

# A Bering Strait Indigenous Framework for Resource Management: Respectful Seal and Walrus Hunting

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*Abstract.* Western resource management is often contentious in northern indigenous communities, as it can be poorly matched with local resource-use traditions. Expert seal and walrus hunters in the Bering Strait region of Alaska requested that Kawerak, Inc., a local tribal consortium, document seal and walrus hunting through the lens of the locally preferred framework of respect. We conducted semistructured interviews and focus groups with 84 expert elders and hunters regarding seal and walrus hunting and use. Local respectful hunting and use practices focused on appropriate relationships between humans and between humans and animals; traditional values; knowledge of seals, walruses, and environmental conditions; hunting and processing skills; and avoiding pollution. Experts explained this system was best transmitted through hands-on activities that build youth skills, values, and relationships with elders and adults. The respect framework and positive system of transmission through education differs markedly from Western resource management frameworks based on regulation and enforcement.

## Introduction

Although indigenous communities and government agencies generally share the goal of healthy populations of wildlife persisting into the future, Western-style government resource management is often contentious in northern Indigenous communities. There are various reasons for this tension, including fundamental philosophical differences about human–animal relationships, different approaches to environmental knowledge, and desires for tribal sovereignty and the right to follow traditional ways of life, as well as Western management policies that do not match well with local environments or use patterns (e.g., Cruikshank 2000; Fieunup-Riordan 1990; Osherenko 1988; Ray 2011;

Raymond-Yakoubian 2012). Although community-based natural-resource management and comanagement attempt to bring together indigenous resource-use strategies and Western management, many studies have found that there are no easy solutions, usually due to conflicting goals, knowledge, and values (e.g., Agrawal and Gibson 1999; Kellert et al. 2000; Kofinas 1998; Nadasdy 1999). Often, communities must meet nonlocal objectives and translate their customs into Western terms, which biases projects against resource knowledge and use patterns that do not fit neatly into Western paradigms (e.g., Nadasdy 1999; Rocheleau and Slocum 1995).

Many tribes and indigenous comanagement groups have expressed a desire for traditional

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indigenous knowledge and resource-use strategies to be better documented on their own terms, for environmental policies to better support indigenous practices even when these differ from Western approaches, and for tribes to have greater control over their resource use in their own homelands (e.g., Gadamus 2013; Houde 2007; Metcalf and Krupnik 2003; Raymond-Yakoubian 2012). These goals have legal and moral support: general democratic values, the Intra-American Commission on Human Rights, the United Nations Declaration on the Rights of Indigenous Peoples, and the U.S. National Strategy for the Arctic Region all affirm indigenous communities' rights to their traditional resource use and to participation in environmental decision making (e.g., Howitt 2001; United Nations General Assembly 2007; Western and Wright 1994; White House 1994; White House 2013). Additionally, numerous studies have documented the sustainability of various indigenous resources-use traditions (e.g., Acheson et al. 1998; Berkes 1999; Berkes et al. 2000; Howitt 2001).

In the Bering Strait region of Alaska, seal and walrus hunting is a major part of culture, identity, nutrition, and food security (Ahmasuk et al. 2008; Gadamus 2013; Inuit Circumpolar Council Alaska 2014; Raymond-Yakoubian et al. 2014). Currently, environmental changes in the Arctic have led to increased marine transportation and development and have prompted changes in marine mammal and ocean management. For example, due to receding sea ice, several populations of bearded and ringed seals have been listed as threatened under the Endangered Species Act, walrus are currently listed as warranted but precluded from listing, offshore resource exploration is expanding, vessel traffic in the region is increasing, the U.S. Coast Guard is proposing a ship-routing scheme, and conservation groups are delineating important marine areas for possible protections (Ayers et al. 2010; National Marine Fisheries Service 2010, 2012a, 2012b, 2013; U.S. Coast Guard 2010; U.S. Fish and Wildlife Service 2011). These changes have alarmed many tribes in the region, who are concerned that increasing presence of nonlocal people and activities, government oversight, and arctic industrialization could threaten traditional ways of life.

Tribal leaders and hunters have two main areas of concern about government regulations and the protection of indigenous marine mammal harvesting. First, many tribes have expressed concern that government regulations do too little to protect marine mammals, their habitat, and their prey from increasing noise, pollution, and industrial fishing in arctic waters (Gadamus et al. 2015). Second, many tribal members have had negative experiences with government regulation of indigenous hunting and fishing and are concerned that increased government regulations could make it

difficult or impossible to continue their traditional marine-mammal hunting. One of the more common concerns is that government regulators portray indigenous hunting as a harmful influence on marine-mammal populations and stigmatize hunters. For a description of indigenous approaches to the first concern, marine-mammal protection in the face of increasing development, see Gadamus et al. (2015). To address the second concern elders and tribal leaders in Alaska's Bering Strait region requested that social scientists working for Kawerak, Inc., the region's tribal consortium, document indigenous approaches to sustainable seal and walrus hunting using the locally preferred framework of respect. This framework reflects local philosophies that abundant future seals and walruses come from respectful seal and walrus hunting.

In this study, Kawerak social scientists collaborated with nine Bering Strait region tribes, using qualitative and participatory methods, to address the question, "*What are current Bering Strait region indigenous strategies for respectful seal and walrus hunting?*"

Throughout this paper, we describe the indigenous approach using words such as "belief" and "philosophy." These terms are not meant to imply that indigenous approaches are more subjective or less "real" than Western resource management, but rather to emphasize that indigenous resource use is driven by a different ontology than Western resource management, and to describe that ontology to the best of our ability. Western resource management is also driven by specific beliefs and philosophies, although a detailed description of these is beyond the scope of this paper.

## Study Area and Cultural Context

Alaska's Bering Strait region is home to three major cultural groups: Inupiaq, Yup'ik, and St. Lawrence Island Yupik. All three of these groups are highly dependent on marine resources, and marine-mammal harvests provide nutrition as well as cultural identity and community well-being (Ahmasuk et al. 2008; Gadamus 2013; Inuit Circumpolar Council Alaska 2014; Raymond-Yakoubian et al. 2014). Nine (of 20) Bering Strait region tribes participated in this research project and participating communities represented all three cultural groups (Fig. 1).

