



Eskimo Heritage Program

A Scientific Report

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Traditional Knowledge and the Arctic Environment

How the experience of indigenous cultures can complement scientific research

Overview

The study of the Arctic ecosystem is no easy task, despite the great advances in science and the wide array of new observational tools on land, sea, air, and space. Understanding the changing dynamics of weather and climate on the region's flora and fauna also requires deep, on-the-ground information. Traditional knowledge, which is passed down from generation to generation by the longtime inhabitants of the Arctic, is an important part of our collective understanding.

Today, "traditional knowledge" is often contrasted with "scientific knowledge" and is used in reference to indigenous peoples around the world. In the Arctic region, these communities include the Iñupiat and the St. Lawrence Island Yupik of the northern and western coasts of Alaska. As the region experiences rapid climate change as well as increased vessel traffic and offshore oil and gas development, it is essential that policies reflect local interests and knowledge about the function of the ecosystem and its sensitivities to disturbance.

In this paper, we will discuss how traditional knowledge has been used in various settings and also will make suggestions for what more can be done. We will use some specific examples from the St. Lawrence Island Yupik, who live on the shores of the northern Bering Sea and hunt extensively on the sea ice and open ocean there. Traditional knowledge has a strong cultural component, and thus the knowledge of one people does not necessarily transfer to another people. Nonetheless, some of the basic lessons learned on St. Lawrence Island have meaning in other regions, too. What is learned about one's ecology or about weather-induced changes is shared not only within one's community but with other communities.

What is traditional knowledge?

Traditional knowledge is the primary way that people have understood their surroundings throughout human history. Traditional knowledge is built on experience, in much the same way that a great deal of scientific knowledge is gained. Traditional knowledge is passed from person to person and from generation to generation through stories, practice, and song. It is continually refined and augmented by new observations.¹

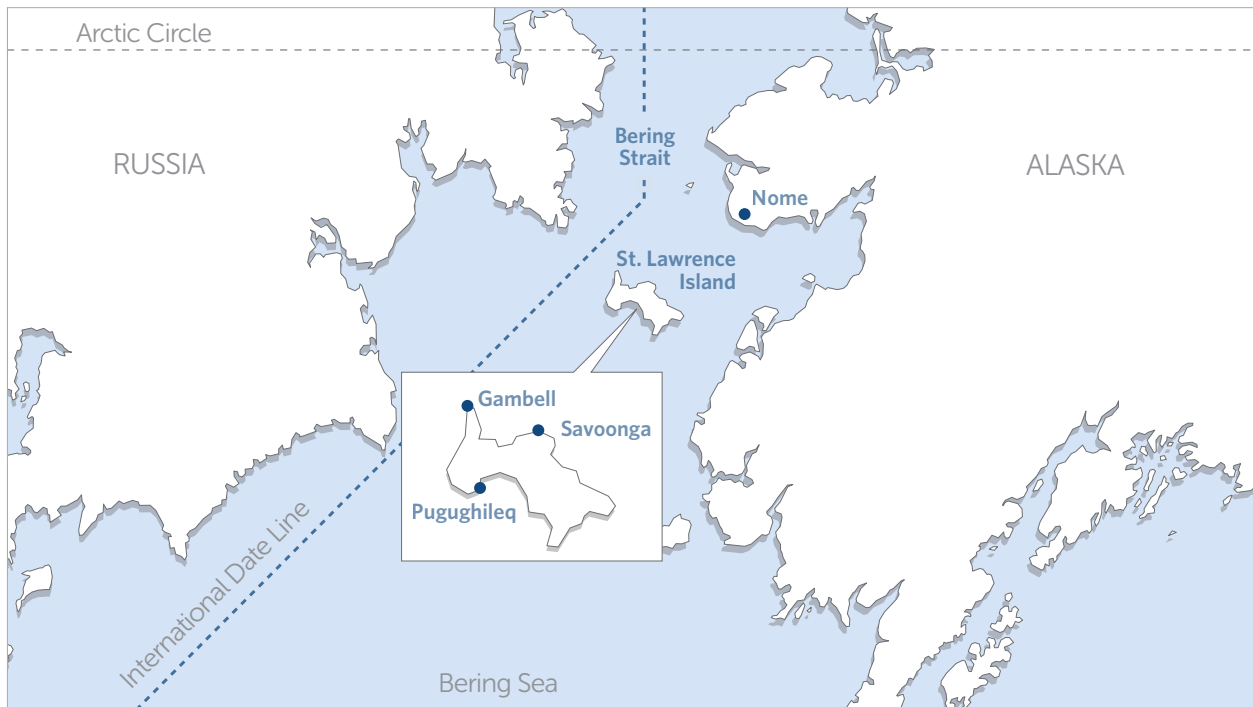
Although many scholars have focused on the differences between scientific and traditional knowledge, the two types of knowledge have much in common, especially in the environmental sciences, where the natural world cannot be easily manipulated in controlled experiments. Scientific and traditional knowledge both depend on careful observation, and both seek to understand patterns in such things as animal behavior, weather, and physical conditions of the land and sea. Both place great value on reliable information. Scientists define this as the ability to replicate results, or to get the same answers when the same observations or experiments are made. For traditional knowledge holders, reliable information means being able to obtain food and materials safely and repeatedly. If the information is not accurate, one's life may literally be on the line.

