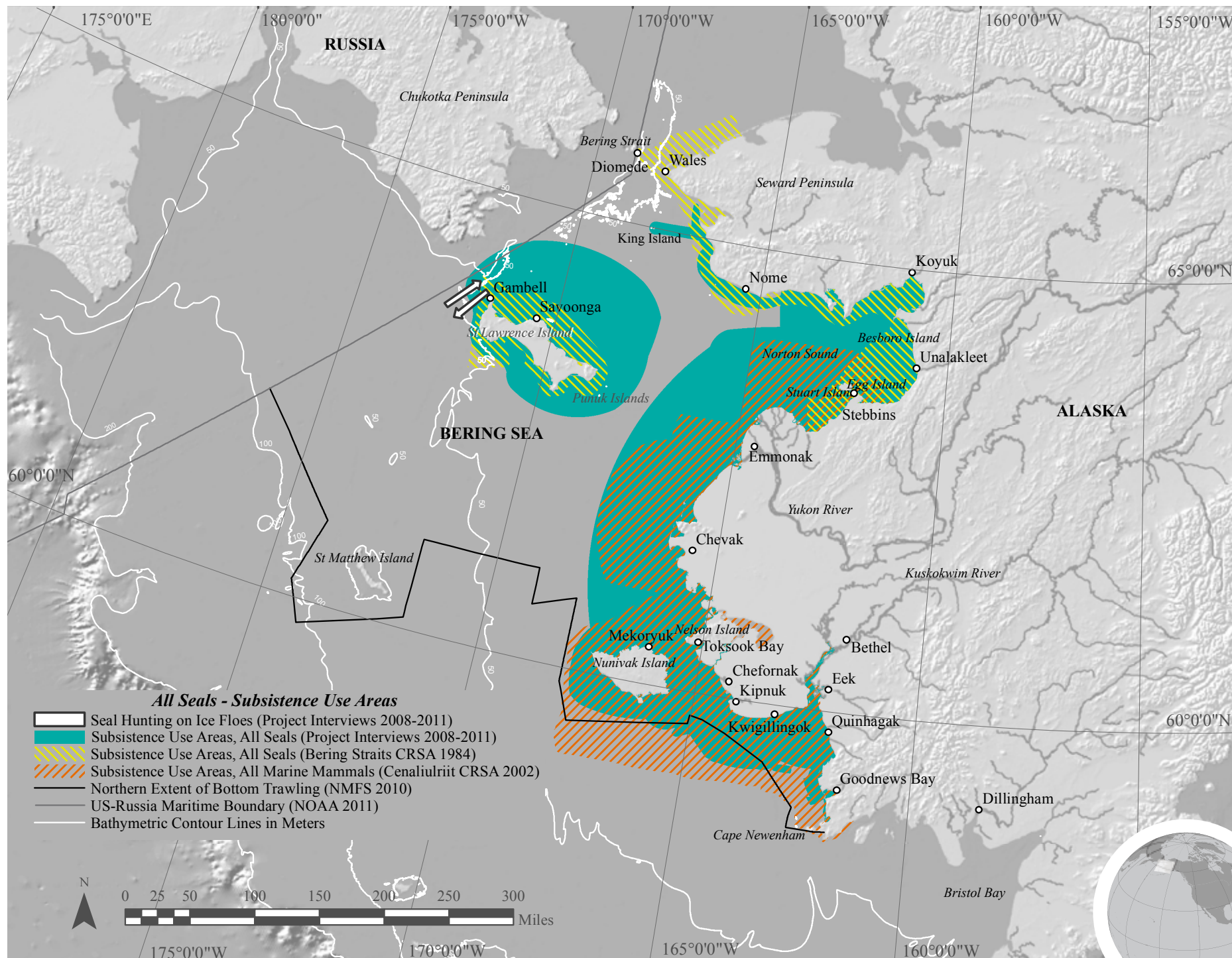
Subsistence areas include those used to harvest bearded, ringed, spotted and ribbon seals as well as a) *iigliq* and *qairaliq*, two species described by Norton Sound hunters but not recognized by science (Huntington 2000) and b) hair seals, which are long-haired seals distinguished by hunters in multiple villages (Project Interviews 2008-2010).

Bering Strait CRSA area around St. Lawrence Is. – Straight western edge represents the end of the page on which data was drawn in the original source.

Cenaliurrit CRSA area near Emmonak –The right angle represents the edges of USGS base maps used in the documentation process.

Seals are also taken opportunistically while walrus hunting farther offshore.





## BEARDED SEAL IMPORTANT HABITAT AREAS

Central Yup'ik: *Maklak*  
Cup'ig: *Maklag*  
St. Lawrence Island Yupik:  
*Maklak*  
Inupiaq: *Ugruk*  
Scientific: *Erignathus barbatus*



US Fish & Wildlife Service

### *Biology*

Bearded seals are the largest of Alaska's ice-associated seals. Adults weigh up to 800 pounds when the blubber is thickest in late winter.<sup>20</sup> Bearded seals exhibit a year-round association with moving sea ice, usually in waters less than 200 meters (600 feet) deep in the Bering, Beaufort, and Chukchi seas.<sup>21</sup> They dive to depths of about 130 meters (390 feet) to feed on benthic invertebrates such as crabs, shrimp, clams, and snails.<sup>22</sup> They are also known to prey to a lesser extent on saffron and arctic cod.<sup>23</sup>



Seal oil storage – Toksook Bay.  
Muriel Morse

*Bearded seals have pups on the floating ice in May and June, when the brant fly north and the ice begins to break up.<sup>17</sup> From “Traditional Ecological Knowledge of Seals in Norton Bay, Alaska”*

### NOTES:

The shape for Total Subsistence Use Area is partly made up of Cendiliurrit CRSA data that represents all marine mammals collectively.

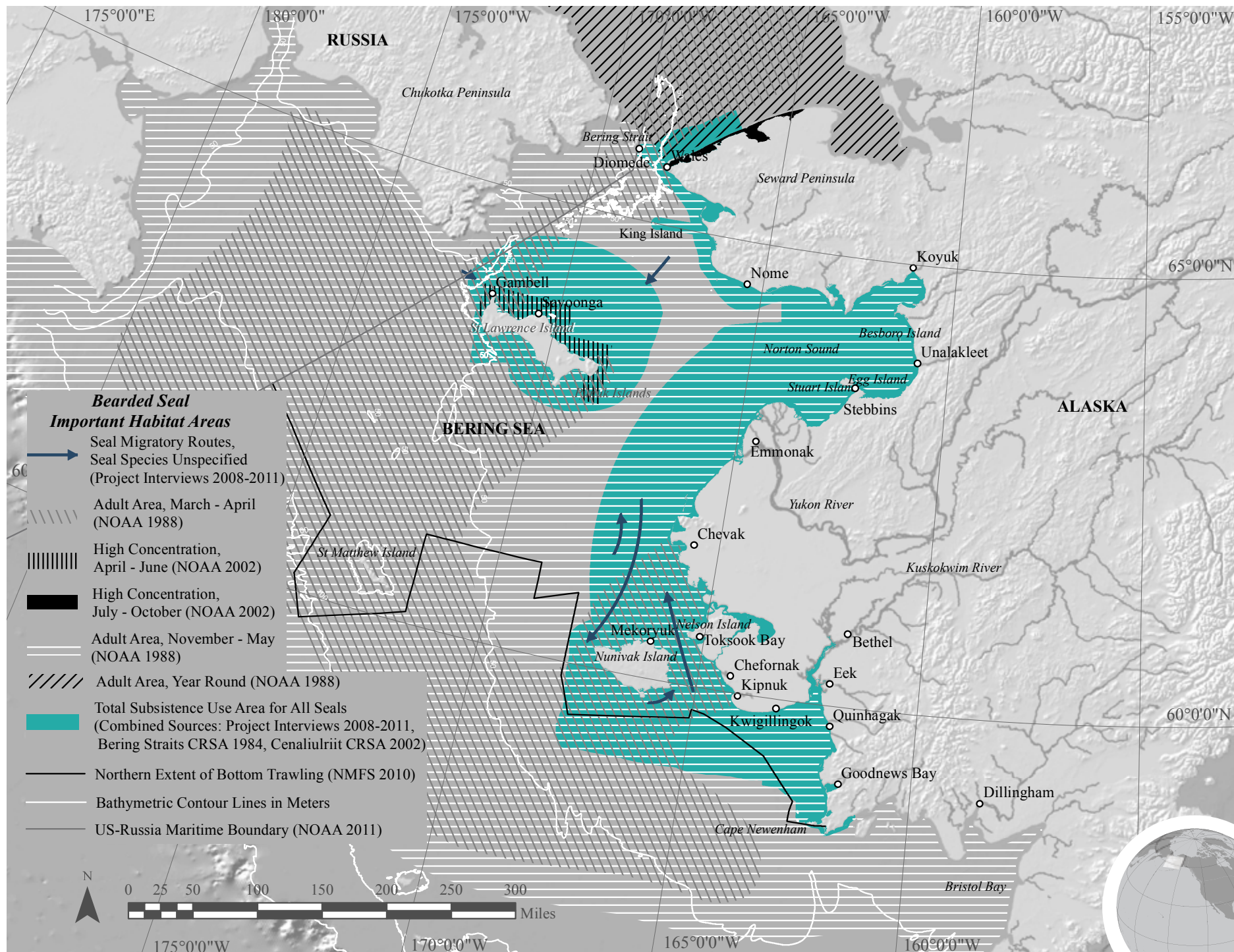
*Male bearded seals ‘holler’ underwater in spring. This can be heard by placing one end of a paddle or pole in the water and holding one’s ear to the other end. Bearded seals can be heard up to a mile away. When they are close, one can often see bubbles rising to the surface from the seal.<sup>18</sup>*

From “Traditional Ecological Knowledge of Seals in Norton Bay, Alaska”

*Bearded seals may play dead when hunted, and so hunters must be careful and prepared for the bearded seal to come back to life. When bearded seals were hunted from kayaks, hunters towing the animals to shore would hold the rope in their teeth so that if the animal came back to life, the hunter would at worst lose teeth rather than have his boat pulled underwater.<sup>19</sup>*

From “Traditional Ecological Knowledge of Seals in Norton Bay, Alaska”







# RIBBON SEAL

## IMPORTANT HABITAT AREAS

Central Yup'ik: *Qasruliq*  
Cup'ig: *Qasruleg*  
St. Lawrence Island Yupik:  
*Kukupak*  
Inupiaq: *Qaigullik*  
Scientific: *Phoca fasciata*



M. Cameron, Alaska Fishery Science Center

*Nobody hardly hunts the ribbon seal.  
Everybody get warm clothing from  
Cabella's. Their skins are for decorations.*<sup>24</sup>  
Elders and Active Hunters – Elim



NOAA

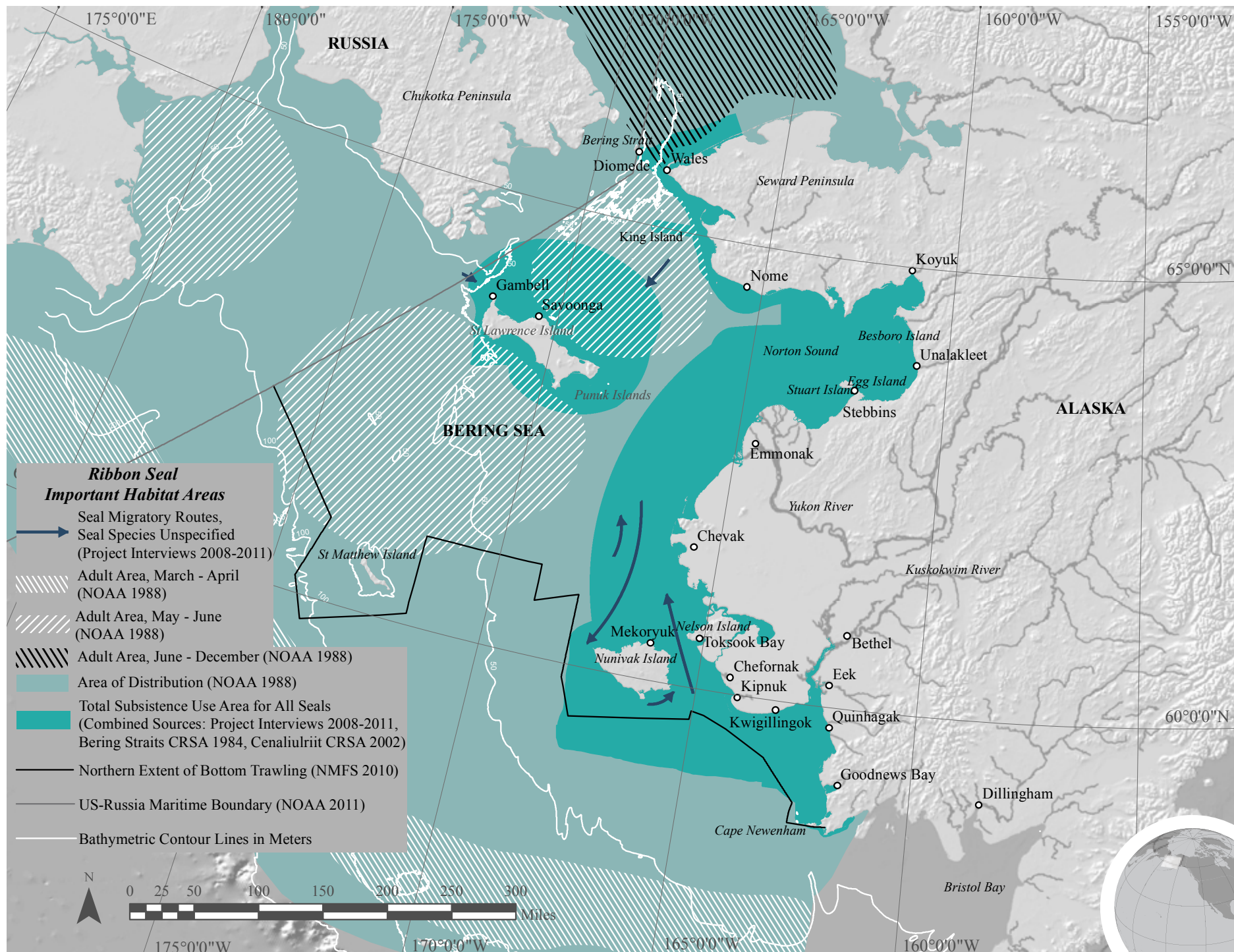
### *Biology*

Ribbon seals are the least abundant of the ice seals that inhabit Alaskan waters.<sup>25</sup> In winter and spring ribbon seals have a strong association with sea ice where they give birth, nurse pups and molt, mostly occupying the inner zone of the ice front. The summer months are spent in the ice free waters of the Bering Sea.<sup>26,27</sup>

Little is known about the feeding habits of ribbon seals. Almost all dietary information has been gathered during the spring; winter feeding patterns remain largely unknown. Ribbon seals are thought to eat mostly fish, while also consuming invertebrates such as crustaceans, cephalopods, and bivalves.<sup>28</sup>

### NOTES:

The shape for Total Subsistence Use Area is partly made up of Cenaliurrit CRSA data that represents all marine mammals collectively.