Seal and walrus hunting in the Bering Strait region follows the seasonal cycle of the sea ice. During the winter, the Bering Sea is a frozen patchwork of sea ice and small areas of open water. Sea ice is an important habitat component for ice seals (ringed [*Phoca hispida*], bearded [*Erignathus barbatus*], ribbon [*Histiophoca fasciata*], and spotted seals [*Phoca largha*]) and walruses [*Odobenus*



**Figure 1. Study area showing participating communities.**

*rosmarus divergens*]), which use it to birth, rest, escape predators, and migrate (Tynan and DeMaster 1997). In winter, ringed seals and bearded seals reside throughout the region and Pacific walrus and spotted seals are found in the larger areas of open water near St. Lawrence Island. When conditions permit, hunters will travel across the ice to harvest seals and walrus in areas of open water. In the springtime, as the ice begins to break up and move north, seals and walrus pass through the region by the tens of thousands, both swimming and floating on ice. During this time, indigenous hunters in small boats move among the ice pans to harvest seals and walrus. By summer, the ice is gone and most seals and walrus have gone with it, many travelling hundreds of miles to the north. The seals and walrus return in the fall, with or before the ice, and seals are hunted from small boats close to shore.

Traditionally, indigenous communities in the north approached animal harvests through the lens of human–animal relationships (Berkes 1999; Brightman 1973; Nelson 1983). Although the specifics vary by cultural group, most groups share the traditional belief that animals have nonhuman personhood. Among other characteristics, this means that animals have souls and can be reborn after death (e.g., Fienup-Riordan 1990) and are aware of human thoughts and actions, even when physically far from humans (e.g., Berkes 1999; Brightman 1973). The boundary between humans and animals was not impenetrable, and many traditional stories feature humans transforming into animals and vice versa (e.g., John 2003; Milligrock 1981; Nelson 1899). Often, human–animal relationships were described as reciprocal. Animals provide themselves to humans, so that humans

will have food, shelter, and clothing. In return, humans treat the animals in a respectful manner. Respect for animals can take various forms, including using good hunting technique, handling harvested animals properly, avoiding certain kinds of thought and speech, following taboos, performing ceremonies, and sharing (e.g., Brightman 1973; Fienup-Riordan 1990; Nelson 1983; Oquilluk 1973; Raymond-Yakoubian and Angnaboogok in press; Scott 1989).

According to many traditional beliefs, when treated properly, animals can be reborn after harvest, and animal populations will not be depleted by high harvests unless they are treated improperly (Fienup-Riordan 1990, 1999). Improper treatment can make it impossible for animals to be reborn, causing permanent loss of those animals (e.g., Fienup-Riordan 1990). Additionally, an animal is aware of its treatment after harvest and may later communicate its experience to other animals. These animals may then choose to no longer offer themselves to a hunter who wastes, mistreats, or otherwise disrespects a harvested animal, and this hunter can lose what is often referred to as their “luck”—their success in harvest (e.g., Fienup-Riordan 1990). In some cases, instances of disrespect may cause animals to leave an area entirely (e.g., Fienup-Riordan 1999; Raymond-Yakoubian and Raymond-Yakoubian 2015). Additionally, not harvesting animals that provide themselves can also be considered disrespectful, and some hunters have expressed the belief that low harvest effort can cause declines in animal abundance (e.g., Huntington 2000; Fienup-Riordan 1999; Nadasdy 2007; Raymond-Yakoubian and Raymond-Yakoubian 2015). For many communities, harvesting higher numbers of animals was believed to promote greater future abundance (e.g., Fienup-Riordan 1990, 1999).

Overall, these indigenous approaches contrast with much of Western resource management because they focus on respect and relationships, rather than on the size of wildlife populations. As Fienup-Riordan (1990: 189) noted, “Listening to coastal Yup’ik elders today, we find fish and waterfowl largely represented as persons to be hosted, not finite resources to be managed.” While the above description, aggregated from various sources, represents beliefs that were, and in some communities remain, common across the north for various species, it is not entirely clear which of these beliefs, and which additional beliefs, traditionally governed human relationships with seals and walrus in communities in the Bering Strait region. In what follows below, we describe some contemporary beliefs and practices of Bering Strait indigenous communities related to proper relationships with, and harvest and treatment of, ice seals and walrus, that were shared with us during the course of this project.

## Methods

### Research Design and Data Collection

This research was conducted by Kawerak as part of a larger project on ice seal and walrus traditional knowledge and use. The first stage, participatory research design, consisted of meetings with tribal governments, members of participating tribes, and project partners—the Eskimo Walrus Commission and the Ice Seal Committee. During this process, many elders noted that their tribes have rich traditions of respectful marine-mammal hunting and requested we document these as part of the project, for the purpose of future youth education as well as communication with management agencies and others. In response to this input, researchers worked with experienced marine-mammal hunters to design questions on respectful marine-mammal hunting. These questions, which reflected local frameworks of respect, included open-ended questions on respect as well as topics such as traditional practices and taboos, strategies for avoiding loss, perceptions of marine-mammal sentience, and decisions about harvest levels. These questions were incorporated into a semistructured interview protocol (Bernard 2006). Project staff conducted interviews with a purposive sample of local experts (n=84) recommended by tribal governments and other local experts (Chalmers and Fabricius 2007). Local experts are individuals who have lived in their community for most of their lives and are recognized by their tribes and peers as highly knowledgeable seal and walrus hunters, elders who used to hunt seals and walrus, or women with extensive experience in the preparation and preservation of marine-mammal foods. There was a good balance between elders (n=39) and younger hunters and processors (n=45). The majority of participants were male (n=76), as

the sample was determined by the larger project, which focused on mapping hunting areas, a knowledge area that is generally a male specialization. Men provided some context on preservation and preparation, and eight women were able to share more specialized knowledge. Local experts came from all nine participating communities (Table 1).

Interviews and focus groups were audio recorded, transcribed, and coded in ATLAS.ti and in Word. Both deductive codes (topics generated during participatory research design) and inductive codes were used (Marshall and Rossman 1995). The information for each code was summarized in either a table or a short narrative (Miles and Huberman 1994). Because of the semistructured format of the interviews, each conversation about respectful hunting went somewhat differently, and followed the local expert's experience. Responses were not counted or analyzed by demographic, as different topics were raised in different interviews, and a response that only came up a few times might have been shared by other hunters, had they been asked directly about that specific topic. For community review, all participating local experts and tribal governments were mailed draft results for review and comment. Additionally, researchers held results review meetings in each community for participating local experts. To achieve the goal of sharing this knowledge with youth, Kawerak also published an attractive book containing elder teachings on respect paired with hunting photos and distributed it widely to young people (Kawerak 2013).