There are, of course, differences between scientific and traditional approaches to gathering and interpreting information. Scientists pay close attention to the designs of their studies and seek to quantify the degree of uncertainty in their results. They will often focus their work on a specific topic or phenomenon to make sure that their interpretation is not affected by other factors. Traditional knowledge holders pay close attention to the specific situation they are in, noting connections between parts of the environment and keeping a careful eye on any unusual conditions. When one plans to hunt on sea ice a thousand times, having 95 percent or even 99 percent confidence may not be enough to ensure one's safety. Thus, rare occurrences and the ways in which people have survived them are often a big topic for traditional knowledge holders.

Traditional knowledge and scientific knowledge are also disseminated in different ways. Scientists publish papers

St. Lawrence Island, Alaska

The St. Lawrence Island Yupik live on the shores of the northern Bering Sea and hunt extensively on the sea ice and open ocean.



in peer-reviewed journals, give talks at conferences, and teach students as part of a formal university curriculum. Traditional knowledge is shared by example, with younger hunters watching what older hunters do; by stories, in which important lessons or observations are repeated to listeners; and by songs, in which information is conveyed through dance movements as well as the words of the songs.²

In both cases, people are careful to explain where the information comes from and how it has reached the speaker or writer. Firsthand information, for example, may be contrasted with secondhand information as one means of assessing reliability.

How is traditional knowledge used?

First and foremost, traditional knowledge is used within the community in which it is generated. It provides a basis for one's activities, to make sure that one can travel and hunt safely and successfully, and also a basis for living one's life in an appropriate way. In this sense, traditional knowledge often incorporates an ethical component or abiding by the values of a community: for example, in how to treat hunted animals, how to cooperate with other members of one's group, and how to be safe in the environment where these activities are conducted.

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Traditional knowledge has been used for more than research. In wildlife management settings, traditional knowledge can help in identifying management priorities and in developing appropriate regulations.

On St. Lawrence Island, the community of Savoonga was formed as a reindeer herding camp on the north side of the island in 1912, when some families from the ancient village site at Gambell moved to the new site. Savoonga hunters continued to go to Gambell in spring to hunt bowhead whales. Then in 1970, one family decided to resume the tradition of hunting bowhead whales from the old hunting site of Pugughileq on the south side of the island.

No one alive had hunted whales there, but the stories and knowledge of how to do so had been passed down in the community. Using this knowledge, whalers from Savoonga were able to enjoy their first successful hunt in 1972, reestablishing a practice that continues today. Traditional knowledge gave them a strong starting point, because they did not have to develop an entirely new understanding of the currents and ice conditions of the area but could rely on what their ancestors had learned through many generations.³

In addition to its use in the communities in which it is held, traditional knowledge has received more and more attention in the past few decades from scientists and others. In the 1970s, for example, the number of bowhead whales in Alaska was unknown but was feared to be low and perhaps dropping. Iñupiaq whalers in Barrow suggested several improvements to the whale-counting techniques then in use. These included the use of hydrophones to detect whales migrating under thick ice, and aerial surveys to determine how many whales were too far offshore to be seen by researchers standing on the shorefast ice. When scientists put these ideas into practice, the whale counts improved dramatically, helping to show that there was no population crisis and that the population was in fact increasing.⁴

This pattern, in fact, dates to the earliest explorers and scientists, who recognized that locals would know much more about the area than newcomers. Some scientists fully acknowledged their reliance on local expertise⁵, but traditional knowledge as a field of its own is a more recent phenomenon.

For scientists, traditional knowledge can be a valuable source of information that may not be obtainable in any other way. In the 2000s, whale biologists wanted to know whether the bowhead whales that migrate past St. Lawrence Island are part of a single population of whales or perhaps part of two separate populations. They used genetic analyses and other modern methods but also sought to learn from the whalers. Interviews with elders in Gambell and Savoonga, the two villages on the island, established that there were two migratory patterns past the island in spring but that both paths went past the western end of the island on the way north. This information helped end speculation about separate populations while recognizing that there were patterns of behavior within the annual bowhead migration.⁶

The relationships and interactions among components of an ecosystem are another area where traditional knowledge can provide information often missing from scientific studies that focus more narrowly. During a scientist's interviews with hunters about beluga whales in the Norton Bay area of



The wooden frame of a skin-covered boat on St. Lawrence Island: Traditional knowledge provides a basis for traveling and hunting safely.

western Alaska, elders began talking about beavers. The connection was not clear to the researcher until one of the elders pointed out that the local beaver population was increasing, leading to more beaver dams and affecting the spawning habitat of fish that belugas ate in the bay.⁷ Although few biologists have the opportunity to study both on land and in the ocean, hunters often spend time in all parts of their landscape and thus may recognize connections such as that between beavers and belugas.