# RINGED SEAL

## IMPORTANT HABITAT AREAS

Central Yup'ik: *Naciq*  
Cup'ig: *Nacir*  
St. Lawrence Island Yupik:  
*Nazighaq*  
Inupiaq: *Natchiq*  
Scientific: *Phoca hispida*



NOAA

*Ringed seals are the only ones that stay on the main [shorefast] ice. Hardly ever see them on the floating ice.<sup>29</sup>*  
Elders and Active Hunters – Elim



Boy sleeping on a boat with seal skin floats - Gambell. Source Unknown

### Biology

Ringed seals are the most common and widespread of the arctic seals.<sup>30</sup> Found throughout the Bering, Beaufort, and Chukchi seas, they are strongly associated with both seasonal and permanent ice. Ringed seals use the ice for resting, pupping, and molting. They rarely come onto land.<sup>31</sup> Breeding usually occurs on the shorefast ice, but some breed near the drifting pack ice.<sup>32</sup>

Ringed seals are capable of maintaining breathing holes in shorefast ice more than 2 meters (6 feet) thick.<sup>33</sup> When breathing holes become covered

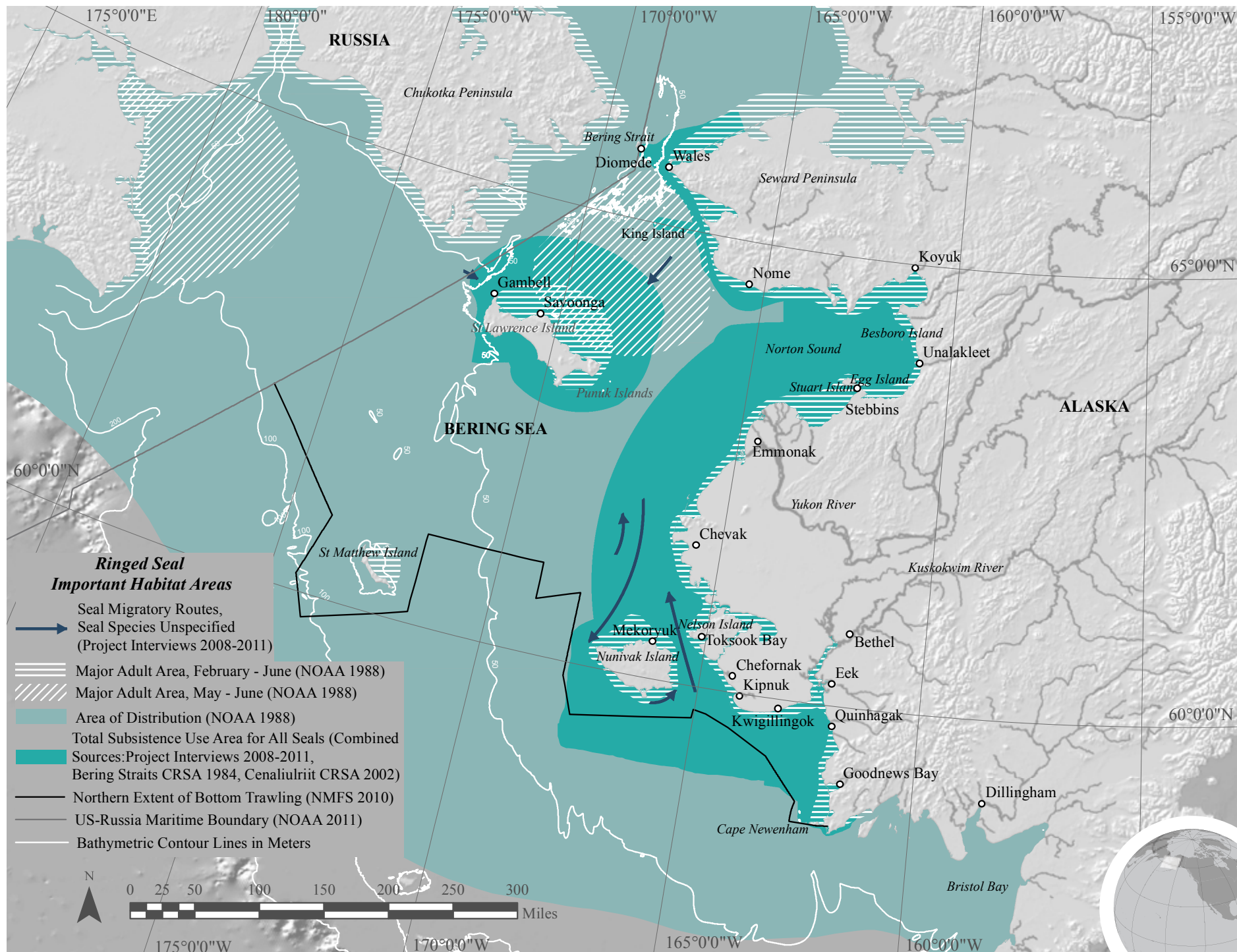
in snow and large drifts, the seals enlarge the holes into subnivean (under snow) lairs which vary greatly in size and can be multi-chambered. Lairs protect vulnerable pups from frigid air and predators. Individuals or pairs commonly occupy two lairs simultaneously, which allows them to increase the area that they utilize for feeding. A ringed seal using multiple lairs can occupy an area of at least 64 kilometers<sup>2</sup> (24 miles<sup>2</sup>).<sup>34</sup>

Ringed seals feed on small crustaceans, zooplankton, and schooling fish.<sup>35</sup>

### NOTES:

The shape for Total Subsistence Use Area is partly made up of Cenaliulriit CRSA data that represents all marine mammals collectively.





# SPOTTED SEAL

## IMPORTANT HABITAT AREAS

Central Yup'ik: *Issuriq*  
Cup'ig: *Suuri*  
St. Lawrence Island Yupik:  
*Gazigyaq*  
Inupiaq: *Qasigiaq*  
Scientific: *Phoca largha*



NOAA

### NOTES:

The shape for Total Subsistence Use Area is partly made up of Cenaliulriit CRSA data that represents all marine mammals collectively.



Seal meat drying.  
Budd Christman

### Biology

In the ice-free summer months, spotted seals are found along the coastlines of the Bering, Beaufort, and Chukchi seas. During the fall and winter months they are closely associated with the edge of the drifting pack ice.<sup>37</sup> This species is incapable of maintaining breathing holes and must remain in areas where there are openings between floes for breathing and hauling out on the ice surface.<sup>38</sup>

In summer and fall, spotted seals regularly come ashore in large numbers at several sites along the coast of Bristol Bay and the Bering and Chukchi seas. Some haulout sites may host several thousand seals at a time.<sup>39</sup> Spotted seals are also dependent on the sea

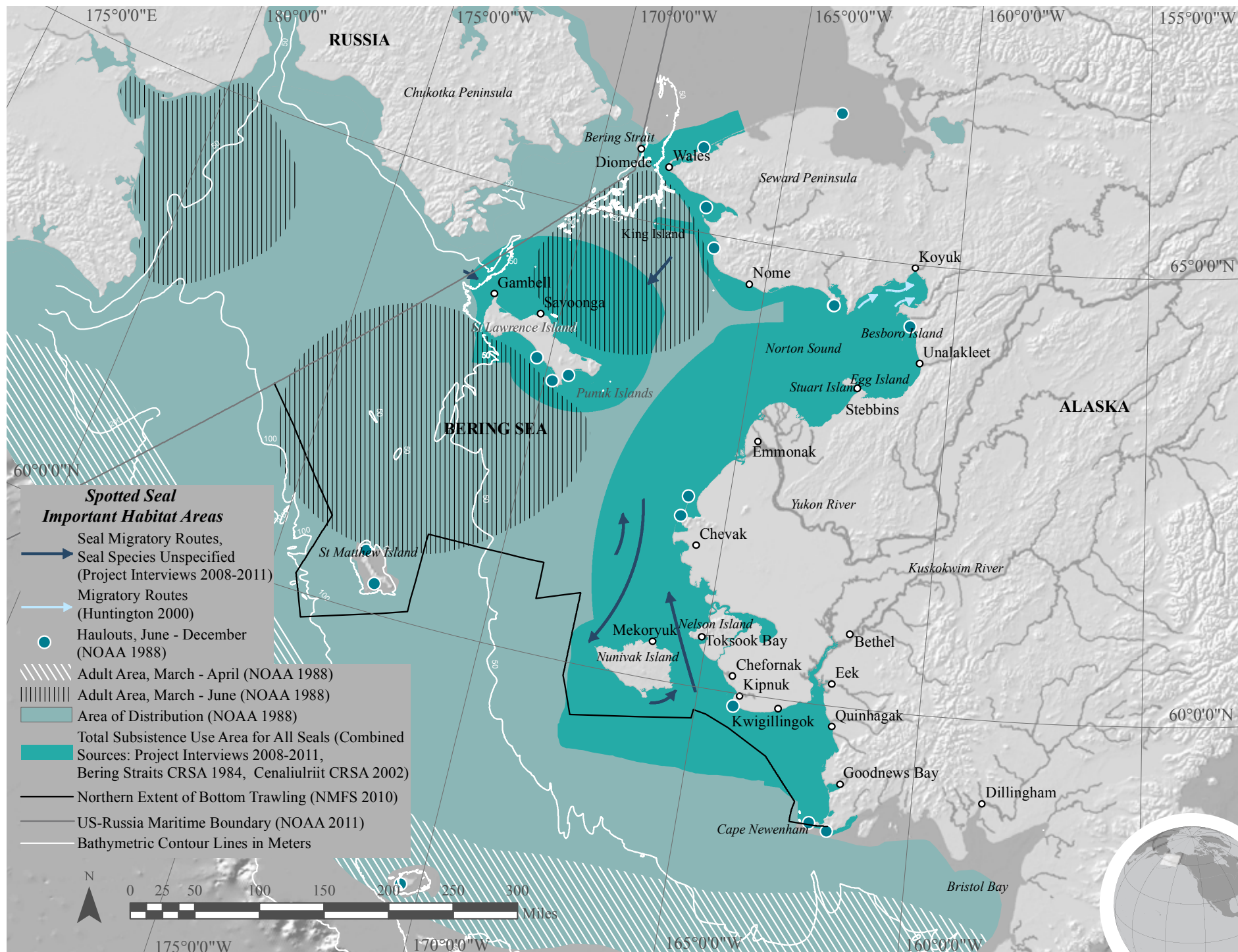
ice for pupping, which takes place in March or April on floes near the ice front in the Bering Sea.<sup>40</sup>

Spotted seals prey on cephalopods, shrimp, and several species of fish.<sup>41</sup> They can dive to depths of over 260 meters (780 feet).<sup>42</sup>

*"Me and my brother were hunting spring time we heard growling out here. We got so happy we thought they were walrus - but we went out there and there were hundreds of spotted seals."*<sup>36</sup>

Charlie Seccheus – Elim







## ALL WHALES (BOWHEAD, BELUGA, GRAY) SUBSISTENCE USE

**BOWHEAD WHALE**  
Central Yup'ik: *Arveq*  
St. Lawrence Island Yupik:  
*Agbvepik*  
Inupiaq: *Agviq*  
Scientific: *Balaena mysticetus*

**BELUGA WHALE**  
Central Yup'ik: *Cetuaq*  
Cup'ig: *Cetuar*  
St. Lawrence Island Yupik:  
*Puugzaq*  
Inupiaq: *Sisuaq*  
Scientific: *Delphinapterus leucas*

Cutting baleen from a bowhead whale after a successful hunt - Gambell. Anchorage Museum Ward Wells Collection B83.91.S4393.420



### *Cultural Practices - Bowhead*

Whaling is an organized and cooperative enterprise from the preparation for the hunt to the hunt itself and finally the distribution of the whale to the captain, families and the community after it is taken.<sup>1</sup> Bowhead whales are used for a variety of purposes providing *mangtak* (St. Lawrence Island Yupik word for the outer layer of whale blubber with the skin attached to it), meat, oil, and baleen.

Hunters know that bowhead whales are sensitive to noise when traveling alone or in small groups. Sails are used to power whaling boats on St. Lawrence Island.<sup>2</sup> Before modern materials, sails were made from split walrus stomachs.<sup>3</sup>



Whaling from an umiak, or skin boat, with sail  
– St. Lawrence Island.  
Chlaus Lotscher

Sometimes a whale will swim along the left side of a whaling boat for up to an hour. Because the harpoon is set up on the right side, the whale cannot be struck. “This phenomenon is known as *angyi* (from the Yupik root *ang-*, which refers to giving something), meaning that the whale is considering giving itself to the whalers. (The same root is found in the Yupik word *agyaq* (skinboat), referring to its use in pursuing the gift of the whale....)”<sup>4</sup>

### *Cultural Practices - Beluga*

The Bering Sea stock of belugas is usually hunted in the spring or fall as they migrate along the coast. In some locations, however, belugas could be available in other times of the year depending on ice conditions.<sup>5</sup> Belugas are both very vocal and sensitive to sound, which hunters take into account when pursuing them. Hunters must be careful not to make sudden movements or too much noise when searching for belugas. When using wooden or aluminum boats, hunters will press their ears to the bottom of the boat or to one end of a wooden paddle in order to hear the vocalizations that the belugas make and to locate pods under water.<sup>6</sup>

When a beluga is taken, the meat is shared throughout the region. Anyone who desires a share can benefit from the harvest.<sup>7</sup> *Muktuk* (Central Yup'ik and Inupiaq word for the outer layer of blubber with the skin attached to it) is a delicacy.<sup>8</sup>