## Results

### Animal Sentience and Personhood

Even after you kill the animal you show respect to it, you don't step on it, you don't mistreat it.

Table 1. Number of local experts that participated by community and demographic.

Community	Diomede	Elim	King Island	Koyuk	Nome	St. Michael	Savoonga	Shaktoolik	Stebbins	Total
Male elders (many of whom still hunt)	3	5	6	4		4	6	3	4	35
Female elders		1		2				1		4
Male active hunters	4	8	1	4	7	3	2	2	10	41
Female active hunters or preparers	1			3						4
<b>Total local expert participants</b>	<b>8</b>	<b>14</b>	<b>7</b>	<b>13</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>6</b>	<b>14</b>	<b>84</b>



They say it's gonna go tell its fellow walrus or ugruks [bearded seals] that this person mistreated me even when I was dead, played with me in an unnatural way.

—Vincent Pikonganna, King Island

Elder local experts relayed traditional beliefs about human–animal relationships comparable to those previously documented across the north. Elders described seals and walruses as sentient beings that understand human thoughts and speech and are aware of their treatment both before and after death. In this tradition, animals have agency and successful hunting occurs when seals or walruses choose to give themselves to hunters. As such, a hunter who is disrespectful to his or her catch can “lose their luck,” as animals will no longer offer themselves to an individual who will not treat them properly. Some local experts also noted that respectful treatment is associated with abundant animals and wasteful treatment can cause scarcity of animals. Traditional beliefs reported during this project varied, with local experts showing diverse perspectives. Although responses were not formally analyzed by demographic, it appeared that differences in community of origin, family, and age group could account for many of the varying perspectives.

Various practices for not offending ice seals and walruses were relayed to the researchers, including avoiding boastful speech before or after hunting, not thinking too much about seals and walruses when hunting them, and treating harvested animals with respect. Local experts were taught to handle harvested marine mammals with care and not to play with them, and these experts described a variety of ways for showing animals respect after harvest. Many reported giving bearded seals a last drink of water, as one tradition holds that these animals give themselves to hunters because they are thirsty. As such, many hunters will melt snow and put it in the mouth of a harvested bearded seal. They then throw the head back into the ocean and ask the bearded seal to come back (or tell it that they will see it next year). Another commonly reported practice was to cut the eyes out of a bearded seal so they would not see themselves being butchered. Some local experts reported that they learned not to move their catch with their feet or to step on them. Other reported practices included facing a seal's head towards the door once it was brought into a house, putting a hunting mitten over a harvested seal's head to cover its mouth, and disposing of any unused remains of marine animals, such as bones, in marine waters. One local expert, an elder from Diomede, described traditional practices which dictated that when a man sets a seal net, he should stay awake until the net was pulled, and women in

his household should not brush their hair or wash the floor while the net was in place.

While not all of the traditional beliefs or practices described above are known or followed by all community members today, experts of all ages described seals and walruses as intelligent beings with agency that were aware of their surroundings and hunters' actions, and that were able to make decisions, learn, and adapt. For example, some local experts described walruses that had been hunted previously as “educated walruses” that would be more wary of hunters. A number of local experts argued that seals and walruses were more adaptable than management agencies realized, and they felt that these animals would be able to adapt to dramatic changes in sea ice by modifying their own habitat use. Local experts described seals and walruses as “intelligent,” “crafty,” “curious,” “smart,” “sensitive,” occasionally “belligerent,” and able to “watch out for themselves” and get “mad.” Additionally, they often compared the behavior and motivations of seals and walruses to those of humans. For example, one Nome expert noted that, “[walruses are] just like humans, you know, some are pretty aggressive and some are pretty calm and laid back” (Bivers Gologergen, personal communication 2012). An elder from Savoonga commented during a focus group that, “Most animals . . . try to take care of their young ones, like thinking you love this kid so much.” Local experts described how walruses would aggressively protect other walruses and even risk their lives to pull dead walruses off the ice and out of reach of hunters, “because they are so protective of family” (Morris Toolie, Sr., Savoonga).

While accounts of human–animal transformations were less common, Patrick Omiak, Sr., of Diomede, referenced a traditional story called Avunna. Avunna was a young man who was turned into a walrus by other walruses. As a human, Avunna had harvested walruses, eaten only their whiskers, and not salvaged the meat (see also Milligrock 1981; Raymond-Yakoubian et al. 2014). As a walrus, he met the walruses that he had abused, and saw they had terrible scars on their faces. Like humans, the walrus lived in a *qagri* [traditional men's house], and when Avunna returned to human form he maintained some walrus characteristics, such as a sensitivity to human smells.

### Minimizing Loss

Local experts explained that seal and walrus hunting is a highly skilled endeavor, as large marine mammals can escape underwater when wounded or sink once killed. A respectful hunter will develop the knowledge and skills needed to minimize the loss of dead or wounded seals and walruses. This involves obtaining, training on, and

maintaining proper gear; going out with a skilled crew; avoiding harvest attempts on seals and walrus that will be difficult to retrieve; recognizing inedible animals; approaching properly so as to get close without scaring the animals; shooting to kill; understanding how to land a large marine mammal; and caring properly for harvested animals (Table 2).

### Harvest Level and Choices

If you don't need them, let them pass through.  
They respect you when you respect them.

—Leonard Raymond Sr., Stebbins

Although marine mammals pass through the Bering Strait region by the tens of thousands during the springtime, and are abundant in fall, local experts emphasized that hunters should only take

what they need to feed their families, crews, and communities. Local experts noted, among other things, that it is disrespectful to harvest walrus only for their tusks and not salvage the meat or to shoot at a seal that is not needed for food. If a hunter has enough meat, they should stop harvesting even if they see a more desirable catch. Traditionally, elders would monitor their family's harvest level and would let hunters know when to stop hunting. Many local experts noted that they avoided harvesting seals in summertime because their condition would be poor, with thin blubber, and that they had been taught to harvest in spring and fall. That said, some experts noted that if they were in need of the meat or blubber, that they would harvest seals in summer.

Certain beliefs about appropriate harvest levels varied according to community or individual.

Table 2. Techniques to minimize loss and waste.