Traditional knowledge has been used for more than research. In wildlife management settings, traditional knowledge can help in identifying management priorities and in developing appropriate regulations. In northwestern Alaska, wildlife biologists wanted local hunters to obtain tags before hunting brown bears. After discussions with hunters in the region, the biologists realized that announcing one's intention to hunt a bear was culturally inappropriate, so the tag requirement violated cultural norms. The goal of the tag requirement was to keep careful track of the number of bears that were hunted. The hunters and the biologists together decided that the goal could be reached by asking hunters to report their hunt right afterward, an action that provided biologists with the information they needed and did not violate any cultural practices.⁸

In the area of resource development, traditional knowledge also has an important role to play. Hunters' observations are important in helping to identify potential impacts of development activities, and hunters are also likely to be affected if animal behavior such as migratory routes changes as a result of development activities. If hunters are involved in the assessment of likely impacts and the design of appropriate management measures, then they are likely to have greater confidence that their ways of life will be adequately protected.

Bowhead hunters, for example, have long pointed out that the whales can be affected by smells associated with human activity. Hunters know that when they approach a bowhead that is downwind, the whale can smell them and may dive or move away from the source of the smell. This behavior is also displayed by other marine mammals as they try to survive in the Arctic. Biologists recently confirmed that the whales do in fact have a sense of smell, which had previously not been accepted by scientists.⁹ Whalers' concerns about odors from human activity were thus well founded and should be taken into account in managing offshore activity.

What more can be done?

The greater recognition being given to traditional knowledge in recent years is a welcome advance. And more can be done both to incorporate the knowledge itself and to improve the participation of traditional knowledge holders in research and environmental management. At the same time, we need to be aware of the demands that this level of interest places on those knowledge holders. Too many studies mean too many demands on their time and can lead to “research fatigue” and decreased interest in taking part.

The level of interest can depend on the intended audience. Many hunters have said that they want to share this information freely with people they know. But they are often hesitant to provide it to those who have little understanding of the Arctic environment or cultures.

Compensating people as consultants when their expertise is sought is appropriate and can help sustain their willingness to participate in studies and related activities, as in any other situation where hiring a consultant is appropriate. It is essential that scientists describe carefully how information will be shared and explain that a written document may benefit the community and future generations, too. With these ideas in mind, we suggest three areas for further engagement with traditional knowledge.

First, information gathered in traditional knowledge studies should be readily available via a single access point. This could be a website with links to different studies or a searchable database with results that have been approved for public dissemination. Such a system would allow those who are interested in using traditional knowledge to gain easy access to available information and would help prevent duplicate studies. Ideally, the system would also help to connect traditional knowledge holders with scientists.

Second, monitoring efforts need to include traditional knowledge holders and find ways to include their observations. Documenting traditional knowledge means recording what has already happened. Monitoring can add a forward-looking component by adding new information as it is gathered. Hunters spend a great deal of time on the land and sea and cover a great deal of territory. Making use of this widespread expertise would provide a broader, more up-to-date, and different picture of the environment than is available from many other methods, complementing data from remote sensing and sparse monitoring stations. Incorporating local data would also increase confidence in the results of monitoring, building a better foundation for cooperative action to address impacts and changes that are detected.

The idea of monitoring applies within communities, too. At a time when environmental changes are occurring so rapidly, hunters and others need to make daily observations so they can adapt to the changes as they happen. Looking for hunting opportunities means monitoring the environment, assessing opportunities, and making use of them safely and ethically so that the hunt can be done successfully. Some of these opportunities arise because the sea ice is dynamic and water currents are active; combined with the winds, these conditions can bring marine mammals close to communities. The ecosystem is virtually a new one each day, with new air, water, and ice conditions that can bring opportunities at any time if one just keeps looking.

Third, it is time to assess the use of traditional knowledge to date. Are traditional knowledge holders satisfied with the extent to which their knowledge has been used and the ways in which it has been gathered? Are scientists and managers satisfied with the availability of traditional knowledge and their understanding of how it can be applied in various settings? What can be done to make better use of what traditional knowledge has to offer while respecting the time, patience, and expertise of its holders?

Traditional knowledge has sustained the lives of Arctic peoples since time immemorial. Its value remains high today, especially if together we can figure out how best to use it in new ways.

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Endnotes

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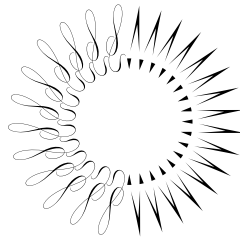
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