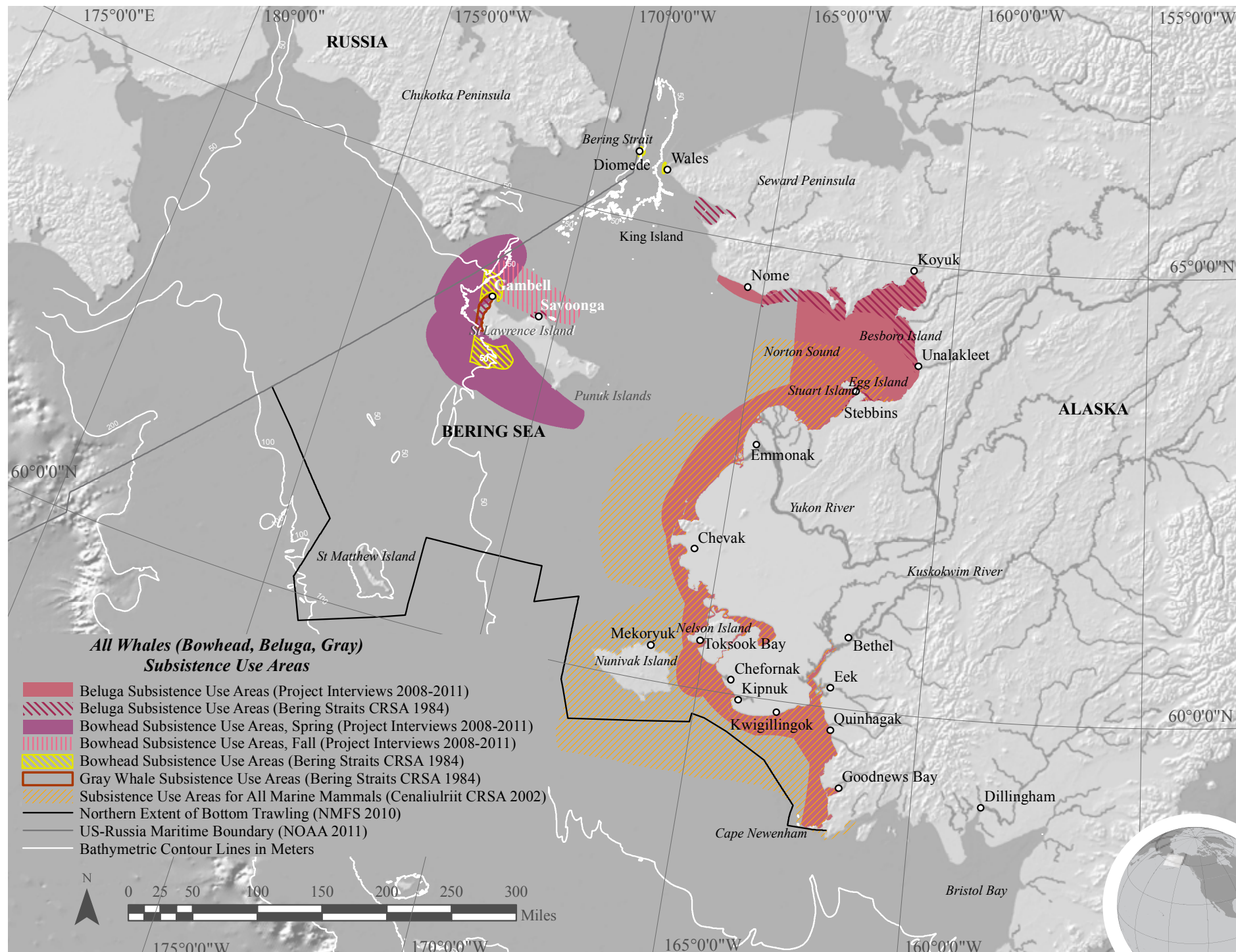
NOAA

### NOTES:

Bering Strait CRSA area around St. Lawrence Is. – Straight western edge represents the end of the page on which data was drawn in the original source.

Cenaliurrit CRSA area near Emmonak –The right angle represents the edges of USGS base maps used in the documentation process.

Unlike walrus and seals, the Bering Straits CRSA Resource Inventory did not show beluga subsistence use in Chukchi Sea. It is, however, documented that belugas are harvested out to 50 miles in the Shishmaref area (ADFG 1985).



Overview Map



# BOWHEAD WHALE

## IMPORTANT HABITAT AREAS

Central Yup'ik : *Arveq*  
 St. Lawrence Island Yupik:  
*Aghvepik*  
 Inupiaq: *Agviq*  
 Scientific: *Balaena mysticetus*

*Bowhead hunting happens in fall too if it's good weather and ice conditions are suitable for going out – late November when the ice is starting to come in. So there are two seasons when we hunt bowheads – spring and fall.*<sup>9</sup>

Elders – Gambell



NOAA

### Biology

Bowhead whales are the only large whales that spend most of their life in or near sea ice. Highly adapted for this life, their blubber can be up to 0.5 meters (1.5 feet) thick and is used for insulation and energy storage. Bowheads use their large heads to break breathing holes in ice up to 0.6 meters (2 feet) thick.<sup>11</sup>

The migratory routes and timing of the bowhead whale are heavily influenced by ice cover. St. Lawrence Island hunters observing the spring migration report that yearling whales come first, followed by mid-sized whales, and last of all by the largest whales and mothers with calves.<sup>12,13</sup> Hunters have noticed a change in the timing of

bowhead migration at St. Lawrence Island in recent years. The first whales begin their spring journey past the island about a month earlier than they have historically and they are gone from the island on their way north about a month earlier. Consequently the timing of when the whales show up is harder to predict than in years past.<sup>14</sup> During fall migration, the whales return to St. Lawrence Island from the north in the opposite order (large whales first, followed by smaller ones).<sup>15</sup>

Bowhead whales feed at all depths, from the surface to the ocean floor. They feed predominately on tiny crustaceans, including copepods, amphipods and krill that are filtered through baleen plates in the mouth of the whale.<sup>16</sup>

Some bowhead whales are thought to live 150-200 years. This estimate is reinforced by the discovery of ivory and stone harpoon tips – not used since the 1800s – embedded in whales harvested in recent years by Alaska Natives.<sup>17,18,19</sup>

Indigenous whaling is carried out through a co-management agreement between the Alaska Eskimo Whaling Commission and National Marine Fisheries Service, with oversight by the International Whaling Commission.

*(Northwest Cape) heading to the northeast. The other path comes near land to the east of Pugughileq, follows the coast past southwest Cape, but then turns offshore in a northwestward direction towards the coast of Chukotka...Few whales go past the east end of the island, although the presence of bowhead bones in archeological sites...suggests that at least some whales, at some time of the year, have traveled that way in the past.*<sup>10</sup> From “Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) around St. Lawrence Island, Alaska”



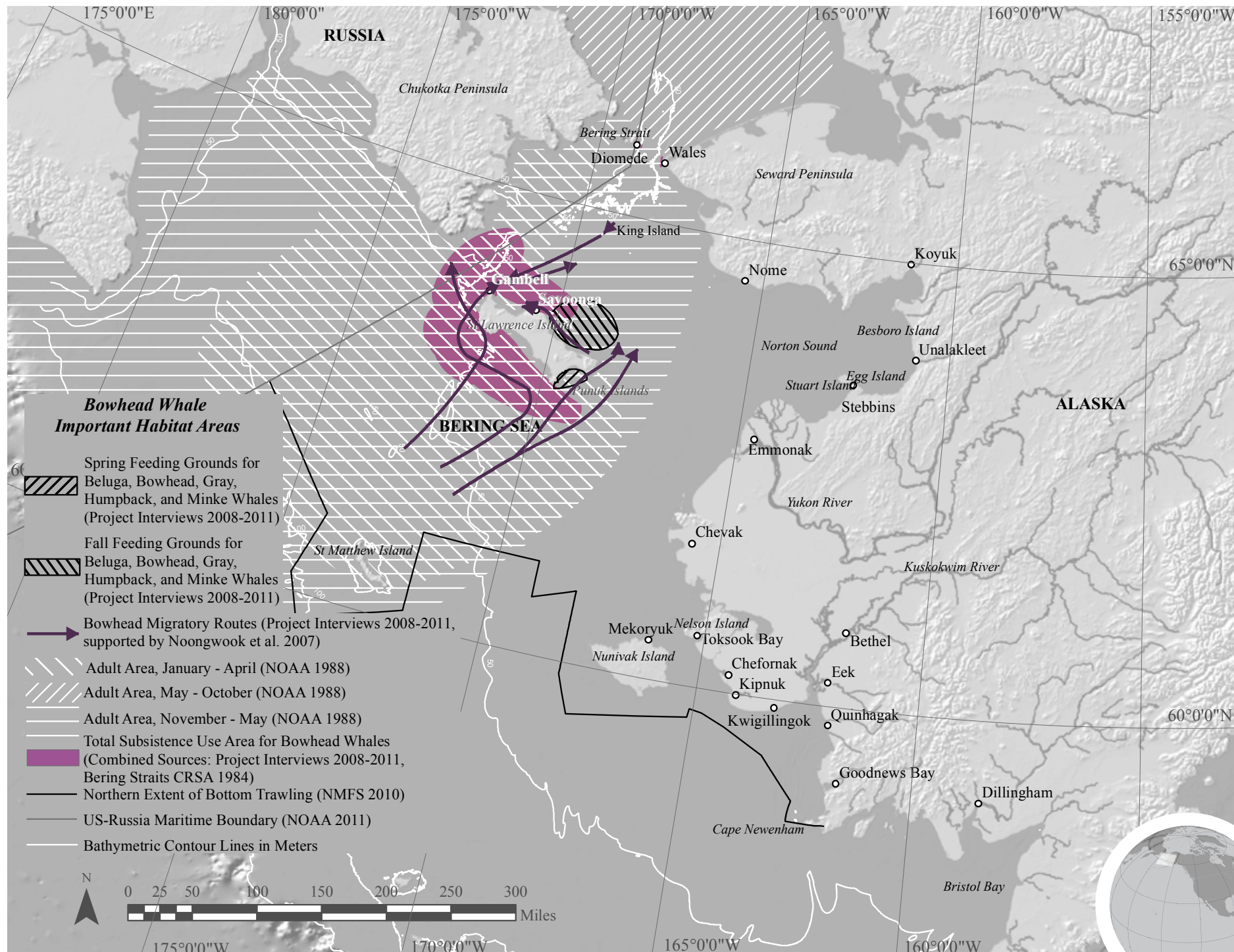
Chlaus Lotscher

### NOTES:

Spring migration arrows were previously published by Noongwook et al. 2007.

The shape for Total Subsistence Use Area is partly made up of Cenaliulriit CRSA data that represents all marine mammals collectively.

*In spring, bowhead whales follow two paths past St. Lawrence Island. One path goes westward past Kiyalighaq (Southeast Cape), remains offshore of Pugughileq (Southwest Cape), and then is seen again at Gambell*



# BELUGA WHALE IMPORTANT HABITAT AREAS

Central Yup'ik: *Cetuaq*  
Cup'ig: *Cetuar*  
St. Lawrence Island Yupik:  
*Puugzaq*  
Inupiaq: *Sisuaq*  
Scientific: *Delphinapterus leucas*

*Belugas, we get some during the winter time, if we're lucky...In March or April, winter time and during summer, anytime all year around.<sup>20</sup>*

Herman Hootch  
– Emmonak

*Fall time is best time to hunt. That's when the muktuk is a lot thicker, when these whales first come out of the Yukon. In the spring, normally they have a lot of young ones.<sup>21</sup>*  
Elders and Active Hunters – Stebbins



Beluga whales following leads in pack ice.  
National Marine Mammal Lab

## Biology

Belugas are the most abundant arctic cetacean (whales, dolphins and porpoises) and can be found throughout the Bering, Chukchi, and Beaufort seas. There are five semi-isolated populations in Alaskan waters during the summer months (Cook Inlet, Bristol Bay, Bering Sea, eastern Chukchi and Beaufort Sea). These groups (except Cook Inlet) mix in the fall and winter when all the whales come into the Bering Sea.<sup>25</sup>

All belugas winter in offshore areas where there are openings in the pack ice. In warmer months the Bering Sea population occupies coastal habitats, often near estuaries and river mouths, while other stocks make extended excursions to the arctic basin and along the Beaufort Sea

*We share beluga with the whole village, dry it, freeze it, eat it with stew. Muktuk is pickled or boiled or raw, depending who you have over for dinner. The elders like it raw more than the kids. Kids like to have it boiled with modern condiments.<sup>22</sup>*

Allan Sagoonick – Unalakleet



National Marine Mammal Lab

## NOTES:

Arrows indicating beluga movement in Norton Sound were generalized from the original source (Huntington et al. 1998). The actual level of detail would not be visible on this map scale.

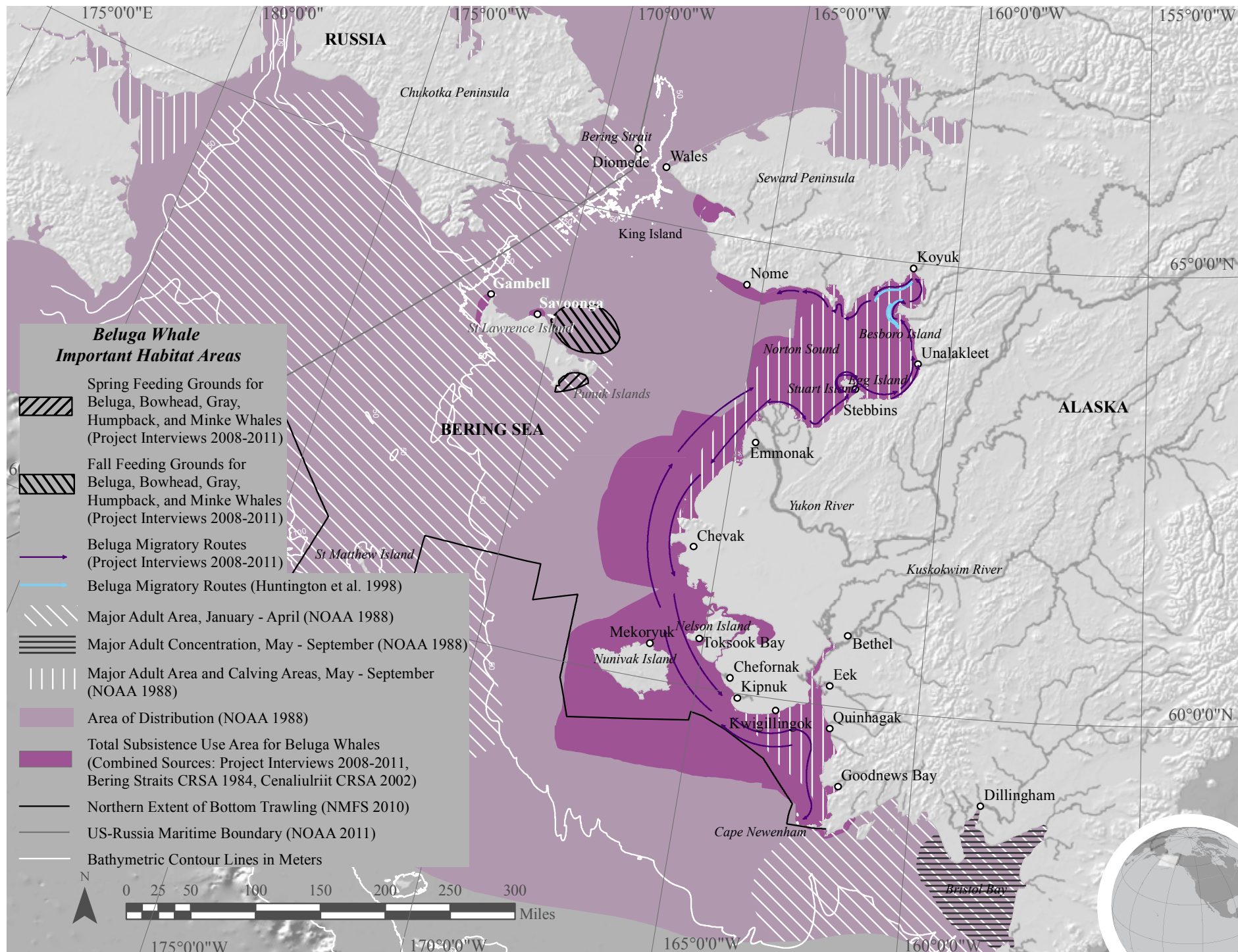
The shape for Total Subsistence Use Area is partly made up of Cendilulriit CRSA data that represents all marine mammals collectively.