Preparation	Sight your gun. Practice shooting.
Gear	Harpoon with an attached buoy and long enough rope, seal hook, proper caliber rifle, sharp knife, and a clean container. Have everything ready so you can move fast. Netting can be an effective way to catch seals and avoid loss.
Crew	Have enough crew to retrieve harvest and process as needed. Work together, stay focused, and avoid arguments. If struggling to retrieve a walrus in water, wave other boats over to help and then give them a share of the meat.
Choosing retrievable walrus	It is much easier to butcher a walrus on ice. It can be hard to retrieve a walrus from the water. Shoot a walrus that is in the middle of the pack, as walrus will push those on the edges into the water. Choose smaller herds. Choose ice that is safe for butchering and that will not flip when walrus leave the ice.
Choosing retrievable seals	Know when ice conditions will prevent hunters from reaching a harvested seal. Know when seals float (winter and early spring when water salinity is higher and blubber is thicker). Know how the wind and current will move a shot seal (e.g. an onshore wind will bring in a harvested seal shot near shore). Big bearded seals easier to retrieve if shot on the ice. For seals on ice, make sure the ice is safe for retrieving and butchering.
Choosing edible seals	Recognize the dark markings that indicate a "gassy" (rutting) seal, recognize signs of a sick seal (lethargy), and avoid harvest when animal condition is poor (summer).
Approach	Approach seals and walrus quietly and from downwind so that you can get close and shoot to kill. A seal may sink in less than a minute, and it needs to be harpooned or hooked before it sinks. Scratching the ice may make seals approach. A wounded walrus may leave the ice and become difficult to retrieve.
Shooting	Allow surfacing seals to inhale before shooting, this makes them more likely to float. Shoot to kill: aim for the neck. This kills quickly and prevents animals from escaping wounded or falling off the ice before dying. Use the right caliber gun. Remove the scope when shooting walrus at close range.
Retrieving seals	Harpoon quickly. Spotted and bearded seals sink more quickly. Fatter seals float longer. Recognize the strength of an ugruk, which may appear dead and "come back to life." When you have a seal on a seal hook, pull it in slowly and do not yank or it may fall off.
Preventing spoilage	Bearded seals must be butchered while out hunting or they will spoil. Smaller seals may be transported to shore intact. Butcher quickly as conditions may change fast, but be neat and respectful.
Retrieval	Try to bring back all the parts.

For example, some local experts noted that baby seals and walrus were delicacies and were culturally preferred foods, while others said that they would avoid harvesting young animals, mothers with young, or pregnant animals. Georgianne Anasogak of Koyuk noted, “You don’t catch them during the mating season and when they might be reproducing.” In Diomede, local experts explained, during the period between a village resident’s death and their subsequent burial, community members refrain from hunting. In Savoonga (as well as Gambell, a community that did not participate in this project), the tribal government has developed a local ordinance limiting boats to four walrus per hunting trip, to prevent hunters from harvesting more walrus than could be properly processed. In the recent past, in communities throughout the region, some hunters would rest on Sundays. Local experts throughout the region noted that when meat is not needed, people should not only refrain from harvesting seals and walrus, but should avoid bothering them in any way.

### Respect for Other Hunters

If you went after a seal or ugruk [bearded seal], the other hunters respected that and didn’t interfere. If you saw it first, you went after it and nobody interfered.

—Georgianne Anasogak, Koyuk

Local experts explained that hunters should treat each other with respect. For example, boys that are quarrelsome are no longer allowed to go out with hunting crews. In the past, when many hunters travelled on foot on the ice or alone in kayaks, traditional rules dictated shares of a harvested animal for other hunters who arrived to assist with retrieval and field dressing. This decreased the odds of lost catch. A respectful hunter should not scare or interfere with animals that are being pursued by others, although some local experts noted that this tradition was stronger in the past. Another tradition is that the first boat to see a herd of walrus should have the chance to approach and harvest without interference from other boats. In Diomede, where some hunters still walk out on the ice in winter, tradition dictates that when a hunter is waiting for seals at open water, the area that he can see is considered his territory, and other hunters should use a different area. One local expert reported that her husband shot a seal too close to another hunter, and that hunter retrieved the seal and took it home, which is acceptable under traditional rules. Although seal and walrus hunters may travel many miles from their communities in springtime, many local experts noted that they would try not to hunt near other communities, to avoid infringing on their territory.

### Respect for the Land and Ocean

[We] set our whitefish net [in a] good fishing spot . . . we caught a lot of whitefish and tomcods and hooligans. . . . [My friend] was saying “Let’s set it again,” I told him “Save it for the seals, let them enjoy. We got what we need.”

—Nicholas Lupsin, St. Michael

You leave the country the way you see it . . . and there’s always game there . . . you take care of the trash.

—Merlin Henry, Koyuk

A few local experts noted that respect for animals includes keeping the environment clean so that animals continue to come. Additionally, many local experts expressed concern about pollution either keeping seals and walrus away, due to their keen senses of smell, or contaminating them and making them unsafe to eat. Noise pollution was also a concern because seals and walrus are known for sensitive hearing. Local experts additionally emphasized the necessity of protecting the entirety of the food chain because they were very aware of seals’ and walrus’ dependence on their prey.

### Preparation that Avoids Waste

Let me tell you a story about a young man. . . . He caught a seal, his first seal, and he was supposed to give it away, but he was stingy with that seal. He didn’t want to give it away; he wanted to keep it for himself. He was stingy from his heart. . . . Try it as he might after that, he never caught another seal again, never. . . .”

—Vincent Pikonganna, King Island

Seals and walrus are very large animals that can provide hundreds of pounds of meat from a single catch, and wasting a harvested seal or walrus would be considered disrespectful to seals and walrus, as well as to other community members. As such, it is important that hunters have the knowledge and networks to share, process, and preserve large amounts of meat. Sharing is an important part of Bering Strait region cultures. Traditional beliefs dictate that if hunters are generous and share, they will have future hunting success, and that stingy hunters may lose their luck. In the past, communities had specific rules about how certain animals, such as bearded seals and walrus, should be divided into shares, and who should get each share. Many local experts struggled to remember the exact details of those rules, although a few elders still could. Today, sharing is more flexible and is usually determined by boat captains, who may each have different sharing protocols. In general, the captain and crew will get shares, and some of the harvest will be distributed, often to relatives of the hunters, elders, families

without hunters, crews that did not harvest, people in need, and others who may have asked for a share. One tradition that is still widely practiced is for a young hunter to give the first seal that they harvest to an elder. Another practice, which is becoming less common, is for the first catch of the season to be shared with the entire community.

Hunters also need family members with expertise in marine-mammal preparation and preservation, as these are highly skilled and time-consuming activities. Traditionally, almost all parts of seals and walruses were used, and most of these continue to be used today. For example, seal blubber is made into seal oil, which is used as a condiment and as a preservative to store berries, greens, meat, and other traditional foods. In the past, seal-oil lamps were used for light and heat. Most parts of the seals and walruses are eaten, including organs and flippers. Walrus stomachs are made into drums, walrus and bearded seal hides are used to make skin boats and rawhide rope, and sealskins are made into clothing. Some products, such as seal pokes for food storage, raingear made of seal intestines, rawhide rope, and boats with skin covers, have become uncommon due to the availability of mass-produced products. In spite of these changes, marine-mammal hides continue to be important and are still processed and used locally, and sealskin hats, mittens, and boots remain important winter clothing. Marine-mammal products are also important raw materials for a variety of arts crafts that are sold both locally and globally.

Bering Strait region residents still practice many traditional methods of preservation, which allow them to store large amounts of meat. These methods include rendering blubber to make oil, hanging strips of meat to dry, preserving meat and organs in seal oil, fermenting meat (usually underground), and freezing meat. Avoiding spoilage takes skill and knowledge, for example, one local expert pointed out that a bearded sealskin will not dry unless all of the blubber is carefully scraped off, and others noted that early spring is a good time for seal harvests because when it is cold and windy with no flies it is easier to dry meat and avoid spoilage.

## Changes in Traditions

I'm not superstitious. I don't really believe in any of that. I grew up with God. I never got to know the other things that [were believed] before we knew God.

—Project participant

Young hunters say, "We're gonna go out and get walrus." . . . You don't [get], it's given to you; the good Lord gives it to you.

—Project participant

While this project included participants from three separate cultural groups (Yup'ik, St. Lawrence Island Yupik, and Inupiaq), and results were not formally analyzed by demographic, some general observations can be made about changes in traditional beliefs related to seals and walruses. Interviews indicated that the more traditional beliefs, for example about animals that are reborn, have become somewhat less common among middle-aged and younger hunters in some communities, most likely due to the influence of Western schooling and religion. Some local experts described traditional beliefs as "superstitions," while some expressed syncretic beliefs that incorporate both traditional values and Christian teachings. Christian beliefs also influence hunting practice, as some local experts reported thanking God for providing them with a harvested animal, avoiding hunting activities on Sundays in the recent past, and connecting traditional teachings about sharing with the Christian value of generosity. Beliefs about not wasting and not mistreating animals were universally expressed and transcended age and religious background.

Although local experts collectively shared the values of minimizing loss and waste and only harvesting what was needed, some felt that these hunting practices had become less strictly practiced than in the past. Local experts occasionally observed incidents of waste, and some had seen or heard about instances of people hunting walruses for their ivory and not harvesting the meat. This was consistently reported as an offensive and unacceptable practice. Local experts almost universally expressed a desire for traditional values to be maintained and to continue to be used to regulate local hunting practice.

## Local Actions to Promote Responsible Harvest and the Transmission of Hunting Norms

We need to get our direction from elders. Not only by telling but by doing. Elder knowledge—we have so few elders left—if we don't do something soon, it's going to go away. The elders knew how to manage the resources they had. Local traditional knowledge works the best.

—Ruby Nassuk, Koyuk

With the exception of Savoonga, which has community-enforced local marine-mammal ordinances, local experts reported few instances of written rules or formal enforcement efforts. Indeed, Savoonga's written ordinances came about after intensive monitoring by the U.S. Fish and Wildlife Service and can be seen as an effort to promote local rather than outside regulation. Local experts noted that traditionally elders would



scold people who did not properly retrieve or care for their catch, and that elders could also intervene and tell others when to stop harvesting and how to hunt, butcher, or share. Some local experts noted that they still get direction about these matters from elders. Additionally, women who prepare the seals and walrus can require hunters to bring back their whole catch and scold if useful parts are missing. Today, boat captains make the decision of when a crew will stop harvesting. Many local experts noted that good hunting and care for catch are family traditions that are best taught to children directly from their family members.

Local experts had varying views on the development of formal community marine-mammal hunting policies or regulations. Savoonga experts were very positive about their local marine-mammal ordinances. Some local experts in other communities were also in favor of more organized community efforts, as they had observed occasional instances of waste, were offended, and hoped to prevent these practices from continuing or becoming more common in the future. These local experts expressed concern that if communities did not act, subsistence-harvested species might become uncommon in the future, and future generations would be unable to practice traditional ways of life. Many ideas for community action focused on youth education including creating elders' and hunters' committees to educate youth and promote responsible hunting and respect for the environment; building gathering places for elders, hunters, and youth; incorporating traditional-hunting ethics into school curriculums; hosting culture camps and culture days; ensuring youth learn hunting from responsible hunters; and documenting traditional knowledge. Other local experts felt that regulation by committee, even at the local level, would not be appropriate or effective. These experts felt that values and practices associated with hunting are very personal and should be learned through family instruction. Almost all experts shared the belief that local cultural traditions of respect for marine mammals and avoiding waste are important values that should be passed on to youth, that youth should learn respect by practicing it, and that maintaining traditional values is key to long-term persistence of abundant resources.

While the vast majority of project participants opposed outside management, several expressed that local enforcement can be difficult in small communities, where people do not want to be the cause of trouble for others (e.g., reporting someone who does not follow local norms). These experts suggested that having the government enforce regulations might help prevent waste while avoiding local conflicts.

## Discussion

Local experts described an indigenous philosophy that ties future seal and walrus abundance with specific respectful behaviors on the part of hunters. Respectful hunting includes many aspects of culture, environment, family, and community and is woven throughout people's lives (Fig. 2). Although specific beliefs and practices vary by family and community, many of the themes that emerged are congruent with practices documented in other Northern indigenous communities, including views on animal personhood (e.g., Fienup-Riordan 1990; Nelson 1983), the connections between environmental knowledge and responsible resource use (e.g., Berkes 1999), the role of preservation and sharing (e.g., Raymond-Yakoubian 2013; West and Ross 2011), the importance of relationships (e.g., Bryner 1995), and the importance of traditional skills (e.g., Ohmagari and Berkes 1997). It is worth noting that the role of specific skills as well as the role of social relationships has gotten considerably less attention in the sustainable resource use literature.