*We see belugas filled with little shrimps and often the water is colored pink from all the shrimp.<sup>23</sup>*  
Elders and Active Hunters – Shaktoolik

*The bigger the beluga, the more salmon there is in their stomach. Maybe 12 salmon in a big one. They swallow them whole.<sup>24</sup>*  
Elders and Active Hunters – Elim

slope. Some populations undertake long seasonal migrations, moving up to 2,000 kilometers (1,242 miles) between winter and summer habitats, while others migrate shorter distances between offshore areas and nearby coastlines.<sup>26</sup> In the spring and summer, their movements are closely associated with concentrations of the migratory fish species that they feed on and some follow fish into bays and up rivers.<sup>27</sup> Belugas feed on a great variety of fish species, shrimp and also on the occasional benthic invertebrate, squid, or octopus. Indigenous hunters observe that belugas feed heavily on shrimp, herring, salmon, and tomcods.<sup>28</sup> Sometimes called “canaries of the sea,” belugas use a repertoire of whistles, chirps and clicks to communicate with other whales and for echolocation used to find prey.<sup>29</sup>





# EIDERS

## IMPORTANT HABITAT AREAS

### COMMON EIDER

Central Yup'ik: *Metraq*  
 Cup'ig: *Nawista*  
 St. Lawrence Island Yupik:  
*Metgbaq*  
 Inupiaq: *Amauligruak*  
 Scientific: *Somateria*  
*mollissima*

### KING EIDER

Central Yup'ik: *Qengalleg*  
 Cup'ig: *Qengallek*  
 St. Lawrence Island Yupik:  
*Qengalek*  
 Inupiaq: *Qinalik*  
 Scientific: *Somateria spectabilis*

### SPECTACLED EIDER

Central Yup'ik: *Qaugeq*  
 Cup'ig: *Qauger*  
 St. Lawrence Island Yupik:  
*Iyegaatelek*  
 Inupiaq: *Qavaasuk*  
 Scientific: *Somateria fisberi*

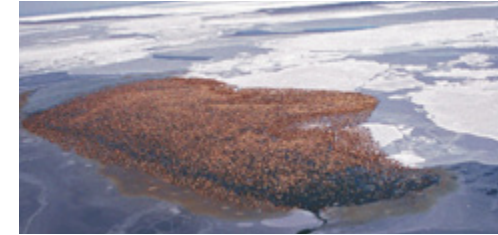


Spectacled Eider  
 J. Wasley

### Biology

The Yukon-Kuskokwim Delta, Norton Sound, Bering Strait and the Nunivak, St. Matthew and St. Lawrence islands offer important habitat for millions of migratory birds. Expansive wetlands, lagoons and cliffs are used by huge numbers of shorebirds, seabirds and waterfowl as they travel long distances to their summer breeding grounds every spring.<sup>4</sup>

Three eider species – spectacled, common and king eiders – remain in the Bering Sea during winter months and are thus featured in this report. From October through March, virtually the entire world population of spectacled eiders is densely packed into open water leads within the ice pack between St. Matthew and St. Lawrence islands.<sup>5</sup> Spectacled eiders are listed as threatened under



The entire spectacled eider population winters in open water leads within the pack ice between St. Lawrence Island and St. Matthew Island. They use the ice to rest, stay warm and as a platform to dive for clams.  
 U.S. Fish & Wildlife Service

the Endangered Species Act; this dynamic marine area is included in their designated critical habitat.

All eider species are benthic feeders with a diet consisting mostly of mollusks, crustaceans and echinoderms. In the summer this diet may be supplemented with plant life.<sup>6</sup> Spectacled eiders are capable of diving up to 70 meters (210 feet) to obtain their prey.<sup>7</sup> Because of the high energy costs associated with surviving the demanding winter at sea, eiders require abundant sources of the right food to sustain their populations until the spring breeding season begins.<sup>8</sup>

### NOTES:

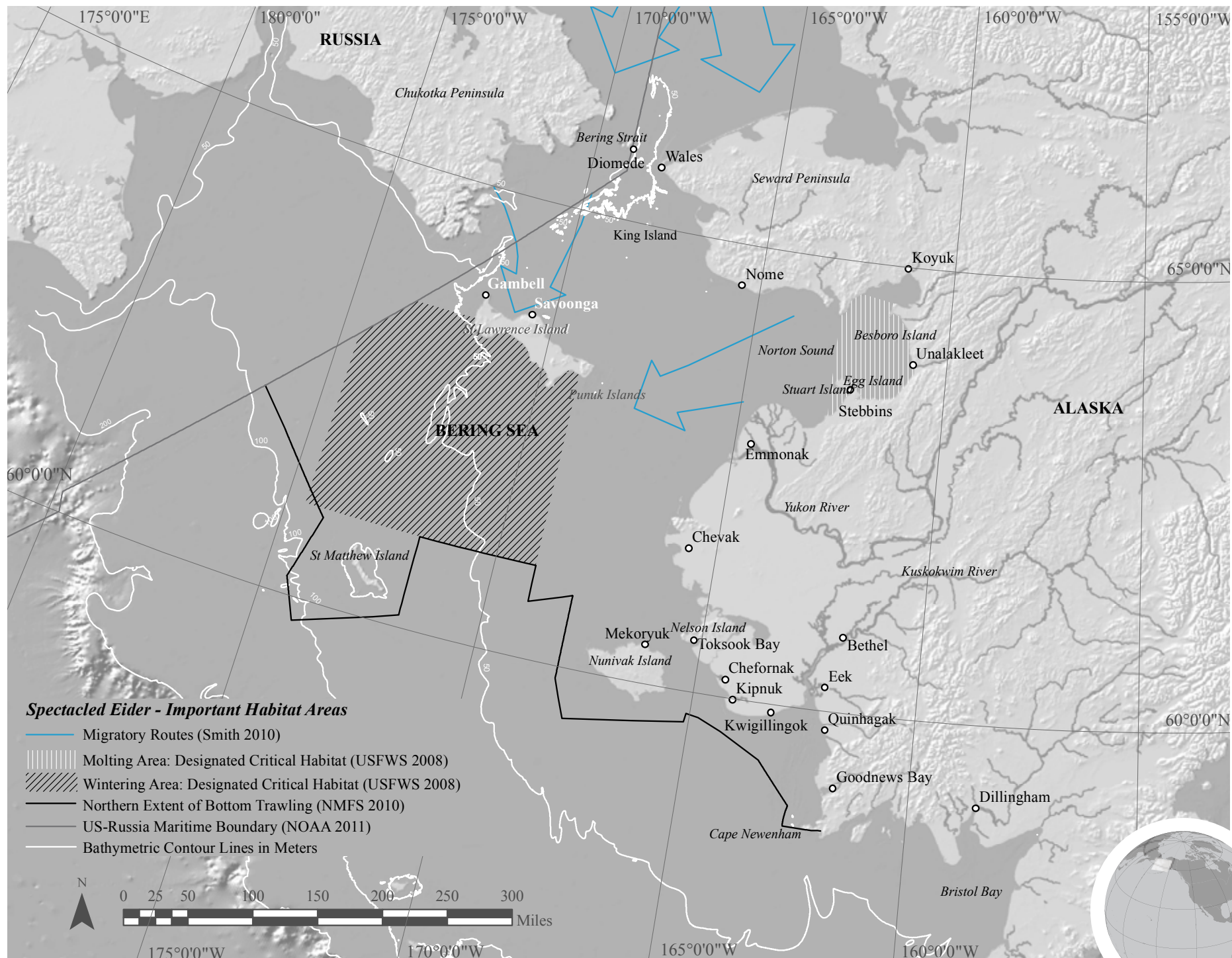
This project does not include eider subsistence use areas. Not all eider species are currently hunted to the extent they used to be due to population declines and restrictions; however eiders were discussed in interviews with hunters and elders. As sea ducks, eiders seasonally occupy the same marine habitats as marine mammals. Spectacled eiders were emphasized because they winter in large aggregations in the ice between St. Lawrence Island and St. Matthew Island, an area noted by elders and hunters as having particular ecological importance.

Designated critical habitat on land is not shown here.

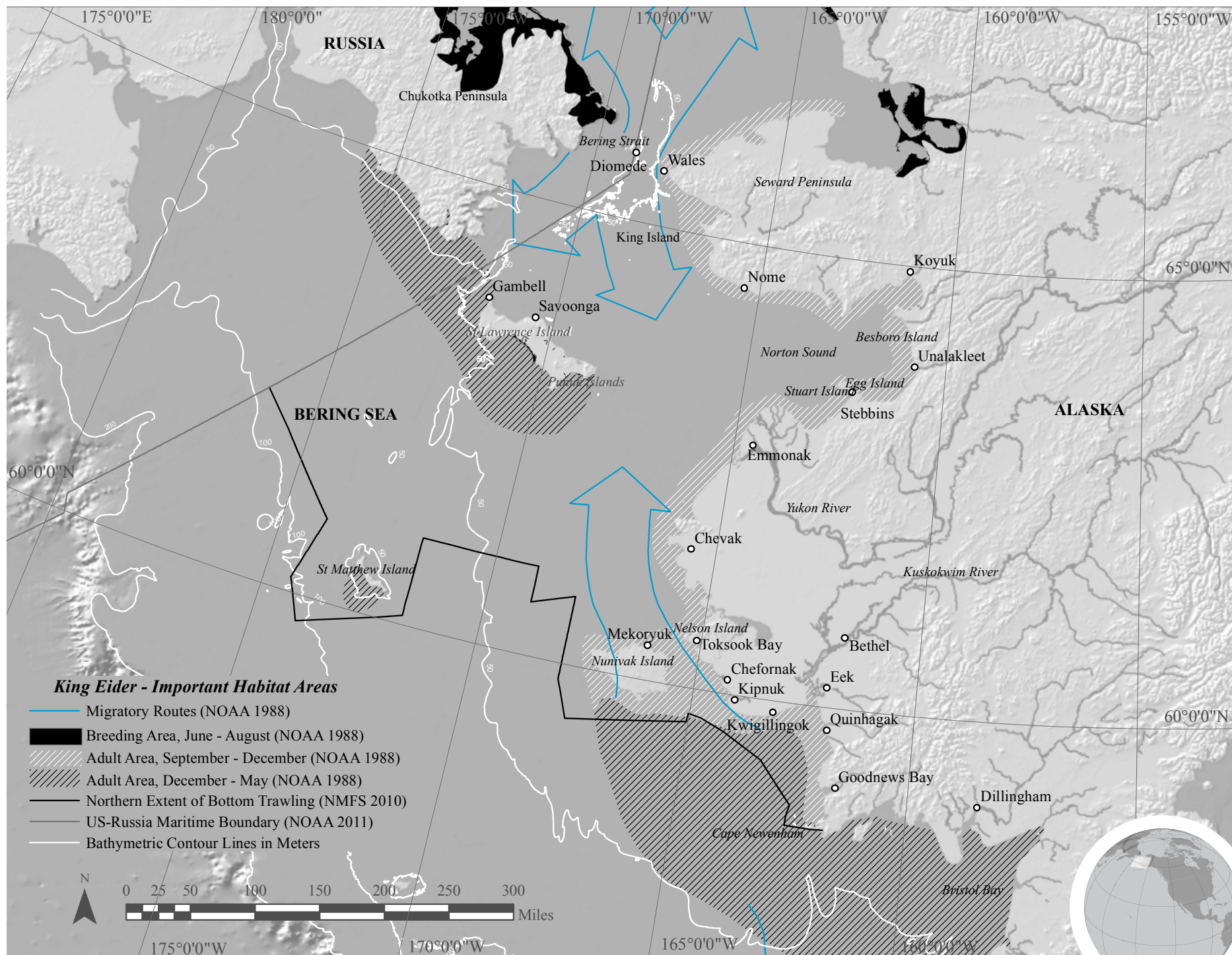
### Cultural Practices

Observations by Alaska Native people at different locations along the coast and on the islands note eiders migrating past, nesting and wintering. Historically eiders were used to make extremely warm, light weight parkas.<sup>1,2,3</sup> Sea ducks are a part of the mosaic of plentiful subsistence foods. Certain practices are diminished now due to modern clothing and conservation management rules restrict hunting and egg collecting of spectacled eiders. The recovery of a healthy spectacled eider population should allow for resumption of subsistence use in the future.