Most suggestions for promoting respectful hunting and sustainable resource use involved bringing youth, elders, and families together to build relationships and to transmit traditional knowledge, skills, and values. Resource use would then be controlled at the personal, family, and community level, as respectful hunters would make personal choices to avoid waste and loss, which would be supported by family and community norms. Additionally, the promotion of traditional skills and values is seen as a matter of cultural survival as well as of resource persistence. These holistic patterns of respectful resource use are essential parts of the fabrics of local cultures, and many consider certain forms of punitive Western resource management as direct threats to culture (e.g., Berger 1985; Bryner 1995). For example, some project participants commented that federal management can be hurtful because it portrays hunters as a threat to healthy marine-mammal populations. This discounts the respectful, reciprocal relationships that form the foundation of traditional harvesting and the positive role of marine-mammal hunting in healthy families and communities. In contrast, local programs as described above are seen as valuable as much for connecting young people with their culture as for ensuring future resource abundance.

### Skills, Values, Relationships, and Sustainability

Western resource management often focuses on population size and health (Metcalf and Robards 2008; Nadasdy 2007), formal regulations, outside



Figure 2. Respectful-hunting framework.

enforcement, and official penalties for those violating regulations (e.g., Berger 1985). This approach has come under criticism because 1) it is often difficult or impossible to determine how much can be sustainably harvested (e.g., Holling 1978; Robards et al. 2009), 2) resource users may not follow regulations (e.g., Feeny et al 1990), and 3) enforcement can cause hardship for rural communities that may have sustainable use patterns that do not match government regulations (e.g., Berger 1985; Osherenko 1988). It is becoming more recognized that 1) management needs to recognize scientific uncertainty (e.g., Lee 1994); 2) the needs and

values of rural communities must be considered (e.g., Western and Wright 1994); 3) since humans are often the drivers of resource degradation or conservation, sustainable resource use depends on influencing human behavior in an effective manner (e.g., Lee 1994); and 4) Western management is not the only philosophical framework through which sustainable resource management may be obtained (e.g., Nadasdy 2003, 2007). As such, there have been calls for new approaches to sustainable resource use (e.g., Nadasdy 1999; Walters 1997).

While the Bering Strait indigenous approaches, which focus on building skills, values,

and relationships, look different from conventional Western resource management, there is evidence that similar approaches have effectively moderated human behavior, including resource use. Social-learning theory, which is supported by considerable empirical evidence, posits that behavior is learned in a social context, through observation (Bandura 1977; Ingold 2000), and other research shows that social context, as well as values and ethical socialization, influence environmental behavior (e.g., Ollie et al. 2001; Stern 1992; Stern et al. 1995). Additionally, research indicates that a person's skills have a strong influence on their behavior (e.g., Bandura 1982; Fishbein et al. 2001). As Ingold (2000: 289, 353) has described, "technical skills," such as those needed for successful marine-mammal hunting, "are themselves constituted within the matrix of social relations" and are best learned through active engagement in such activities. As such, there is theoretical support for promoting respectful resource-use behavior through relationships, socialization, and skill and value building.

Although it may be difficult to calculate the amount that harvests and lost catch would be limited by respectful resource use, it is important to remember that researchers have never calculated what a sustainable harvest level would be for walruses (Robards et al. 2009), and there is no indication that current harvests are having a negative influence on seal and walrus populations. One question is whether a decline in seal and walrus populations would be observable and would trigger a change in seal and walrus harvest patterns. Although hunters noted that it can be difficult to monitor exact population size due to migration fluctuations, hunters are acutely aware of body condition, and are also very aware of local scarcity. One hunter noted that if hunter observations were gathered from across the region, it would likely be possible to get a better sense of seal and walrus abundance. Additionally, many project participants noted that they were interested in Western science studies on population size and health, and these tended to be less controversial than Endangered Species Act listings or regulations on hunters. As such, communities working with each other and with resource-management agencies would likely be able to detect declining populations. This would then give them the opportunity to respond in a culturally appropriate manner.

## Conclusion

A considerable evidence base indicates that Western resource management can often be ineffective due to ecosystem complexity and a lack of successful influence on human behavior, whereas indigenous use strategies can be sustainable. In

spite of this evidence, many attempts to engage indigenous communities in resource management require they fit their knowledge and customs into Western molds. This is difficult for communities due to fundamental philosophical and practical differences. Bering Strait indigenous communities described an approach to preserving healthy seal and walrus populations that is based in a framework of respect. This framework of respect is woven throughout individual, family, and community life, and indigenous experts emphasized the role of traditional skills, traditional knowledge, and respectful human–animal and human–human relationships. Building skills, values, and relationships is a major part of indigenous strategies that aim to ensure the continuance of both resources and culture. Although these techniques are uncommon in conventional Western resource management, social-science research indicates that these positive, culturally appropriate approaches are powerful strategies for influencing environmental behavior. Since indigenous communities and resource managers both recognize that human behavior can affect resource persistence or degradation, positive strategies that successfully influence environmental behavior have considerable potential to promote sustainability.

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## Local Experts

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### Koyuk

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### Nome

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### Saint Michael

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### Savoonga

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### Shaktoolik

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### Stebbins

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## References Cited

- Acheson, James M., James A. Wilson, and Robert S. Steneck  
1998 Managing Chaotic Fisheries. *In* Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. Fikret Berkes and Carl Folke, eds. Pp. 390–413. New York: Cambridge University Press.
- Agrawal, Arun and Clark C. Gibson  
1999 Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development* 27(4):629–649.
- Ahmasuk, Austin, Eric Trigg, James Magdanz, and B.A. Robbins  
2008 Comprehensive Subsistence Use Study of the Bering Strait region. North Pacific Research Board Project 643, final report. Nome: Kawerak, Inc.
- Ayers, Jim, Ashley Blacow, Ben Enticknap, Chris Krenz, Susan Murray, Santi Roberts, Geoff Shester, Jeffrey Short, and Jon Warrenchuk  
2010 Important Ecological Areas in the Ocean: A Comprehensive Ecosystem Protection Approach to the Spatial Management of Marine Resources. Juneau, Alaska: Oceana.
- Bandura, Albert  
1977 *Social Learning Theory*. Englewood Cliffs, New Jersey: Prentice Hall.
- 1982 Self-Efficacy Mechanism in Human Agency. *American Psychologist* 37(2):122–147.
- Berger, Thomas R.  
1985 *Village Journey: The Report of the Alaska Native Review Commission*. New York: Hill and Wang.
- Berkes, Fikret  
1999 *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*. Philadelphia: Taylor and Francis.
- Berkes, Fikret, Johan Colding, and Carl Folke  
2000 Rediscovery of Traditional Ecological Knowledge as Adaptive Management. *Ecological Applications* 10(5):1251–1262.
- Brightman, Robert  
1973 *Grateful Prey: Rock Cree Human-Animal Relationships*. Saskatchewan: Canadian Plains Research Center.



- Bryner, William M.  
1995 Toward a Group Rights Theory for Remediating Harm to the Subsistence Culture of Alaska Natives. *Alaska Law Review* 12:293.
- Chalmers, Nigel and Christo Fabricius  
2007 Expert and Generalist Local Knowledge about Land-Cover Change on South Africa's Wild Coast: Can Local Ecological Knowledge Add Value to Science? *Ecology and Society* 12(1):10.
- Cruikshank, Julie  
2000 *Social Life of Stories: Narrative and Knowledge in the Yukon Territory*. Vancouver: University of British Columbia Press.
- Feeny, David, Fikret Berkes, Bonnie J. McCay, and James M. Acheson  
1990. The Tragedy of the Commons: Twenty-Two Years Later. *Human Ecology* 18(1):1–19.
- Fienup-Riordan, Anne  
1990 *Eskimo Essays*. New Jersey: Rutgers University Press.  
1999 'Yaqlugel Qaillun Pilartat (What the Birds Do)': Yup'ik Eskimo Understandings of Geese and Those Who Study Them. *Arctic* 52(1):1–22.
- Fishbein, Martin, Harry C. Triandis, Frederick H. Kanfer, M. Becker, Susan E. Middlestadt, and A. Eichler  
2001 Factors Influencing Behavior and Behavior Change. *In Handbook of Health Psychology*. Andrew Baum, Tracey A. Revenson, and Jerome Singer, eds. Pp. 3–17. Mahwah, New Jersey: Lawrence Erlbaum.
- Gadamus, Lily  
2013 Linkages between Human Health and Ocean Health: A Participatory Climate Change Vulnerability Assessment for Marine Mammal Harvesters. *International Journal of Circumpolar Health* 72:20715.
- Gadamus, Lily, Julie Raymond-Yakoubian, Roy Ashenfelter, Austin Ahmasuk, Vera Metcalf, and George Noongwook  
2015 Building an Indigenous Evidence-Base for Tribally-Led Habitat Conservation Policies. *Marine Policy* 62:116–124.
- Holling, Crawford S.  
1978 *Adaptive Environmental Assessment and Management*. New York: John Wiley and Sons, Ltd.
- Houde, Nicolas  
2007 The Six Faces of Traditional Ecological Knowledge: Challenges and Opportunities for Canadian Co-Management Arrangements. *Ecology and Society* 12(2):34.
- Howitt, Richard  
2001 *Rethinking Resource Management: Justice, Sustainability, and Indigenous Peoples*. London: Routledge.
- Huntington, Henry (ed.)  
2000 *Traditional Ecological Knowledge of Seals in Norton Bay, Alaska*. Alaska: Elim-Shaktoolik-Koyuk Marine Mammal Commission.
- Ingold, Tim  
2000 *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*. New York, NY: Routledge.
- Inuit Circumpolar Council-Alaska  
2014 *Bering Strait Regional Food Security Workshop: How to Assess Food Security from an Inuit Perspective: Building a Conceptual Framework on How to Assess Food Security in the Alaskan Arctic*. Anchorage, Alaska: Inuit Circumpolar Council.
- John, Paul  
2003 *Stories for Future Generations: The Oratory of Yup'ik Eskimo Elder Paul John*. Anne Fienup-Riordan, ed. Sophie Shield, trans. Alaska and Seattle: Calista Elders Council and the University of Washington Press.
- Kawerak, Inc.  
2013 *Traditions of Respect: Traditional Knowledge from Kawerak's Ice Seal and Walrus Project*. Nome: Kawerak Social Science Program.
- Kellert, Stephen R., Jai N. Mehta, Syma A. Ebbin, and Laly L. Lichenfeld  
2000 Community Natural Resources Management: Promise, Rhetoric and Reality. *Society and Natural Resources* 13:705–715.
- Kofinas, Gary  
1998 *The Cost of Power Sharing: Community Involvement in Canadian Porcupine Caribou Co-Management*. Ph.D. dissertation. Vancouver: University of British Columbia.
- Lee, Kai N.  
1994 *Compass and Gyroscope: Integrating Science and Politics for the Environment*. Washington, D.C.: Island Press.
- Marshall, Catherine and Gretchen B. Rossman  
1995 *Designing Qualitative Research*. Thousand Oaks: Sage.
- Metcalf, Vera and Igor Krupnik (eds.)  
2003 *Pacific Walrus: Conserving Our Culture through Traditional Management*. Report produced by Eskimo Walrus Commission, Kawerak, Inc. under the grant from the U.S. Fish and Wildlife Service, Section 119, Cooperative Agreement #701813J506. Alaska: Eskimo Walrus Commission.
- Metcalf, Vera and Martin Robards  
2008 Sustaining a Healthy Human-Walrus Relationship in a Dynamic Environment: Challenges for Co-management. *Ecological Applications* 18:S148–S156.