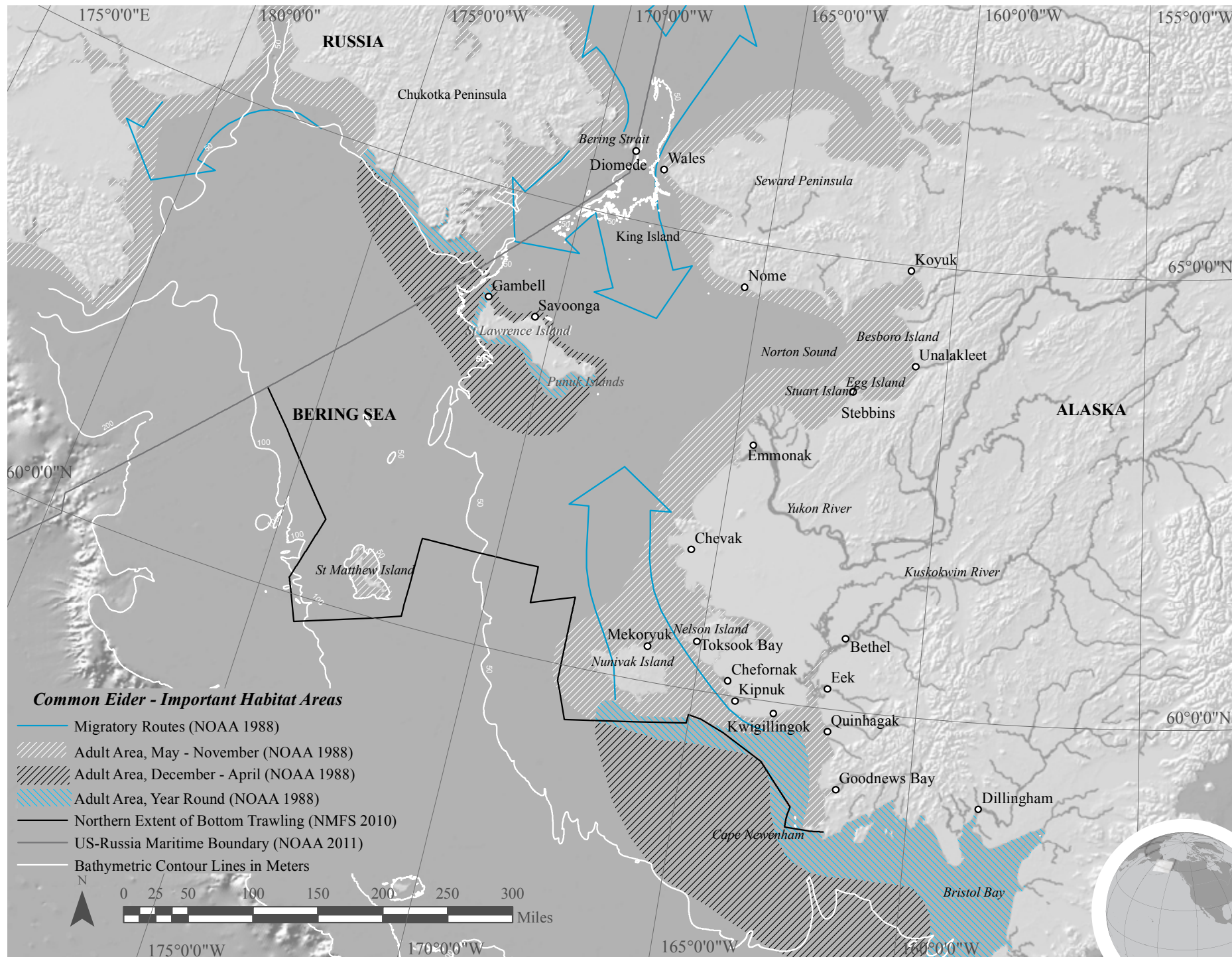








Overview Map





# FISH AND SHELLFISH

## SHELLFISH - SUBSISTENCE AND COMMERCIAL USE

### *Shellfish*

Clams and mussels  
Crab (red king, blue king, snow)  
Shrimp

### *Invertebrates*

Sea peach



Red king crab.  
Braxton Drew, NOAA

Commercial crab fishing  
through the winter ice in  
Norton Sound.  
Tim Akimoff

### *Cultural Practices*

Fish and shellfish are harvested for subsistence in coastal and marine waters, through the ice and in rivers. Provided is a list of species as they were named in interviews with elders and active fishermen.

Halibut, herring, salmon and crab are also harvested in small-scale commercial fisheries and are an important contribution to the mixed subsistence and cash economy.

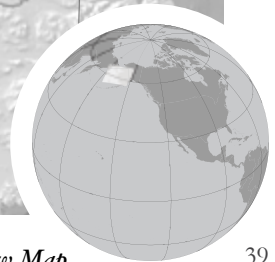
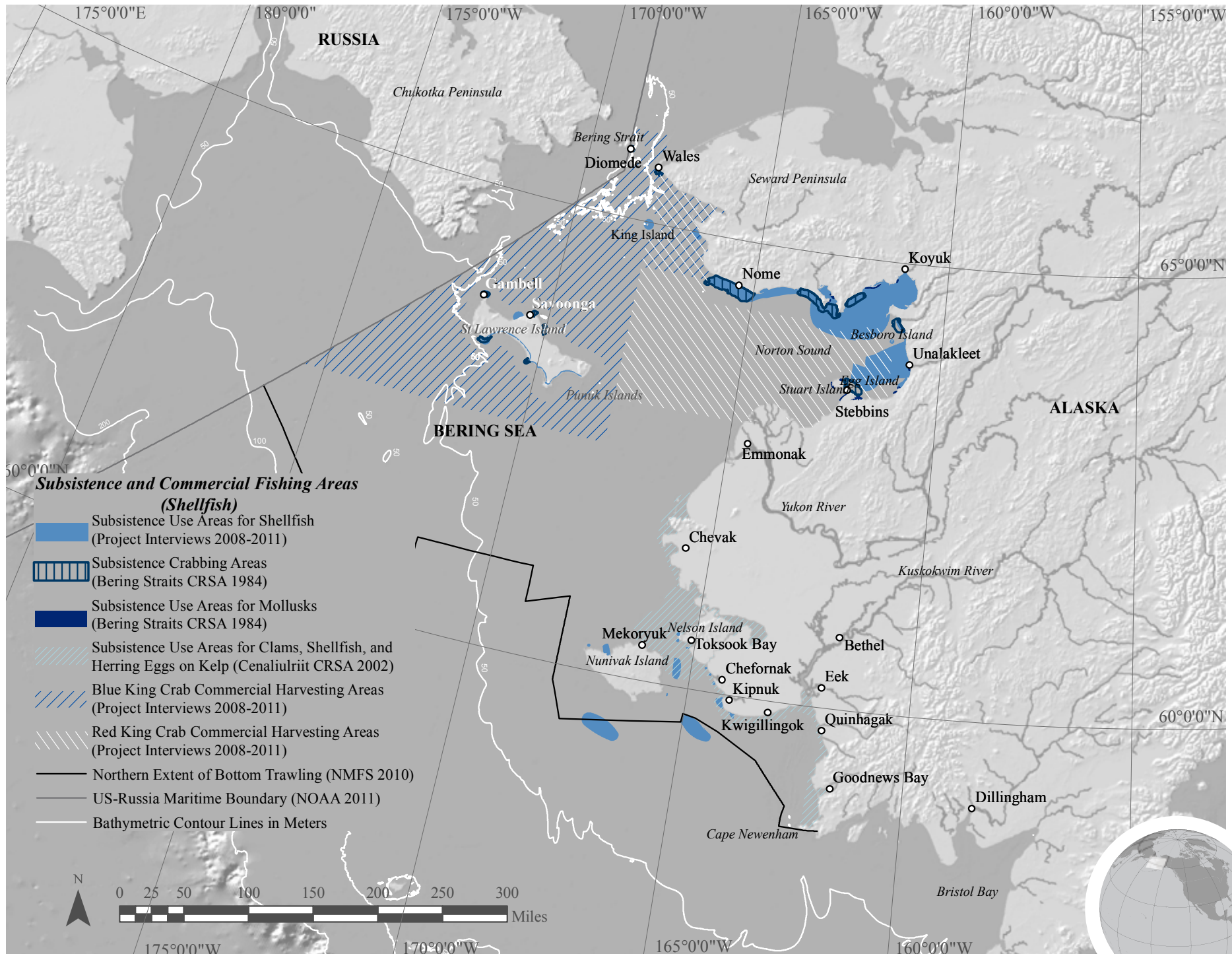


### NOTES:

Crab areas shown south of Nunivak Island were noted as areas where crab has been caught, sometimes while halibut fishing.

Sea peaches (like these found in the Aleutian Islands), also locally called "seafood," wash up on the beach and are collected by St. Lawrence Islanders.  
Robert Stone, NOAA





Overview Map

# FISH AND SHELLFISH

## FISH - SUBSISTENCE AND COMMERCIAL USE

### *Fish*

Arctic char  
Blackfish  
Blue cod  
Burbot  
Capelin  
Cisco  
Eel  
Flounder  
Grayling  
Halibut  
Herring  
Herring eggs  
Hooligan or candlefish  
Lush fish  
Needlefish  
Salmon (red, king, silver, chum, pink)  
Sculpin  
Pacific cod  
Saffron cod  
Sheefish  
Skipjack  
Smelt  
Tomcod  
Trout  
Whitefish



Goodnews Bay  
Dorothy Childers



Halibut  
Guly Becken



Herring braided together with grass and drying on racks – Toksook Bay.  
Dorothy Childers

Tomcod fishing  
through the ice.  
U.S. Fish & Wildlife  
Service

### NOTES:

Halibut in this region is harvested for the commercial fishery only by local vessels. In western Alaska, undersized halibut may be retained for subsistence while commercial fishing. The area for commercial and subsistence halibut is shown as one shape, although commercial harvest is primarily in the deeper waters.

The commercial halibut area west of Chevak was noted as an area of limited fishing effort but a potentially good area in the future.

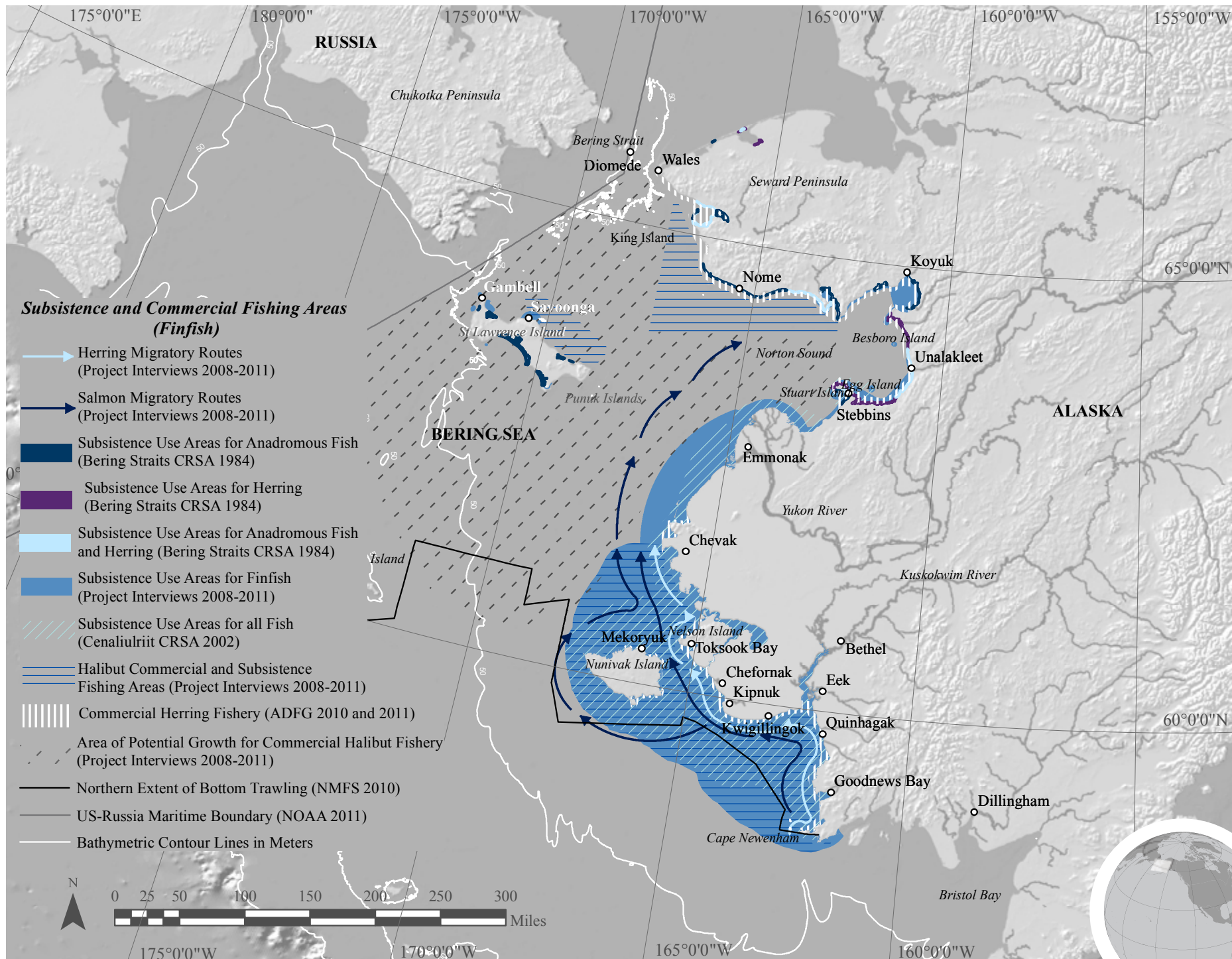
The area of potential growth for commercial halibut fishing represents the view of Nome fishermen interested in building capacity to expand into new areas and the importance the larger northern Bering Sea holds for future fishing opportunity.

Marine waters used for commercial salmon fishing in Norton Sound are the same as the subsistence harvest areas described as "anadromous fish" and "anadromous fish and herring." Commercial salmon fisheries also occur along the mouths of the Yukon River and in management districts (Quinhagak and Goodnews) of Kuskokwim Bay (ADFG 2010 and 2011).

In-river use areas are not shown on this map.







# ENDNOTES

## MESSAGE FROM THE ELDERS

- <sup>1</sup> Alaska Native Traditional Knowledge and Ways of Knowing Workshop. 1994. Sponsored by Rural Alaska Community Action Program and Indigenous Peoples' Council on Marine Mammals.
- <sup>2</sup> "Diomed Island Names, Places and Stories." Apr. 2, 1980. Kawerak Eskimo Heritage Program, EC.80.004 Tape 34.
- <sup>3</sup> John Active. 1999. "Why Subsistence is a Matter of Cultural Survival: A Yupik Point of View." In Ronald Spatz, ed. 1999. *Alaska Native Writers, Storytellers and Orators, Expanded Edition*. Alaska Quarterly Review.
- <sup>4</sup> Chevak Traditional Council. 2008. *Atlas Qisunaq*. Prepared by the Chevak Mapping Project of the Chevak Traditional Council. p. 116.
- <sup>5</sup> Ann Fienup-Riordan, ed. 2005. *Yupit Qanruytait/Yupik Words of Wisdom*. Transcriptions and translation by Alice Rearden with Marie Meade. University of Nebraska Press. p. 93.
- <sup>6</sup> John Pingayak – Chevak. Sep. 2, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>7</sup> Gordon Westlock – Emmonak. Mar. 18, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>8</sup> Stuart Olrun – Mekoryuk. Sep. 23, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>9</sup> John Pingayak – Chevak. Sep. 2, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>10</sup> Stuart Olrun – Mekoryuk. Sep. 23, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>11</sup> Joseph David – Mekoryuk. Sep. 23, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>12</sup> Ann Fienup-Riordan. 2007. *Tuungnaqpiallerput - The Way We Genuinely Live: Masterworks of Yupik Science and Survival*. University of Washington Press in association with Anchorage Museum Association and Calista Elders Council. p. 20.
- <sup>13</sup> John Pingayak – Chevak. Sep. 2, 2009. Interview for Bering Sea Elders Advisory Group.

## ABOUT THIS PROJECT

- <sup>1</sup> Henry Huntington and Nikolai Mymrin. 1996. "Traditional Ecological Knowledge of Beluga Whales: An Indigenous Knowledge Pilot Project in the Chukchi and Northern Bering Seas." Inuit Circumpolar Conference. p. 61.
- <sup>2</sup> Paul John – Toksook Bay. Jul. 17, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>3</sup> Clement Ungott – Gambell. Jan. 13, 2010. Interview for Bering Sea Elders Advisory Group.
- <sup>4</sup> Alice Pitka – Toksook Bay. Jul. 17, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>5</sup> Elders – Gambell. Jan. 12, 2010. Group interview for Bering Sea

Elders Advisory Group.

- <sup>6</sup> Igor Krupnik, ed. 2003. "Pacific Walrus: Conserving Our Culture through Traditional Management." Eskimo Walrus Commission. p. 52.
- <sup>7</sup> Elders & active hunters – Stebbins. Feb. 5, 2010. Group interview for Bering Sea Elders Advisory Group.
- <sup>8</sup> Wally Otton – Koyuk. Oct. 14, 2011. Interview for Bering Sea Elders Advisory Group.
- <sup>9</sup> Igor Krupnik, ed. "Pacific Walrus: Conserving Our Culture through Traditional Management." p. 16.
- <sup>10</sup> George Noongwook, The Native Village of Savoonga, The Native Village of Gambell, Henry P. Huntington and John C. George. 2007. "Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) around St. Lawrence Island, Alaska." *Arctic* 60(1). p. 48.

## ABOUT THE NORTHERN BERING SEA

- <sup>1</sup> Ann Fienup-Riordan, ed. 2005. *Yupit Qanruytait/Yupik Words of Wisdom*. Transcriptions and translation by Alice Rearden with Marie Meade. University of Nebraska Press. p. 89.
- <sup>2</sup> Conrad Oozeva, Chester Noongwook, George Noongwook, Christina Alowa and Igor Krupnik. 2004. *Watching Ice and Weather Our Way*. Edited by Igor Krupnik, Henry Huntington, Christopher Koonooka and George Noongwook. Washington, DC: Arctic Studies Center, Smithsonian Institute.
- <sup>3</sup> Ann Fienup-Riordan and Alice Rearden. 2010. "The Ice Is Always Changing: Yup'ik Understandings of Sea Ice, Past and Present." In Igor Krupnik, Claudio Aporta, Shari Gearheard, Gita J. Laidler, Lene Kielsen Holm, eds. *SIKU: Knowing Our Ice*. Springer.
- <sup>4</sup> James Overland and Phyllis Stabeno. 2004. "Is the Climate of the Bering Sea Warming and Affecting the Ecosystem?" *EOS* 85(33): 309-316.
- <sup>5</sup> Franz Mueter, Michael Litzow and Robert Lauth. 2010. "Spatial Distribution of Groundfish Stocks in the Bering Sea." In S. Zador and S. Gaichas, eds. *SAFE 2010, Appendix C, Ecosystem Considerations for 2011*. Alaska Fisheries Science Center. pp.124-127.
- <sup>6</sup> Ibid.
- <sup>7</sup> Phyllis Stabeno, Ed Farley, Nancy Kachel, Sue Moore, Calvin Mordy, Jeffrey Napp, James Overland, Alexei Pinchuk and Michael Sigler. Dec. 22, 2010. A Comparison of the Physics, Chemistry and Biology of the Northeastern and Southeastern Bering Sea Shelf. Manuscript for Bering Sea Ecosystem Study-Bering Sea Integrated Ecosystem Research Program (BEST-BSIERP).
- <sup>8</sup> J.M. Grebmeier and K.H. Dunton. 2000. "Benthic Processes in the Northern Bering/Chukchi Seas: Status and Global Change." In "Impacts of Changes in Sea Ice and Other Environmental Parameters in the Arctic." Report of the Marine Mammal Commission Workshop, Girdwood, Alaska. pp. 61-71.
- <sup>9</sup> James R. Lovvorn, Jacqueline M. Grebmeier, Lee W. Cooper, Joseph K. Bump, and Samantha E. Richman. 2009. "Modeling Marine Protected Areas for Threatened Eiders in a Climatically Changing Bering Sea." *Ecological Applications* 19: 1596-1613.
- <sup>10</sup> Vera Alexander. "Why Is the Bering Sea Important?" <http://www.beringclimate.noaa.gov/essays> (Accessed Mar. 1, 2010).
- <sup>11</sup> Elders – Gambell. Jan. 12, 2010. Group interview for Bering Sea Elders Advisory Group.
- <sup>12</sup> Allan Sagoonick – Unalakleet. Jan. 6, 2010. Interview for Bering Sea Elders Advisory Group.
- <sup>13</sup> Edward Shavings – Mekoryuk. Sep. 24, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>14</sup> Joseph David – Mekoryuk. Sep. 23, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>15</sup> David Bill, Sr. – Toksook Bay. Jul. 17, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>16</sup> Conrad Oozeva, Chester Noongwook, George Noongwook, Christina Alowa, and Igor Krupnik, *Watching Ice and Weather Our Way*. p. 59.
- <sup>17</sup> Elders – Gambell. Jan. 12, 2010. Group interview for Bering Sea Elders Advisory Group.
- <sup>18</sup> Elders and active hunters – Savoonga. Jan. 14, 2010. Group interview for Bering Sea Elders Advisory Group.
- <sup>19</sup> Henry Huntington, George Noongwook, Chad Jay, Bruce Marcot and Caleb Pungowiyi. Sep. 18, 2009. Notes from a Savoonga interview for the local & traditional knowledge component of the Bering Sea Integrated Ecosystem Research Program (BSIERP).
- <sup>20</sup> Steven Billy – Cheforak. Aug. 28, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>21</sup> Igor Krupnik, ed. 2003. "Pacific Walrus: Conserving Our Culture through Traditional Management." Eskimo Walrus Commission. p. 25.
- <sup>22</sup> John Pingayak – Chevak. Sep. 2, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>23</sup> Florence Fetterer, K. Knowles, W. Meier, and M. Savoie. 2002, updated 2011. Sea Ice Index. National Snow and Ice Data Center. Digital media.



# ENDNOTES

## THE MAPS: INTRODUCTION

<sup>1</sup> Charles Seccheus, Sr. – Elim. Oct. 16, 2010. Interview for Bering Sea Elders Advisory Group.

## PACIFIC WALRUS

- <sup>1</sup> Elders – Gambell. Jan. 12, 2010. Group interview for Bering Sea Elders Advisory Group.
- <sup>2</sup> Walter Lewis – Chefornek. Aug. 28, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>3</sup> Elders, active hunters and fishermen – Yukon-Kuskokwim and Bering Strait regions. 2008-2011. Interviews for Bering Sea Elders Advisory Group.
- <sup>4</sup> Ibid.
- <sup>5</sup> Ibid.
- <sup>6</sup> Anders Apassingok, Willis Walunga and Edward Tennant, eds. 1985. *Sivuaqam Nangagbnegha - Siivannlemta Ungipaqellghat/Lore of St. Lawrence Island - Echoes of Our Eskimo Elders, Volume 1*. Bering Strait School District. p. 169.
- <sup>7</sup> Ann Fienup-Riordan. 2007. *Yuungnaqpiallerput - The Way We Genuinely Live: Masterworks of Yup'ik Science and Survival*. University of Washington Press in association with Anchorage Museum Association and Calista Elders Council. p. 118.
- <sup>8</sup> Anders Apassingok, Willis Walunga and Edward Tennant, eds. *Sivuaqam Nangagbnegha - Siivannlemta Ungipaqellghat/Lore of St. Lawrence Island - Echoes of Our Eskimo Elders, Volume 1*. p. 171.
- <sup>9</sup> Ann Fienup-Riordan. 2007. *Yuungnaqpiallerput - The Way We Genuinely Live: Masterworks of Yup'ik Science and Survival*. pp. 69, 136-140.
- <sup>10</sup> Joseph David – Mekoryuk. Sep. 23, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>11</sup> Edward Shavings – Mekoryuk. Sep. 24, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>12</sup> Kate Wynn. 1993. *Guide to Marine Mammals of Alaska*. Alaska Sea Grant, University of Alaska Fairbanks.
- <sup>13</sup> U.S. Fish and Wildlife Service, Alaska Region. 2008. "Walrus." <http://alaska.fws.gov/fisheries/mmm/walrus/nhistory.htm> (Accessed May 12, 2011).
- <sup>14</sup> Ibid.
- <sup>15</sup> Francis Fay. 1982. *Ecology and Biology of the Pacific Walrus, Odobenus rosmarus divergens Illiger*. U.S. Fish and Wildlife Service, North American Fauna 74. pp. 167-172.
- <sup>16</sup> Ibid. pp. 134-137.
- <sup>17</sup> NOAA. 1988. *Bering, Chukchi and Beaufort Seas Coastal and Ocean Strategic Assessment Data Atlas*.

## SEALS

- <sup>1</sup> Edward Shavings – Mekoryuk. Sep. 24, 2009. Interview for Bering Sea Elders Advisory Group.
- <sup>2</sup> Elders, active hunters and fishermen – Yukon-Kuskokwim and Bering Strait regions. 2008-2011. Interviews for Bering Sea Elders Advisory Group.
- <sup>3</sup> Mark Nelson. 2008. "Alaska Wildlife Notebook Series - Bearded Seal." Alaska Department of Fish and Game. [http://www.adfg.alaska.gov/static/education/wns/bearded\\_seal.pdf](http://www.adfg.alaska.gov/static/education/wns/bearded_seal.pdf) (Accessed May 12, 2011).
- <sup>4</sup> Elders, active hunters and fishermen – Yukon-Kuskokwim and Bering Strait regions. 2008-2011. Interviews for Bering Sea Elders Advisory Group.
- <sup>5</sup> Alice Stickney. 1984. "Coastal Ecology and Wild Resource Use in the Central Bering Sea Area: Hooper Bay and Kwigillingok." Alaska Department of Fish and Game, Division of Subsistence Technical Paper #85. pp. 117-121.
- <sup>6</sup> Elders, active hunters and fishermen – Yukon-Kuskokwim and Bering Strait regions. 2008-2011. Interviews for Bering Sea Elders Advisory Group.
- <sup>7</sup> Ibid.
- <sup>8</sup> Ann Fienup-Riordan. 2007. *Yuungnaqpiallerput - The Way We Genuinely Live: Masterworks of Yup'ik Science and Survival*. University of Washington Press in association with Anchorage Museum Association and Calista Elders Council. pp. 325-328.
- <sup>9</sup> Ibid. p. 145.
- <sup>10</sup> Robert Hurwitz. "Report to Congress on Subsistence." In "A Special Relationship with the Land - Recommendations by the Association of Village Council Presidents on National Interest Lands of the Yukon-Kuskokwim Delta Region in Southwestern Alaska." Association of Village Council Presidents.
- <sup>11</sup> "Diomed Island Names, Places and Stories." Apr. 2, 1980. Kawerak Eskimo Heritage Program, EC.80.004 Tape 34.
- <sup>12</sup> Ann Fienup-Riordan. *Yuungnaqpiallerput - The Way We Genuinely Live: Masterworks of Yup'ik Science and Survival*. p. 146.
- <sup>13</sup> Clement Ungott – Gambell. Jan. 13, 2010. Interview for Bering Sea Elders Advisory Group.
- <sup>14</sup> Elders and active hunters – Yukon-Kuskokwim region. 2009. Interviews for Bering Sea Elders Advisory Group.
- <sup>15</sup> Ann Fienup-Riordan. *Yuungnaqpiallerput - The Way We Genuinely Live: Masterworks of Yup'ik Science and Survival*. p. 326.
- <sup>16</sup> Ibid. p. 325.
- <sup>17</sup> Henry Huntington, ed. 2000. "Traditional Ecological Knowledge of Seals in Norton Bay, Alaska." Report submitted to the Elim-Shaktoolik-Koyuk Marine Mammal Commission and National Marine Fisheries Service, translated by Clara Sookiyak.
- <sup>18</sup> Ibid. p. 5.
- <sup>19</sup> Ibid.
- <sup>20</sup> Mark Nelson. "Alaska Wildlife Notebook Series - Bearded Seal."
- <sup>21</sup> Brendan Kelly. 1988. "Bearded seal *Erignathus barbatus*." In J.W. Lentfer, ed. *Selected Marine Mammals of Alaska*. Marine Mammal Commission.
- <sup>22</sup> NOAA. 1988. *Bering, Chukchi and Beaufort Seas Coastal and Ocean Strategic Assessment Data Atlas*.
- <sup>23</sup> Kate Wynn. 1993. *Guide to Marine Mammals of Alaska*. Alaska Sea Grant, University of Alaska Fairbanks.
- <sup>24</sup> Elders, active hunters and fishermen – Elim. Oct. 16, 2010. Group interview for Bering Sea Elders Advisory Group.
- <sup>25</sup> NOAA. *Bering, Chukchi and Beaufort Seas Coastal and Ocean Strategic Assessment Data Atlas*.
- <sup>26</sup> Cleveland Cowles. 1981. "Marine Mammals, Endangered Species, and Rare Plants Potentially Affected by Proposed Federal Lease Sales in the Northern Bering Sea and Norton Sound Vicinity." Technical paper. U.S. Department of the Interior, Alaska Outer Continental Shelf Office.
- <sup>27</sup> National Marine Mammal Lab. "Ribbon seal (*Histiophoca fasciata*)." [http://www.afsc.noaa.gov/nmml/species/species\\_ribbon.php](http://www.afsc.noaa.gov/nmml/species/species_ribbon.php) (Accessed May 12, 2011).
- <sup>28</sup> Ibid.
- <sup>29</sup> Elders, active hunters and fishermen – Elim. Oct. 16, 2010. Group interview for Bering Sea Elders Advisory Group.
- <sup>30</sup> John Citta. 2008. "Alaska Wildlife Notebook Series - Ringed Seal." Alaska Department of Fish and Game. [http://www.adfg.alaska.gov/static/education/wns/ringed\\_seal.pdf](http://www.adfg.alaska.gov/static/education/wns/ringed_seal.pdf) (Accessed May 12, 2011).
- <sup>31</sup> Brendan Kelly. 1988. "Ringed seal *Phoca hispida*." In J.W. Lentfer, ed. *Selected Marine Mammals of Alaska*. Marine Mammal Commission.
- <sup>32</sup> Cleveland Cowles. "Marine Mammals, Endangered Species, and Rare Plants Potentially Affected by Proposed Federal Lease Sales in the Northern Bering Sea and Norton Sound Vicinity."
- <sup>33</sup> Ibid.
- <sup>34</sup> Brendan Kelly. "Ringed seal *Phoca hispida*."
- <sup>35</sup> Kate Wynn. *Guide to Marine Mammals of Alaska*.
- <sup>36</sup> Charles Seccheus, Sr. – Elim. Oct. 16, 2010. Interview for Bering Sea Elders Advisory Group.
- <sup>37</sup> Mark Nelson. 2008. "Alaska Wildlife Notebook Series - Spotted Seal." Alaska Department of Fish and Game. [http://www.adfg.alaska.gov/static/education/wns/spotted\\_seal.pdf](http://www.adfg.alaska.gov/static/education/wns/spotted_seal.pdf) (Accessed May 12, 2011).
- <sup>38</sup> Lori Quakenbush. 1988. "Spotted seal *Phoca largha*." In J.W. Lentfer, ed. *Selected Marine Mammals of Alaska*. Marine Mammal Commission.

## ENDNOTES

<sup>39</sup> Mark Nelson. "Alaska Wildlife Notebook Series - Spotted Seal."

<sup>40</sup> NOAA. *Bering, Chukchi and Beaufort Seas Coastal and Ocean Strategic Assessment Data Atlas*.

<sup>41</sup> Mark Nelson. "Alaska Wildlife Notebook Series - Spotted Seal."

<sup>42</sup> Kate Wynn. *Guide to Marine Mammals of Alaska*.

### WHALES

<sup>1</sup> Anders Apassingok, Willis Walunga and Edward Tennant, eds. 1985. *Sivugam Nangagbnegha - Siirvanlemta Ungipaqellghat/Lore of St. Lawrence Island - Echoes of Our Eskimo Elders*, Vol. 1. Bering Strait School District. pp. 217-223.

<sup>2</sup> George Noongwook, The Native Village of Savoonga, The Native Village of Gambell, Henry P. Huntington and John C. George. 2007. "Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) Around St. Lawrence Island, Alaska." *Arctic* 60 (1): 47-54. p. 51.

<sup>3</sup> Anders Apassingok, Willis Walunga and Edward Tennant, eds. *Sivugam Nangagbnegha - Siirvanlemta Ungipaqellghat/Lore of St. Lawrence Island - Echoes of Our Eskimo Elders*, Vol. 1. p. 169.

<sup>4</sup> George Noongwook, The Native Village of Savoonga, The Native Village of Gambell, Henry P. Huntington and John C. George. "Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) Around St. Lawrence Island, Alaska." p. 52.

<sup>5</sup> Elders, active hunters and fishermen – Yukon-Kuskokwim and Bering Strait regions. 2008 – 2011. Interviews for Bering Sea Elders Advisory Group.

<sup>6</sup> Ibid.

<sup>7</sup> Missaq/Frank Andrew. 2008. *Paitarkiutenka My Legacy to You*. Edited by Ann Fienup-Riordan and translated by Alice Rearden and Marie Meade. University of Washington Press in association with Calista Elders Council and Anchorage Museum Association. p. 57.

<sup>8</sup> Elders, active hunters and fishermen – Yukon-Kuskokwim and Bering Strait regions. 2008 – 2011. Interviews for Bering Sea Elders Advisory Group.

<sup>9</sup> Elders – Gambell. Jan. 12, 2010. Group interview for Bering Sea Elders Advisory Group.

<sup>10</sup> George Noongwook, The Native Village of Savoonga, The Native Village of Gambell, Henry P. Huntington and John C. George. "Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) Around St. Lawrence Island, Alaska." p. 50.

<sup>11</sup> Lori Quakenbush. 2008. "Alaska Wildlife Notebook Series - Bowhead Whale." Alaska Department of Fish and Game. [http://www.adfg.alaska.gov/static/education/wns/bowhead\\_whale.pdf](http://www.adfg.alaska.gov/static/education/wns/bowhead_whale.pdf) (Accessed May 12, 2011).

<sup>12</sup> Elders – Gambell. Jan. 12, 2010. Group interview for Bering Sea Elders Advisory Group.

<sup>13</sup> George Noongwook, The Native Village of Savoonga, The Native Village of Gambell, Henry P. Huntington and John C. George. "Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) Around St. Lawrence Island, Alaska." p. 50.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid. p. 51.

<sup>16</sup> Lori Quakenbush. "Alaska Wildlife Notebook Series - Bowhead Whale."

<sup>17</sup> Ibid.

<sup>18</sup> Natalie Phillips. Apr. 17, 1998. "Old Mammals of the Sea." *Anchorage Daily News*.

<sup>19</sup> George Noongwook, The Native Village of Savoonga, The Native Village of Gambell, Henry P. Huntington and John C. George. "Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) Around St. Lawrence Island, Alaska." p. 51.

<sup>20</sup> Herman Hootch – Emmonak. Mar. 18, 2009. Interview for Bering Sea Elders Advisory Group.

<sup>21</sup> Elders, active hunters and fishermen – Stebbins. Feb. 5, 2010. Group interview for Bering Sea Elders Advisory Group.

<sup>22</sup> Allan Sagoonick – Unalakleet. Jan. 5, 2010. Interview for Bering Sea Elders Advisory Group.

<sup>23</sup> Elders, active hunters and fishermen – Shaktoolik. Oct. 12, 2010. Group interview for Bering Sea Elders Advisory Group.

<sup>24</sup> Elders, active hunters and fishermen – Elim. Oct. 16, 2010. Group interview for Bering Sea Elders Advisory Group.

<sup>25</sup> John Citta and Lloyd Lowry. 2008. "Alaska Wildlife Notebook Series - Beluga Whale." Alaska Department of Fish and Game. [http://www.adfg.alaska.gov/static/education/wns/beluga\\_whale.pdf](http://www.adfg.alaska.gov/static/education/wns/beluga_whale.pdf) (Accessed May 12, 2011).

<sup>26</sup> K. Hazard. 1988. "Beluga whale *Delphinapterus leucas*." In J.W. Lentfer, ed. *Selected Marine Mammals of Alaska*. Marine Mammal Commission.

<sup>27</sup> Ibid.

<sup>28</sup> Elders, active hunters and fishermen – Shaktoolik, Koyuk and Elim. Oct. 12, 14, 16, 2010. Interviews for Bering Sea Elders Advisory Group.

<sup>29</sup> Kate Wynn. 1993. *Guide to Marine Mammals of Alaska*. Alaska Sea Grant, University of Alaska Fairbanks.

### EIDERS

<sup>1</sup> Anders Apassingok, Willis Walunga and Edward Tennant, eds. 1985. *Sivugam Nangagbnegha - Siirvanlemta Ungipaqellghat/Lore of St. Lawrence Island - Echoes of Our Eskimo Elders*, Vol. 1. Bering Strait School District. p. 105.

<sup>2</sup> Ann Fienup-Riordan. 2007. *Xuungnaqpiallerput - The Way We Genuinely Live: Masterworks of Yupik Science and Survival*. University of Washington Press in association with Anchorage Museum Association and Calista Elders Council. pp. 204-210.

<sup>3</sup> "Diomed Island Names, Places and Stories." Apr. 2, 1980. Kawerak Eskimo Heritage Program, EC.80.004 Tape 34.

<sup>4</sup> David Banks, Margaret Williams, John Pearce, Alan Springer, Randy Hagenstein and David Olson, eds. 1999. "Ecoregion-Based Conservation in the Bering Sea." World Wildlife Fund and The Nature Conservancy based on Bering Sea Experts Workshop in Girdwood, Alaska, March 20-23, 1999. [http://www.worldwildlife.org/beringsea\\_erbc/main\\_book.pdf](http://www.worldwildlife.org/beringsea_erbc/main_book.pdf) (Accessed May 12, 2011).

<sup>5</sup> U.S. Fish and Wildlife Service. 1999. "Threatened and Endangered Species Factsheet: Spectacled Eider (*Somateria fischeri*)."  
[http://alaska.fws.gov/media/SpecEider\\_FactSheet.htm](http://alaska.fws.gov/media/SpecEider_FactSheet.htm) (Accessed May 12, 2011).

<sup>6</sup> NOAA. 1988. *Bering, Chukchi and Beaufort Seas Coastal and Ocean Strategic Assessment Data Atlas*.

<sup>7</sup> U.S. Fish and Wildlife Service. 2002. "Threatened and Endangered Species Factsheet: Protecting Spectacled Eiders at Sea." <http://alaska.fws.gov/fisheries/endangered/pdf/SPEIatsea.pdf> (Accessed May 12, 2011).

<sup>8</sup> Samantha Richman and James Lovvorn. 2003. "Effects of Clam Species Dominance on Nutrient and Energy Acquisition by Spectacled Eiders in the Bering Sea." *Marine Ecology Progress Series* 261: 283-297.



## REFERENCES FOR MAP DATA

- ADFG (Alaska Department of Fish and Game). 1985. *Alaska Habitat Management Guide*.
- ADFG (Alaska Department of Fish and Game). 2010 and 2011. Fishery Management Reports No. 10-49, 10-56 and 11-29.
- Bering Straits CRSA (Coastal Resource Service Area). 1984. *Bering Straits CRSA, Volume 1 - Resource Inventory*. (Shapes digitized by Julia Beaty at Alaska Marine Conservation Council.)
- Cenaliulriit CRSA (Coastal Resource Service Area). 2002. Subsistence maps created for "Cenaliulriit CRSA Management Plan: Final District Plan." (Used with permission from the Cenaliulriit board of directors.) [http://www.alaskacoast.state.ak.us/District/DistrictPlans\\_Final/Cenaliulriit.htm](http://www.alaskacoast.state.ak.us/District/DistrictPlans_Final/Cenaliulriit.htm) (Accessed Apr. 7, 2011). See also: John Oscar and Glenn Gray. 2005. "Mapping Subsistence Resources in a Remote Alaska Region." Proceedings of the 14th Biennial Coastal Zone Conference, New Orleans, Louisiana. [http://www.csc.noaa.gov/cz/CZ05\\_Proceedings/pdf%20files/Oscar.pdf](http://www.csc.noaa.gov/cz/CZ05_Proceedings/pdf%20files/Oscar.pdf) (Accessed May 12, 2011).
- Huntington, Henry, ed. 2000. "Traditional Ecological Knowledge of Seals in Norton Bay, Alaska." Report submitted to the Elim-Shaktoolik-Koyuk Marine Mammal Commission and National Marine Fisheries Service, translated by Clara Sookiayak.
- Huntington, Henry and the Communities of Buckland, Elim, Koyuk, Point Lay and Shaktoolik. 1998. "Traditional Knowledge of the Ecology of Beluga Whales (*Delphinapterus leucas*) in the Eastern Chukchi and Northern Bering Seas, Alaska." *Arctic* 52(1): 49-61.
- NMFS (National Marine Fisheries Service). 2010. Northern Bering Sea bottom trawl boundary derived from GIS shapefiles for Northern Bering Sea Research Area, Modified Trawl Gear Zone and Nunivak Island/Etolin Strait/Kuskokwim Bay Habitat Conservation Area. Alaska Region.
- NOAA (National Oceanic and Atmospheric Administration). 1988. *Bering, Chukchi and Beaufort Seas Coastal and Ocean Strategic Assessment Data Atlas*. National Ocean Service.
- NOAA (National Oceanic and Atmospheric Administration). 2002. *Environmental Sensitivity Index, version 3.0*. National Ocean Service. <http://response.restoration.noaa.gov/esi> (Accessed May 12, 2011).
- NOAA (National Oceanic and Atmospheric Administration). 2011. Download EEZ boundary. Office of the Coast Survey. <http://www.nauticalcharts.noaa.gov/csd/EEZ.htm> (Accessed May 12, 2011).
- Noongwook, George, The Native Village of Savoonga, The Native Village of Gambell, Henry P. Huntington and John C. George. 2007. "Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) Around St. Lawrence Island, Alaska." *Arctic* 60(1): 47-54.
- Project Interviews. 2008-2011. Interviews with elders, active hunters, and subsistence and local commercial fishermen in Yukon-Kuskokwim and Bering Strait regions for Bering Sea Elders Advisory Group northern Bering Sea mapping project.
- Qayassiq Walrus Commission. 2009. "Resolution 09-01 Urging the North Pacific Fishery Management Council to Create a Protection Zone for Walrus Habitat in Bristol Bay."
- Smith, Melanie. 2010. *Arctic Marine Synthesis: Atlas of the Chukchi and Beaufort Seas*. Audubon Alaska and Oceana. <http://ak.audubon.org/birds-science-education/arctic-marine-synthesis-atlas-chukchi-and-beaufort-seas> (Accessed May 12, 2011).
- USFWS (U.S. Fish and Wildlife Service). 2008. Critical habitat for the spectacled eider, GIS shapefile. <http://crithab.fws.gov> (Accessed May 12, 2011).



Hunters push through the ice  
toward open water – Nelson Island.  
James Barker



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# ACKNOWLEDGEMENTS

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All the elders, hunters, and subsistence and commercial fishermen who participated in mapping interviews.

Tribal administrators, coordinators and staff who identified and helped to organize elders, hunters and fishermen for mapping interviews and map reviews – Ruby Nassuk and Tracy Kimoktoak (Koyuk), Janelle Murray and Robert Keith (Elim), Gloria Wilson (Shaktoolik), Art Ivanoff (Unalakleet), Peter Martin, Sr., Fred Pete and Gladys Pete (Stebbins), Ted Hamilton (Emmonak), Roy Atchak (Chevak), Alice Julius (Goodnews Bay), Sam Davis (Mekoryuk), Branson Tungian (Gambell), Sylvia Toolie, Kenneth Kingeekuk and Peggy Akeya (Savoonga), George Sam (Nightmute), Moses Chanar, Florence Therchik and Rose Julius (Toksook Bay), Janice Knowlton and Sylvester Ayek (King Island), Arthur Lake, Emma Kiunya and Fred Phillip (Kwigillingok), Jonathan Lewis (Cheforak), and Jimmie Paul (Kipnuk).

Yupik interpreters and transcribers – Fred Phillip, Bernadette Lewis, Peter Julius, Arthur Lake, Cameron Lake, Sam Davis, Moses Chanar, Maggie Scholtz, and Fred Pete.

All others who assisted in other ways to support the interviews with elders and active hunters, and all who kindly hosted the project team in the rural communities.

GIS support – Doug Tosa, Melanie Smith, and Joanne Wishart.

Experts who reviewed portions of the report – Henry Huntington, Phyllis Stabeno, Chad Jay, Tom Van Pelt, Lori Quakenbush, Sue Moore, James Lovvorn, Margie Ann Gibson, and Cynthia Monroe.

James Barker for the generous contribution of his photographs of Yup'ik life.

Cenaliulriit Coastal Resource Service Area, Board of Directors for permission to use the subsistence map data for the Yukon-Kuskokwim region \* Assistance from Hanson Irrigoo of Sivuquq, Inc. for the use of their lodge for interviews in Gambell \* Association of Village Council Presidents for hosting the Bering Sea Elders Advisory Group during the Yukon-Kuskokwim region map review \* Staff at the Kawerak Eskimo Heritage Archives for helping to locate useful material \* Steve Jacobson at University of Alaska Fairbanks, Native Language Center for providing orthography for walrus and seal species in four languages \* Ruby Nassuk and Roger Nassuk, Sr. of Koyuk for terminology used in Norton Sound \* George Noongwook for clarification of species names and for sharing supportive information sources \* Jason Geck at Alaska Pacific University for scanning large format maps \* Norton Sound Economic Development Corporation staff for advice on documenting commercial fishing areas and for use of their office for Unalakleet interviews \* Nome Fishermen's Association members for advice on documenting commercial fishing areas.

Funding support for *The Northern Bering Sea: Our Way of Life* – Moore Family Foundation, Oak Foundation, Pew Marine Conservation Fellows Program, Regional Marine Conservation Project, Thoresen Foundation, Alaska Conservation Foundation, 444S Foundation, The Ocean Foundation, Harder Foundation and True North Foundation. Funding support for meetings of the Bering Sea Elders Advisory Group – Donlin Gold, Honor the Earth Fund, Grant Aviation, Hageland Aviation, Bering Air, Norton Sound Economic Development Corporation, Alaska Conservation Foundation, and World Wildlife Fund.



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# APPENDIX

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## NORTHERN BERING SEA: OUR WAY OF LIFE - MAPPING METHODOLOGY

### *Purpose*

The Bering Sea Elders Advisory Group and Alaska Marine Conservation Council undertook the Northern Bering Sea mapping project to compile spatial information about hunting and fishing use in the ocean and ecologically sensitive marine areas for the species used by coastal tribes in the Yukon-Kuskokwim and Bering Strait regions. The objective was to identify use areas and to identify other areas beyond hunting and fishing grounds, either from direct observation, traditional knowledge or science, that are important for maintaining healthy populations of subsistence species (e.g. migration routes, offshore ice edge, seasonal habitats). The maps are intended to inform fishery management and other policy decisions that affect resources used for subsistence activities and local small-scale fisheries, and the marine ecosystem that supports them.

### *Maps Generated*

A set of maps was generated to show general areas used for:

- › Hunting walrus, seals and whales for subsistence.
- › Harvesting fish and shellfish for subsistence in marine and coastal waters.
- › Local small-scale commercial fisheries for halibut, herring, salmon and crab.

A separate set of maps was generated to show important habitat areas for walrus, seals, whales and eiders. As sea ducks, eiders seasonally occupy the same marine habitats as marine mammals. Spectacled eiders were emphasized because they winter in large aggregations in the ice between St. Lawrence Island and St. Matthew Island, an area noted by elders and hunters as having special ecological importance. Defining habitat areas for the many fish and shellfish species that are harvested was not undertaken.

On the following page is a description of the data sources used to create the two sets of maps.

*People use nearby resources and also venture out to hunt marine and land mammals, to fish and to gather favored foods. Although some areas are heavily used, hunting, fishing, and gathering are generally land extensive, rather than intensive. Consequently, large areas are needed to sustain villages...Areas may be important because of resource abundance or because of relatively easy access. Animal distribution changes with environmental factors, natural cycles, and shifting migration patterns. Consequently, in some years a subsistence harvest area may have little to offer. In years of low resource abundance, seldom-used areas may take on greater importance.*

Bering Straits CRSA (Coastal Resource Service Area). 1984. *Bering Straits CRSA, Volume 1 - Resource Inventory*. p. 7.

Opposite:  
Spring ice chokes  
the Bering Strait.  
George Riggs,  
NASA GSFC



## Use Area Maps – Data Sources

The project compiled data from the following sources to describe harvest areas for walrus, seals, whales, fish and shellfish. Each source is shown as a separate layer:

- › Bering Straits CRSA (Coastal Resource Service Area). 1984. *Bering Straits CRSA, Volume 1 - Resource Inventory*. (Shapes digitized by Julia Beaty at Alaska Marine Conservation Council.)
- › Cenaliulriit CRSA (Coastal Resource Service Area). 2002. Subsistence maps created for “Cenaliulriit CRSA Management Plan: Final District Plan.” (Used with permission from the Cenaliulriit board of directors.) [http://www.alaskacoast.state.ak.us/District/DistrictPlans\\_Final/Cenaliulriit.htm](http://www.alaskacoast.state.ak.us/District/DistrictPlans_Final/Cenaliulriit.htm) (Accessed Apr. 7, 2011). See also: John Oscar and Glenn Gray. 2005. “Mapping Subsistence Resources in a Remote Alaska Region.” Proceedings of the 14th Biennial Coastal Zone Conference, New Orleans, Louisiana. [http://www.csc.noaa.gov/cz/CZ05\\_Proceedings/pdf%20files/Oscar.pdf](http://www.csc.noaa.gov/cz/CZ05_Proceedings/pdf%20files/Oscar.pdf) (Accessed May 12, 2011).
- › Project Interviews. 2008-2011. Interviews with elders, active hunters, and subsistence and local commercial fishermen in Yukon-Kuskokwim and Bering Strait regions for Bering Sea Elders Advisory Group northern Bering Sea mapping project. (See details about methods associated with this source on page 52.)

The CRSA maps provided data where interviews were not conducted for the Bering Sea Elders Advisory Group. However the two CRSAs did not use the same approach to mapping. The differences in the data sets are described in the chart on the right. »

Although each data set represents lifetime use, the timeframes are different. Bering Sea Elders Advisory Group information was collected from 2008-2011. Collection of data for the Cenaliulriit CRSA maps began in 2002. The Bering Straits CRSA Resource Inventory was published in 1984. For

the purpose of this project, the Bering Sea Elders Advisory Group wanted to incorporate past and present use information to account for changes in natural cycles, species distributions, sea ice variability, and needs of communities. Despite their differences, data from all three sources were considered relevant to form a composite picture of the extensive area used.

We reviewed detailed maps published in the Alaska Habitat Management Guide by Alaska Department of Fish and Game (ADFG) in 1985. We found the data in the maps for the Western and Interior Regions (vol. IV) and Arctic Region (vol. V) were reflected in the CRSA maps. The CRSA maps were more applicable because they represent regions while the ADFG maps apply to a subset of villages.

	<i>Bering Sea Elders Advisory Group</i> 2008-2011	<i>Cenaliulriit CRSA</i> 2002	<i>Bering Straits CRSA</i> 1984
<i>Marine Mammals</i>	Separate GIS layers showing subsistence use of walrus, all seals combined, bowhead whales, beluga whales.	Single GIS layer showing subsistence use of all marine mammals combined.	Separate GIS layers showing subsistence use of walrus, all seals combined, bowhead whales and beluga whales.
<i>Fish &amp; Shellfish</i>	One GIS layer showing subsistence use of all fish combined & another layer showing all shellfish combined. Commercial fishing areas for herring, crab, halibut and salmon.	One GIS layer showing subsistence use areas for all fish and another showing clams/shellfish/herring eggs on kelp.	Separate GIS layers showing subsistence use areas for herring, all anadromous fish, crabs, and mollusks.

### *Important Habitat Area Maps – Data Sources*

The project incorporated scientific information about areas that are ecologically important for the resources that tribes rely on. Sources for these data include:

- › NOAA (National Oceanic and Atmospheric Administration). 1988. *Bering, Chukchi and Beaufort Seas Coastal and Ocean Strategic Assessment Data Atlas*. National Ocean Service.
- › NOAA (National Oceanic and Atmospheric Administration). 2002. *Environmental Sensitivity Index, version 3.0*. National Ocean Service. <http://response.restoration.noaa.gov/esi> (Accessed May 12, 2011).
- › Smith, Melanie. 2010. *Arctic Marine Synthesis: Atlas of the Chukchi and Beaufort Seas*. Audubon Alaska and Oceana. <http://ak.audubon.org/birds-science-education/arctic-marine-synthesis-atlas-chukchi-and-beaufort-seas> (Accessed May 12, 2011).
- › USFWS (U.S. Fish and Wildlife Service). 2008. Critical habitat for the spectacled eider, GIS shapefile. <http://crithab.fws.gov> (Accessed May 12, 2011).

The maps incorporate spatial information on migration from the following traditional ecological knowledge papers:

- › Huntington, Henry and the Communities of Buckland, Elim, Koyuk, Point Lay and Shaktoolik. 1998. “Traditional Knowledge of the Ecology of Beluga Whales (*Delphinapterus leucas*) in the Eastern Chukchi and Northern Bering Seas, Alaska.” *Arctic* 52(1): 49-61.
- › Huntington, Henry, ed. 2000. “Traditional Ecological Knowledge of Seals in Norton Bay, Alaska.” Report submitted to the Elim-Shaktoolik-Koyuk Marine Mammal Commission and National Marine Fisheries Service, translated by Clara Sookiyak.

- › Noongwook, George, The Native Village of Savoonga, The Native Village of Gambell, Henry P. Huntington and John C. George. 2007. “Traditional Knowledge of the Bowhead Whale (*Balaena mysticetus*) Around St. Lawrence Island, Alaska.” *Arctic* 60(1): 47-54.
- › Project Interviews. 2008-2011. Interviews with elders and active hunters in Yukon-Kuskokwim and Bering Strait regions for Bering Sea Elders Advisory Group northern Bering Sea mapping project.

In the habitat maps we also show harvest areas as a composite of the data sources presented as separate layers in the use area maps described above. Our purpose was to show the “big cultural and ecological picture” in the northern Bering Sea.

### *The Map Report – The Northern Bering Sea: Our Way of Life*

The use maps are one dimensional without the cultural context from which they emerged. The map report provides excerpts from project interviews to connect the maps with the perspective of elders and active hunters who participated. We also include excerpts from other published traditional knowledge sources to augment the project interviews or elaborate on what was shared. Because of the large geographic scale of the project, we collected information on hunting and fishing areas, but not in depth traditional ecological (natural history) knowledge; we also acknowledge that the cultural practices illustrated through quotes from interviews and other publications can be specific to smaller areas or villages. However, our purpose is to show the use of traditional marine resources as a way of life across the extensive Yukon-Kuskokwim and Bering Strait regions. Finally, throughout the interviews we were asked over and over again to include migration routes and places where the sea mammals, birds and fish go because the interconnectedness of the Bering Sea is as important as the places where hunting and fishing occurs.

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*Project Interviews for Bering Sea Elders Advisory Group, 2008-2011*  
(Detailed Methods)

Tribes that participated in the project interviews are members of the Bering Sea Elders Advisory Group by resolution. To generate maps of hunting and fishing areas we conducted interviews with experts in 18 tribes and key local commercial fishermen from 2008-2011:

- › Bering Strait Region: Gambell, Savoonga, Stebbins, Unalakleet and King Island (January 2010); Shaktoolik, Koyuk and Elim (October 2010); Nome (June 2011).
- › Yukon-Kuskokwim Region: Kwigillingok (March 2008); Emmonak (March 2009); Kipnuk (June 2009); Nightmute, Umkamiut and Toksook Bay (July 2009); Cheforak (August 2009); Chevak and Mekoryuk (September 2009); and Goodnews Bay (October 2009).

In organizing this project, the team utilized approaches recommended in *Chief Kerry's' Moose, A Guidebook to Land Use and Occupancy Mapping, Research Design and Data Collection*, which provides support to non-academic First Nation researchers in Canada.

### *Mapping Process*

#### Interviews -

Tribal officials for each village participating in the project designated 5-7 experts to be interviewed. Local commercial fishermen identified by staff from North Sound Economic Development Corporation and Nome Fishermen Association were interviewed in Nome. In each interview the age and life experience as local hunters and fishermen were documented.

In some villages interviews were conducted with individuals. In others they were group interviews. In both approaches, the individuals or groups had the option to conduct the interview in Yup'ik, Inupiaq or English. As it turned out, a number of interviews in the Yukon-Kuskokwim region were conducted in Central Yup'ik with support from bi-lingual speakers in the community.

Group interviews on St. Lawrence Island were conducted in English but the participants spoke among each other extensively in St. Lawrence Island Yupik and then provided consensus information in English. Each interview was audio recorded; most were video recorded except in a few villages where there were technology failures.

Interviews conducted in Central Yup'ik were translated and transcribed in English by local bi-lingual speakers. Information from all interviews was transcribed with information labeled with headings (such as species, cultural practices, or various other topics that emerged from each interview). This treatment allowed information to be retained the way it was conveyed but also easily accessible. In some cases where information was unclear, follow up inquiries were made by phone.

#### Documenting areas on the map -

Most interviews were conducted using USGS maps (1:250,000) and with some distances on the water noted for clarity. St. Lawrence Island interviews required using NOAA chart #16006, with the St. Lawrence area enlarged, as the base map. This was used because the USGS map for the island does not include water or any of the U.S. or Russia mainland useful for scale and landmarks. Interviews in Unalakleet and Nome were done using the Norton Sound Fisheries District Map made for the Norton Sound Economic Development Corporation, version 11/27/97.

Mylar was overlayed on the base maps. Elders and active hunters and fishermen were asked to draw the extent of their lifetime use area for walrus, seals, whales and fish based on a common set of questions. The questions were used as a guide to generate information that could be aggregated with other villages' data.

Interviewers sought perspective from elders and active hunters on areas that are not necessarily used for harvesting but are ecologically important to the species harvested. Experts discussed migration and other observations. These data were applied to the habitat maps along with scientific information.



The hand drawn map overlays were digitized. Notes and transcriptions from the interviews were used to clarify the shapes drawn on the mylar overlays. GIS shapefiles were created using ArcEditor 9.3.1 and stored in a geodatabase. Interview data were given codes according to the individual or group interviewed and the village where the interview took place. Although data were stored according to the individual or group that was interviewed, the data were later aggregated by village and by species so that individual hunting or fishing areas could not be distinguished from the maps or from the digital files.

Each participating tribe had the opportunity to review and correct the information that was digitized. The first review session took place in Bethel in November 2009 when 25 elders from the Yukon-Kuskokwim region gathered for a summit and spent a full day reviewing maps that showed data aggregated from all of the villages in the Yukon-Kuskokwim region. After additions from the summit were made, aggregated maps were sent to each individual tribe for additional review. St. Lawrence Island tribes were sent draft maps that contained aggregated data from the Gambell and Savoonga interviews. These maps were reviewed by teams in each village and updated with their suggested changes. The Norton Sound villages of Unalakleet, King Island, and Stebbins were sent draft maps that contained only the data from interviews done in those individual villages. (The data was not aggregated with other villages.) The GIS technician was present during the interviews done in Shaktoolik, Koyuk, and Elim and these maps were reviewed and updated the day after each group interview by designated experts.

#### *Intellectual Property*

The mapping program was carried out with permission of the participating tribes. Each interview participant was fully informed about the program and why information was being collected. The name of each person interviewed was coded so that specific information mapped was not attributed to individuals.

The information shared in the interviews belongs to the participating tribes. Tribes provided final review and approved the use of quotes selected from interviews for the report. Audio and video recordings and interview transcriptions will be returned to the tribes. Detailed maps and associated GIS data will also be returned to the participating tribes. With permission of the tribes, transcriptions may be archived for public access in an appropriate location.

Tribes participating in the project approved releasing the aggregated maps and the accompanying map report.

#### *Project Team*

The mapping project was carried out by a team at Alaska Marine Conservation Council on behalf of the Bering Sea Elders Advisory Group:

- › Muriel Morse (tribal member of the Native Village of Koyuk) – Western Alaska Outreach Coordinator and Interviews
- › Dorothy Childers – Editor
- › Julia Beaty – GIS Services

The project could not have been done without many helping hands including tribal administrators and coordinators, tribal office staff, translators, map reviewers, the elders, hunters and fishermen who were interviewed and the kind hospitality of our hosts in the villages we visited.