- Miles, Matthew B. and A. Michael Huberman  
1994 *Qualitative Data Analysis*. Thousand Oaks: Sage.
- Milligrock, Queenie  
1981 Interview with Queenie Milligrock. Margaret Seeganna, trans. Eskimo Heritage Program file 1981 006 005 DIO 010. Nome: Kawerak.
- Nadasdy, Paul  
1999 The Politics of TEK: Power and the “Integration” of Knowledge. *Arctic Anthropology* 36(1–2):1–18  
2003 Reevaluating the Co-management Success Story. *Arctic* 56(4):367–380.  
2007 The Gift in the Animal: The Ontology of Hunting and Human-Animal Sociality. *American Ethnologist* 34(1):25–43.
- National Marine Fisheries Service  
2010 Endangered and Threatened Wildlife and Plants; Threatened Status for the Southern Distinct Population Segment of the Spotted Seal; Final Rule. *Federal Register* 75(204):65239–65248.  
2012a Endangered and Threatened Species; Threatened Status for the Arctic, Okhotsk, and Baltic Subspecies of the Ringed Seal and Endangered Status for the Ladoga Subspecies of the Ringed Seal; Final Rule. *Federal Register* 77(249):76706–76738.  
2012b Endangered and Threatened Species; Threatened Status for the Beringia and Okhotsk Distinct Population Segments of the *Eriognathus barbatus nauticus* Subspecies of the Bearded Seal; Final Rule. *Federal Register* 77(249):76740–76768.  
2013 Endangered and Threatened Wildlife; Determination on Whether to List the Ribbon Seal as a Threatened or Endangered Species. *Federal Register* 78:41371–41384.
- Nelson, Richard  
1983 *Make Prayers to the Raven: A Koyukon View of the Northern Forest*. Chicago: University of Chicago Press.
- Nelson, Edward W.  
1899 The Eskimo about Bering Strait. Eighteenth Annual Report of the Bureau of Ethnology, 1896–97, part 1, 3–518. Washington, D.C.: Government Printing Office.
- Olli, Eero, Gunnar Grendstad, and Dag Wollebaek  
2001 Correlates of Environmental Behaviors Bringing Back Social Context. *Environment and Behavior* 33(2):181–208.
- Oquilluk, William (with Laurel Bland)  
1973 *People of Kauwerak: Legends of the Northern Eskimo*. Anchorage, Alaska: Alaska Methodist University.
- Osherenko, Gail  
1988 Can Co-management Save Arctic Wildlife? *Environment* 30(6):6–35.
- Ray, Dorothy J.  
1961 *Artists of the Tundra and Sea*. Seattle: University of Washington Press.
- Ray, Lily  
2011 Using Q-methodology to Identify Local Perspectives on Wildfires in Two Koyukon Athabascan Communities in Rural Alaska. *Sustainability: Science, Practice, and Policy* 7(2):1011–1061.
- Raymond-Yakoubian, Brenden, Lawrence Kaplan, Meghan Topkok, and Julie Raymond-Yakoubian  
2014 “The World has Changed”: Inalit Traditional Knowledge of Walrus in the Bering Strait. Final report to the North Pacific Research Board for Project 1013. Nome: Kawerak Social Science Program
- Raymond-Yakoubian, Brenden and Julie Raymond-Yakoubian  
2015 “Always Taught Not to Waste”: Traditional Knowledge and Norton Sound/Bering Strait Salmon Populations. Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative Project 1333 Final Product. Nome: Kawerak Social Science Program.
- Raymond-Yakoubian, Julie  
2012 Participation and Resistance: Tribal Involvement in Bering Sea Fisheries Management and Policy. In *Fishing People of the North: Cultures, Economies, and Management Responding to Change*. Courtney Carothers, Keith Criddle, Catherine Chambers, Paula Cullenberg, James Fall, Amber Himes-Cornell, Jahn P. Johnsen, Nicole S. Kimball, Charles R. Menzies, and Emily S. Springer, eds. Pp. 117–130. Alaska: Alaska Sea Grant and University of Alaska Fairbanks.  
2013 When the Fish Come, We Go Fishing: Local Ecological Knowledge of Non-Salmon Fish Used for Subsistence in the Bering Strait Region. U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring Program, Final Report (Study No. 10-151). Nome: Kawerak Social Science Program.
- Raymond-Yakoubian, Julie and Vernae Angnaboogok  
in press Cosmological Changes: Shifts in Human-Fish Relationships Amongst the Bering Strait Eskimo. In *Urban-Rural-Wilderness: The Co-Living of Humans and Animals in the North since the Nineteenth Century*. Taina Syrjämaa, Helena Ruotsala, and Tuomas Räsänen, eds.
- Robards, Martin, John. J. Burns, Chanda L. Meek, and Annette Watson  
2009 Limitations of an Optimum Sustainable Populations or Potential Biological Removal Approach for Conserving Marine Mammals: Pacific Walrus

- Case Study. *Journal of Environmental Management* 91:57–66.
- Rocheleau, Dianne and Rachel Slocum  
1995 Participation in Context: Key Questions. *In* Power, Process and Participation: Tools for Change. Rachel Slocum, Lori Wichart, Dianne Rocheleau, and Barbara Thomas-Slyter, eds. Pp. 17–30. London: Intermediate Technology Publications.
- Scott, Colin  
1989 Knowledge Construction among Cree hunters: Metaphors and Literal Understanding. *Journal de la Societie des Americanistes* 75:193–208.
- Stern, Paul C.  
1992 Psychological Dimensions of Global Environmental Change. *Annual Review of Psychology* 43(1):269–302.
- Stern, Paul C., Linda Kalof, Thomas Dietz, and Gregory Guagnano  
1995 Values, Beliefs, and Pro-Environmental Action: Attitude Formation toward Emergent Attitude Objects. *Journal of Applied Social Psychology* 25(18):1611–1636.
- Tynan, Cynthia T. and Douglas P. DeMaster  
1997 Observations and Predictions of Arctic Climate Change: Potential Effects on Marine Mammals. *Arctic* 50(4):308–322.
- United Nations General Assembly  
2007 United Nations Declaration on the Rights of Indigenous Peoples. *United Nations* 12:1–18.
- U.S. Coast Guard  
2010 Port Access Route Study: in the Bering Strait. *Federal Register* 75(215):68568–68570.
- U.S. Fish and Wildlife Service  
2011 Endangered and Threatened Wildlife and Plants; 12-month Finding on a Petition to List the Pacific Walrus as Endangered or Threatened. *Federal Register* 76(28):7634–7679.
- Walters, Carl  
1997 Challenges in Adaptive Management of Riparian and Coastal Ecosystems. *Conservation Ecology* 1(2):1–17.
- West, Colin T. and Connor Ross  
2012 Local Institutions for Subsistence Harvesting in Western Alaska: Assessing their Adaptive Role in the Context of Global Change. *Journal of Ecological Anthropology* 15(1):22–40.
- Western, David and R. Michael Wright (eds.)  
1994 *Natural Connections*. Washington D.C.: Island Press.
- White House  
1994 Government-to-Government Relations with Native American Tribal Governments. Online [http://www.justice.gov/archive/otj/Presidential\\_Statements/presdoc1.htm](http://www.justice.gov/archive/otj/Presidential_Statements/presdoc1.htm).
- 2013 National Strategy for the Arctic Region. [http://www.whitehouse.gov/sites/default/files/docs/nat\\_arctic\\_strategy.pdf](http://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf).