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Observations on the Workshop as a Means of Improving Communication Between Holders of Traditional and Scientific Knowledge

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ABSTRACT / Traditional ecological knowledge (TEK) and the information and insights it offers to natural resource research and management have been given much attention in recent years. On the practical question of how TEK is accessed and used together with scientific knowledge, most work to date has examined documentation and methods of recording and disseminating information. Relatively little has been done regarding exchanges between scientific and traditional knowledge. This paper examines three workshop settings in which such exchanges were intended outcomes. The Barrow Symposium on Sea Ice, the *Exxon Valdez* Oil Spill Restoration Program Synthesis/Information Workshops, and the Alaska Beluga Whale Committee illuminate certain features of the preparation, format, and context of workshops or series of workshops and their eventual outcomes and influence. The examples show the importance of long-term relationships among participants and thorough preparation before the actual workshop. Further research should look more systematically at the factors that influence the success of a given workshop and the various ways in which participants perceive success.

A critical aspect of environmental management is acquiring information that is not only accurate, but trusted by those who make and abide by decisions based on that information (e.g., Berkes 1989, 1999, Pinkerton 1989, Ostrom 1990, Finger and Kilcoyne 1995, Newell and Ommer 1999, Wiser 2001). In cross-cultural settings particularly, achieving the latter can be more difficult than the former (e.g., Stevens 1997, Smith 1999, Maffi 2001). The use of traditional ecological knowledge (TEK) offers one way of bridging gaps in perspective and understanding, especially when used in conjunction with knowledge derived from the scientific method (Stevenson 1996, Huntington 2000). The process of exchanging information effectively and collaborating on interpretation, however, is often overlooked in the effort to incorporate TEK into research and management.

KEY WORDS: Traditional ecological knowledge; Scientific knowledge; Workshops; Sea ice; *Exxon Valdez* oil spill; Alaska Beluga Whale Committee

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For more than a decade, the topic of TEK has received a great deal of attention. This form of knowledge is referred to by various names, including traditional and local knowledge, indigenous knowledge, and traditional knowledge and wisdom, and has been defined variously as well. For our purposes, we use the term TEK to refer to "the system of experiential knowledge gained by continual observation and transmitted among members of a community" (Huntington 1998).

By any name, its proponents argue that TEK offers rich ecological insight, that it allows indigenous and other local communities to participate more effectively and equally in resource management, and that it sup-

ports sounder and more equitable development policies—in short, that it confers numerous benefits from the narrowly technical and scientific to the broadly cultural and political (Brokensha and others 1980, Nakashima 1990, Huntington 1992a, 1992b, 1998, Johnson 1992, Inglis 1993, Johannes 1993, Mailhot 1993, Kawagley 1995, Fehr and Hurst 1996, Caulfield 1997, McDonald and others 1997, Stevens 1997, Berkes and Folke 1998, Berkes 1999, Pierotti and Wildcat 2000).

The debate about whether and how to use TEK has had several foci. One centers on the theoretical aspects of how TEK and scientific knowledge are constructed, and thus how they converge or diverge in various settings (e.g., Agrawal 1995, Stevenson 1996). Debate in this area has focused on the appropriateness of using TEK. Some argue that efforts to integrate TEK with scientific knowledge serve to interpret TEK in scientific terms, thereby taking it out of context while benefiting scientists and managers rather than holders of TEK (Cruikshank 2001). In this view, the use of TEK is not collaborative, but merely exploitative in a new guise (e.g., Cruikshank 1998, Nadasdy 1999). Another theoretical focus has been on the scientific merits and environmental management applications of TEK, and whether in fact it offers more to scientific knowledge than additional pieces of data (e.g., Freeman and Carbyn 1988, Kawagley 1995, Berkes and others 2000, Fernandez-Gimenez 2000, Gadgil and others 2000).

A complementary focal area has been the practical aspect of utilizing TEK and combining it with scientific knowledge, particularly in the context of environmental management (e.g., Ferguson and Messier 1997, Berkes 1998, 1999, Huntington 1998, 2000, Fernandez-Gimenez 2000, Gadgil and others 2000, Nabhan 2000, Usher 2000). Here, too, various terms are used, including integration and synthesis, with differing shades of meaning and emphasis. For the purposes of this paper, we are interested in the extent to which the holders of the two forms of knowledge can benefit by mutual exchange with the insights of the other, including both sharing information and interpreting it collaboratively. Such evaluations are likely to remain subjective and qualitative, although some examples exist. For example, the ability of Alaska Native whalers and scientific researchers to work together to determine the population, distribution, and behavior of bowhead whales (*Balaena mysticetus*) led to significant advances in the understanding of the species and greatly improved the ability of resource managers to develop appropriate whaling regulations (Huntington 1992a, 1992b, 2000, Albert 2001).

For the most part, research on the utilization of TEK has concentrated on documenting it and analyzing the results in comparison with scientific knowledge. Several projects have conducted interviews or otherwise gathered information from knowledgeable persons, compiled the results, and published summaries of TEK, often accompanied by a discussion of the lessons learned and the additions made to collective understanding (Nakashima and Murray 1988, Johnson 1992, Thomsen 1993, Kalxdorff 1997, McDonald and others 1997, Kilabuck 1998, Huntington and others 1999, Mymrin and others 1999, Turner and others 2000).

The promotion of common, collective understanding has been given great importance in recent literature on cooperative management of various aspects of the environment. Two linked themes emerge from these analyses: communication and collaboration. Cooperative management itself is often regarded as a way to move beyond ineffective adversarial approaches by involving users in making management decisions (Pinkerton 1989, Huntington 1992b, Singleton 1998). To do so, those who are cooperating must develop a common understanding, which requires communicating effectively to share knowledge (Berkes 1989, Ostrom 1990, Newell and Ommer 1999, Smith 1999, Maffi 2001). Sharing existing knowledge is not necessarily sufficient, and the gathering of new information should be collaborative to create trust and a sense of shared community among those involved (Gray 1985, Finger and Kilcoyne 1995, Stevens 1997, Singleton 1998, Wondolleck and Yaffee 2000, Wiser 2001).

Despite the attention given to TEK and to the importance of communication and collaboration in management, one relatively commonly used mechanism—the workshop—has been given scant attention (Huntington 2000). A considerable body of work is devoted to the structure and functioning of meetings, conferences, workshops, and other such gatherings. Typically, meeting handbooks and analyses emphasize thorough preparation, clear objectives for which a meeting is appropriate, maintaining focus during the meeting, establishing a structure and procedures for the meeting, and working towards effective implementation of the ideas developed in the meeting (e.g., Capes 1960, Jorgenson and others 1981, Tropman 1996a, 1996b). These works also emphasize that, in order to share information and concerns and to solve problems, there is often no alternative to a meeting. The particular demands of a workshop to communicate ideas between science and traditional knowledge, however, have not been examined before now.

The purpose of this paper is to explore the utility of workshops as a means of improving communication

Figure 1. Map of Alaska, showing locations mentioned in the text.

and collaboration between holders of traditional and scientific knowledge. We do so through the use of three case studies, workshops that were specifically designed to facilitate such interactions. We examine the origin of, preparation for, conduct of, and outcomes of the Barrow Symposium on Sea Ice, the *Exxon Valdez* Oil Spill Restoration Program Synthesis/Information Workshops, and the Alaska Beluga Whale Committee's annual meetings, which function in part as an on-going workshop (see Figure 1 for locations mentioned below).

The authors have all been involved in one or more of these workshops, in addition to many similar exercises. For the descriptions of each event, we draw on our experiences and observations in addition to published material. For the evaluations of the workshops, we draw on our own experiences as well as extensive, though largely informal, discussions with various participants.

Barrow Symposium on Sea Ice

Origin

The Barrow Symposium on Sea Ice (BSSI) was held 31 October–2 November 2000, in Barrow, Alaska, USA, to facilitate and encourage substantive interactions between scientists studying sea ice and Iñupiat whalers who use the ice for travel and hunting. The idea for the BSSI came from a group of arctic-resident researchers who had gained extensive experience through traveling and working on sea ice and collaborating with Iñupiat whalers and elders in Barrow. They recognized that the Iñupiat whalers were highly skilled in recognizing types of ice and associated ice dynamics, with particular regard for safety. Moreover, these researchers were aware of the ability of remote sensing technologies to provide images of sea ice, to help assess its structure, and to display information on a regional, rather than only local, basis. Combining these two types of understand-

ing offered the possibility of far greater insight into the large- and small-scale forces acting on nearshore sea ice and the relationships between these forces. Improved insights promised to benefit all who are interested in sea ice, especially those who take the risks associated with living on and working from the ice for extended periods each year. [The description of the BSSI is based largely on Huntington and others (2001).]

Preparation

Because a workshop format necessarily limits each participant's time to speak, the organizers decided to focus discussions by examining particular case studies rather than general topics. The case studies would offer a specific starting point, from which generalizations could be made if appropriate. Several possible cases were identified, typically involving a memorable event for which there were likely to be both remote sensing or weather records and detailed recollection by the elders. The criteria for inclusion in the BSSI were that (1) cases should address events that were important from the local perspective, (2) there should be adequate weather or remote sensing records of the event, (3) detailed traditional knowledge of the event or the phenomenon should exist, and (4) collectively, the case studies should cover a wide range of topics and several geographic locations with distinct sea ice regimes.

Case studies were ultimately selected by researchers and elders together and spanned four decades. They included two local topics, the catastrophic break-up of shorefast ice near Barrow in May 1957 and the events in 1993 and 1997 when large sections of shorefast ice broke free or calved, carrying whaling crews away. Two topics were regional: the summer of 1975 during which heavy pack ice blocked barge traffic to Prudhoe Bay and prevented hunters from traveling by boat in Wainwright and Barrow, and the spring of 1980 when ice blocked the Bering Strait and prevented marine mammals from migrating northward for over a month. The final case study was a review of efforts by the National Weather Service and the Barrow Whaling Captains' Association to share information in near real-time during the spring 2000 whaling season.

For each case study, a presenter was assigned lead responsibility for gathering information about the event and making a presentation at the BSSI to stimulate the discussions of that particular event or phenomenon. The case studies varied in the types of information on which they drew. The case of the violent breakup of shorefast ice in May 1957, for example, preceded the availability of satellite-borne remote sensing and thus relied heavily on interviews with whalers who had been there. The case of large calving events in 1993 and 1997, by contrast, relied both on recollections of people who had seen them and on satellite images of the ice during the events in question.

Considerable effort was invested in preparing the case studies, including interviews, reviewing archival information, obtaining weather maps and satellite imagery where possible, and analyzing the data to present a coherent picture of the event, the conditions that preceded it, and its implications for the local ecosystem and the people who use it.

The BSSI was open to all members of the Barrow community. Several elders and whalers were invited personally. Staff of the North Slope Borough (the regional government for northern Alaska, equivalent to a county in other states) handled logistical arrangements and technical preparations. The BSSI was held in the Iñupiat Heritage Center, a community facility that houses a library, museum collections, meeting rooms, and shops for making traditional equipment and artifacts. Ice scientists currently working or who had worked near Barrow were selected and invited. Several other interested persons were invited to attend for the purpose of independently evaluating the effectiveness of the symposium. These independent assessments have been used in describing the BSSI herein.

The Symposium

The BSSI was held over three days. Each of the five case studies was given a half day, and the morning of the second day was set aside for a field trip to Point Barrow to look at the remains of pressure ridges formed the previous winter and at the new ice that was forming nearshore. Following introductory remarks the first morning, the participants introduced themselves and explained their interest in the symposium and in sea ice. Thirty-five persons participated in part or all of the BSSI. About two dozen were present throughout all the sessions, including three elders from Barrow and one elder from Wainwright. Tables and chairs were arranged in a large square, one side of which was taken up by a projection screen. Although the square was too large for intimate discussions between participants, it did seem to facilitate interaction and exchange better than classroom-style seating would have done.

Like the case studies themselves, the presentations and discussions varied in style and approach. Some presentations were brief, focusing on a description of the event and then turning to discussion. One included a lengthy and formal presentation on the process of community-based research. During some of the discussions, supplemental information was presented, often with regard to weather conditions at the time of the event but also introducing others ways of studying and

looking at ice. Two films were shown in addition to the presentations. One was home-movie footage of a pressure ridge forming and burying a bowhead whale that had been hauled on the ice for butchering. The other was a time-lapse film of radar imagery of ice off the coast near Barrow, showing formation of ice, creating of pressure ridges, and patterns of ice movements and currents. Discussions followed each one, adding to the material covered in the five case studies.

The uniquely valuable components of the BSSI were the discussions that followed each presentation. By and large, the case studies and their presentation succeeded in stimulating interaction between the scientists and the whalers. Although there were fewer whalers than scientists, those whalers present took an active part in the discussions, raising new points and responding to the ideas of others. The scientists, too, questioned each other and the whalers, eager to impart their own information as well as to learn. The extended period given to each case study, together with the free-form nature of the discussions, allowed a variety of points to be raised concerning not only the specific event of the case study but related aspects of sea ice as well.

Three examples illustrate the value of the discussions. Regarding the 1957 break-up event, considerable attention was given to local and regional weather conditions, the frequency with which those specific patterns have occurred in the Barrow weather records, and the ways in which they could have contributed to or caused the destruction of the entire extent of local shorefast ice. Late in the extended discussion period, one of the elders who had been on the ice that spring recalled that the proportion of multiyear ice (ice that has remained frozen for more than one winter) incorporated in nearshore ice during the winter of 1956–1957 was unusually high. Before the onset of the spring whaling season, whalers had worried aloud that this unusual nearshore ice platform might shatter instead of forming pressure ridges if hit by pack ice. In a limited discussion period, this critical insight might not have been raised.

The case study of the heavy ice summer in 1975 focused on the village of Wainwright, southwest of Barrow. During the discussion period, a biologist who had been working in Wainwright that summer pointed out that although walrus (*Odobenus rosmarus*) hunting was greatly hampered because boat travel was impossible, ringed seal (*Phoca hispida*) and bearded seal (*Erignathus barbatus*) hunting was excellent. The residents of Wainwright were able to switch prey and secure a large harvest. This observation opened the door to a number of subtle points on the use of sea ice by marine mammal hunters and the ways in which the hunters could adapt to various conditions. Attempts to classify years as good or bad for hunting obscure more subtle variations as well as social changes. In previous decades, a poor walrus year might have caused hardship, because walrus were used for feeding the dogs upon which hunters relied. By 1975, however, snowmachines (also known as snowmobiles) had replaced dogs as the mode of travel in Wainwright, and the lack of walrus meat was not nearly as significant. Detailed subtleties such as these might fail to arise in the absence of an extended and open discussion period.

In discussions of calving events and the break-up of shorefast ice, the elders stressed the importance of knowing the conditions under which the ice formed in fall. The direction of wind and current, the incorporation of pack ice within the newly freezing ice, and the sequence and effects of winter storms on pressure ridge formation are all key factors determining the weaknesses of the ice and the conditions under which it will be susceptible to break-up and calving in spring. The critical lesson is that understanding the dynamics of shorefast ice requires continual observation and interpretation, not just the analysis of data collected at one time.

Outcome

The BSSI was an overall success. The case studies were interesting, the discussions were stimulating and productive, and both whalers and scientists enjoyed the opportunity to talk and to learn. Among the strengths of the symposium were the high level of interest brought by each person who took part, their willingness to consider the many aspects of studying and using sea ice, and the utility of the case study approach for stimulating exchanges without unnecessarily narrowing the scope of discussions. The use of both traditional and scientific sources of knowledge added considerably to the description and understanding of the case studies, as each perspective alone missed certain critical details. Had less attention been paid to selecting persons to invite and encouraging them to do so, the symposium might have spurred far less interaction. Had the participants not been willing to look at sea ice in new ways, the case studies would have been dry lectures, not springboards for lengthy exchanges. Had the case studies not been well chosen and well prepared, the discussions could have meandered aimlessly. Instead, a lively group took advantage of a strong forum and long-standing traditions of sharing both scientific and traditional knowledge that distinguish Alaska's North Slope (see Alaska Beluga Whale Committee discussion, below) in such a forum.

That said, the BSSI suffered from some weaknesses as well. The five case studies varied in scope, and in some cases had different purposes and audiences. To expect one setting—the symposium in a large room

with 25 or more people—to accommodate all cases equally well is unrealistic. For those who had not previously had the opportunity to take part in this kind of exchange, the BSSI was a good introduction to the potential benefits of scientists and whalers sharing knowledge and working together. As an introduction, however, the symposium did not allow deeper and more detailed discussions such as those that might happen with a smaller group or during an interview. Important topics or details were often mentioned, but with many people wishing to speak in the relatively short time allotted to each case study, it was rarely possible to pursue these lines of thought.

Another drawback was the inconsistency in the use of plain language during presentations and discussions. This is difficult to regulate while a symposium is in progress, and issuing guidelines beforehand is no guarantee that they will be followed. Nonetheless, the value of at least one presentation was reduced by its lack of clarity, and some points raised in discussion were likely not understood by a majority of participants. This point relates not only to communication between scientists and whalers, but among scientists, especially from different disciplines. While there is no simple remedy, it is clear that establishing effective communication takes time and effort and does not happen by chance during a single meeting.

The BSSI was intended as the first step towards collaborative sea ice research and understanding between whalers and scientists. As such, it had multiple goals and expected outcomes. For an introductory meeting, this was perhaps a strength, in that each participant could bring distinct expectations and seek distinct results. On the other hand, the ultimate success of the symposium rests with the will and ability of the participants to develop the ideas that were raised. The BSSI opened the door to a range of issues, but lacked an institutional framework in which those issues could be pursued. Sea ice research will continue in Barrow. The BSSI was a good start to sharing information between whalers and scientists. To be successful in the long run, however, it needs to be followed not only by research, but by more, and more regular, opportunities for scientists and whalers to share what they know and to learn from one another.

Exxon Valdez Oil Spill Restoration Program Synthesis/Information Workshops

Origin

On 24 March 1989, the oil tanker *Exxon Valdez* ran aground in Prince William Sound, Alaska, releasing 41.6 million liters of crude oil. The oil flowed through Prince William Sound and westward into the Gulf of Alaska, reaching Kodiak Island and the Alaska Peninsula and eventually spreading across 2000 km of coastline (Lethcoe and Nurnberger 1989, Lord 1992, Piper 1993). In partial response, the state and federal governments established the *Exxon Valdez* Oil Spill Trustee Council to oversee a restoration program, funded with monies from the settlement of a civil lawsuit filed against Exxon Corporation by the governments. The restoration program includes a substantial research component designed to chart recovery of the ecosystem from the oil spill and to improve understanding of the physical and biological processes that govern the system (*Exxon Valdez* Oil Spill Trustee Council 1994).

Prior to the establishment of the restoration program, a great deal of intensive research had been done quickly in the months following the spill. Unfortunately, the influx of researchers overwhelmed local communities, who soon tired of the constant stream of visitors and resented the failure of most researchers to report results back to the communities. In contrast to the history of collaboration that had been established on the North Slope as described in the previous and the following sections, this experience laid a poor foundation for further collaboration.

Once the restoration program itself was underway, local communities, particularly those of the indigenous Alutiiq people, demanded a larger role, particularly in designing research to address their concerns and in contributing their knowledge and observations to the research underway. One result was the creation of a community involvement project. A portion of that project, later spun off into a separate project, focused on the use of TEK in the restoration program. The intention of this effort was to spur the use of TEK by researchers, to help communities document relevant knowledge concerning the oil spill and restoration of the ecosystem, and to promote a more substantive interaction between community members and researchers.

As the project developed, however, it became apparent that there were relatively few opportunities for including TEK in ongoing research projects. Several major projects had been underway for a few years and were in fact concluding their fieldwork. Using TEK to help design the projects and carry them out was no longer possible. Where projects were at an early enough stage to benefit from the use of TEK, the costs of a significant documentation effort were prohibitive. Furthermore, the communities themselves were ambivalent about the use of their knowledge in a context where they would not have control over how it was used and to whom it

was distributed. In the end, only one documentation project was carried out, examining juvenile Pacific herring (*Clupea pallasi*) and other forage fishes (J. Seitz personal communication, Huntington 2000).

Reviewing this situation, project personnel decided to try another approach. Rather than attempting to document TEK so that it might contribute to a project from the start, they decided to hold workshops to promote collaborative interpretation of the results of some research projects. Whereas the opportunity for contributing at the stage of data collection had passed, the researchers' results still required analysis and interpretation. It was thought that the holders of TEK could review those results to see if they were consistent with local observations and thereby help interpret the results to explain what had been found.

Preparation

The first workshop was held in Tatitlek, Alaska, in northwestern Prince William Sound, in October 1997. The purpose of this workshop was twofold: first, to present and discuss with community members the results of surveys to assess the recovery of harlequin duck (*Histrionicus histrionicus*) populations following the *Exxon Valdez* oil spill; and second, to discuss plans, seek community involvement, and gather TEK for an upcoming project designed to use satellite telemetry to identify affiliations between wintering, breeding, and molting areas of white-winged and surf scoters (*Melanitta fusca* and *M. perspicillata*). For the former, the researcher hoped to combine local knowledge with the results of scientific surveys to fully assess the recovery status of harlequin ducks. Of particular interest from the point of view of the restoration program was whether the behavior, body condition, distribution, abundance, and other biological parameters of the birds had changed as a result of the oil spill, and if so, whether there were any signs of recovery. The researcher also hoped to gain insight into scoter population size, seasonal movements, and habitat use in PWS and any historical changes to these parameters as a result of the oil spill or other factors.

The staff of the TEK project helped set up an agenda and worked with community leaders to organize the workshop and encourage community members to attend. The Tatitlek workshop was intended as the first of several, and the results were expected to help shape future workshops. The initial workshop was designated a "synthesis workshop," because it was intended to help synthesize the knowledge of the researcher and that of the community members to achieve a common understanding of the status of harlequin ducks and the directions that future research should take.

As described below, the synthesis workshop did not live up to expectations. Five more workshops were held between January 1998 and August 1999, but they were called "information workshops" in light of the expectation that their main outcome would be sharing of information rather than a true collaborative analysis of data and observations. Preparation for the five subsequent workshops was similar to that for the first one. Harlequin ducks and scoters were discussed in Nanwalek, Port Graham, and Seldovia. A multiple-researcher workshop was held in Chenega Bay, covering river otters, sea otters, clams, harlequin ducks, and scoters. The final workshop was held again in Tatitlek, reviewing Pacific herring research, including the TEK documentation project mentioned above.

The Workshops

The first workshop was held in the Tatitlek Community Center one afternoon and the following morning. Eight village residents took part. In addition to the researcher, three project staff members attended. Junior and senior high school students observed portions of the workshop, occasionally contributing to the discussion. The researcher described his research on harlequin ducks and showed some of the results. He also described his plans for scoters, explaining that he was eager to involve the community and add TEK in his plans and analysis, where possible. There was lengthy discussion of various points, including whether ducks from the eastern (unoiled) part of Prince William Sound were appropriate controls for ducks from the western (oiled) part of the sound.

In a discussion about hunting patterns, the community members turned to the ban on spring hunting imposed by the Migratory Bird Treaty Act (see, e.g., Huntington 1992b). Although the topic of amending the act was outside the original scope of the workshop, it became apparent that, from the local perspective, government restrictions on hunting were an integral part of their relationship with ducks and those who study and manage them. The workshop also led to the possibility of involving local residents and students in fieldwork for the scoter project.

Although the discussions were interesting and productive for all the participants, they led neither to the integration of traditional and scientific perspectives nor to a detailed analysis of the recovery status of harlequin ducks. Subsequent workshops were therefore scheduled for a single afternoon, and the objective shifted to sharing information and setting the stage for future interactions.

The five remaining workshops had between three and eight community participants and between two and

five researchers and project staff combined. The community members who took part indicated that they were pleased to hear from the researchers and liked the opportunity to listen and ask questions. The researchers, by contrast, had in most cases expected more participation and more discussion. Although the opportunity to give a presentation in the community was seen as worthwhile, the workshops themselves were not as productive as the researchers had hoped.

Outcome

The workshops, while useful, did not achieve their goals. The format may have been responsible in part. In all cases, the workshops began with a short introduction, followed by presentations from the researchers, and then a discussion period. In all but one case, participants were seated around a large table or ring of tables. In the other case, seating was classroom-style. Some of the apparent lack of interaction may have been the result of differing styles of conversation and discussion. The researchers often gave formal presentations, similar to ones that might be given at a science conference. While the discussions were tailored to an extent to the audience, the use of graphical material projected on a wall or screen may have contributed to a sense of formality, thus inhibiting discussion during presentations.

On the other hand, some of the community participants had seen similar presentations during larger workshops addressing the entire restoration program in Anchorage. Several of the researchers had worked in communities or with community members and had experience in communicating scientific concepts and results to nonscientific audiences. Some of the difficulty in stimulating long and productive discussions may have been simply a matter of trying to absorb a large amount of information in a short period. In five of the six workshops, only one research project was discussed, which may have placed an excessive burden on a single researcher to stimulate discussion and respond to a variety of community interests and concerns.

A related obstacle may have been the lack of preparatory work undertaken with the community members. Although it was reasonable to expect the community participants to know about the species in question for a given workshop, no interviews were held with community members nor were there any community discussions prior to the workshop, either of which might have helped to focus attention on the topic and to elicit more detailed responses and information. The legacy of the first postspill research efforts is likely to have imposed an additional barrier to full community participation, especially in the absence of preparatory work.

Another explanation for the outcome of the workshop has more to do with context than format. While the workshops were hardly the first time the two groups had met one another, the setting was novel. By holding the workshops in the communities, rather than during a large conference in Anchorage, as had been done in the restoration program previously, more community members were able to take part and the place was familiar. For the researchers, the workshops offered a chance to participate in a community-based activity, learning something about the people and the way the community operates. In this light, expectations may have been too high: developing a level of understanding and comfort takes time. A single workshop may simply not give enough time to get beyond introductions.

One longer-term goal of the workshops was achieved. When the scoters were captured and implanted with satellite transmitters, several residents of Tatitlek were able to visit the research site and help with the captures. The researchers sent the birds' subsequent locations to the school, where students were able to track the migrations of "their" birds. This allowed classroom teachers to incorporate local research into their curriculum. Direct student involvement with the research and researcher hopefully added more relevance to the learning process. Keeping residents informed and creating more opportunities for involvement in local research projects will build bridges that can only benefit future research and management activities.

Alaska Beluga Whale Committee

Origin

The Alaska Beluga Whale Committee (ABWC) was created to ensure that beluga whale (*Delphinapterus leucas*) stocks in Alaska remained viable and capable of supporting traditional subsistence harvests (Huntington 1992a, Adams and others 1993). The ABWC was also concerned that the International Whaling Commission (IWC) might become involved in the management of small cetaceans. The ABWC sought to gather information on stock sizes and identity and on harvest levels and to demonstrate that belugas were adequately managed in Alaska in order to forestall IWC involvement.

Significantly, the ABWC was initiated by the North Slope Borough (NSB), the regional government of the largely Iñupiat northern portion of Alaska. The NSB

government and other recognized community leaders of the region had amassed extensive experience with the processes of research, and understood how science could help support their interests (Huntington 1992a, 1992b, 2000, Albert 2001). The ABWC was also able to draw on a community of researchers with extensive experience working with Alaska Natives. This experience among members of both groups helped communication from the start and set the tone when the ABWC expanded to include more representatives from other parts of the state. Similarly, the history of scientific investigations and programs on Alaska's North Slope is distinguished by several 20th century examples of strong interdisciplinary teamwork and genuine syntheses among diverse scientific specialties and perspectives (Elsner 2001, Burns 2001, Norton and Weller 2001). This regional scientific tradition of sharing insights predisposed scientists to be relatively comfortable with exploring novel ideas across disciplinary and cultural boundaries.

The ABWC is composed of representatives of the tribes (most Native villages in Alaska are recognized as distinct tribes by the federal government, with the government-to-government relationship that accompanies such recognition) that hunt belugas and researchers and managers from government agencies. It is funded through a contract with the National Marine Fisheries Service, the federal agency responsible for beluga management, and with which the ABWC recently concluded a comanagement agreement. Other scientists and members of various organizations around Alaska participate in meetings but are not allowed to vote. The structure is designed to draw on the collective expertise of those involved. Meetings are held annually and are attended by about 40 persons. Science conferences were held in 1995 and 1999, and included participants from Canada, Greenland, and Russia (Suydam and others 1996).

Preparation

The ABWC is involved throughout the year in research and other activities concerning beluga whales. In that sense, preparation for the annual meeting is carried out by most if not all participants. Hunter representatives are responsible for gathering harvest data from their villages or regions. They also provide other information that they deem relevant, including observations of unusual environmental conditions or beluga whale behavior, abundance, and distribution. Researchers conduct aerial surveys, investigate stock identity through genetic analysis of tissue samples, place satellite transmitters on individual belugas to monitor migratory patterns and other behavior, and carry out other studies. In most cases, there is close cooperation between hunters and researchers, with hunters or other local residents actively involved in research efforts. The ABWC has supported or funded the documentation of traditional ecological knowledge in several beluga-hunting villages, which are reported on at the meetings. Management agency representatives discuss harvest levels in relation to population sizes and provide updates on IWC activities. The ABWC also sends hunter representatives to the IWC.

The annual meeting is thus an opportunity to provide updates on research activities, to report and compile harvest data, and to plan future activities to meet the needs of the ABWC, as identified by the entire committee. The agenda is similar from year to year. With the exception of newcomers, the participants know what to expect and what to bring with them. Informal interviews with ABWC members indicate that the exchange of up-to-date reports and accurate information is an important aspect of the meetings, and a goal that the ABWC achieves especially well. The exchange of scientific and traditional knowledge, although important and valued by committee members, is a means and not an end of the ABWC's meetings.

Logistically, the ABWC annual meeting is supported by its officers and by staff of the North Slope Borough. The agenda is distributed in advance, and packets of meeting materials are provided at the meeting. Minutes of each meeting are prepared by the ABWC secretary, and reviewed and approved at the next meeting. An executive committee oversees ABWC activities between meetings.

The Annual Meetings

The annual meetings of the ABWC have been held in November or December, either in Anchorage or Fairbanks, Alaska. They typically last one-and-a-half to two days, and take place around one large table. Depending on the size of the meeting room, some guests may sit in a row of chairs around the perimeter, but no clear distinction is made between the various groups represented on the committee or between committee members and guests (except when votes are taken). The agenda is similar from year to year, including harvest reports, research and management updates, and planning of future activities. Considerable time is given to discussion of the meaning of research results and the priorities for further investigation. Over time, many participants in the ABWC have developed close ties and a clear understanding of how to communicate effectively.

Harvest reporting includes providing the number of belugas taken or struck and lost during the different

seasons, as well as other information that the hunter representatives deem pertinent. Such information can include weather and ice conditions that affected the hunt, estimates of effort expended in hunting, concerns about factors that might affect belugas, and descriptions of local efforts related to the conservation or management of belugas and other marine mammals. Although basic harvest information can be and often is gathered by phone or fax as well as at the meeting, the participants clearly enjoy the opportunity to hear from each representative and to learn more than just the basic numbers of belugas taken. Questions and discussion following harvest reports indicate the extent of interest as well as a form of peer pressure among the hunters to provide the information and to demonstrate that their communities are responsible in the conduct of the hunt.

Research updates are made by the scientists involved, who often spend considerable time preparing presentations that are thorough and clear. The updates are given in language designed to be understood by all participants, including the many for whom English is a second language, but researchers who have worked with the ABWC over time do not avoid technical details and terminology. Instead, those who do not understand are encouraged to ask questions and to learn. In informal interviews, ABWC members said they appreciate scientists who do not talk down to them.

Although there is no limit on harvests of belugas from the four stocks within the current geographic scope of the ABWC, several management issues are discussed at the meetings. The ABWC is developing regional management plans, which delegate to the regions of the state the requirements to be voluntarily placed on beluga hunters. These requirements are designed to ensure hunter safety and to minimize the loss of belugas that have been harpooned or shot. The comanagement agreement between the ABWC and the National Marine Fisheries Service outlines cooperative activities and respective responsibilities. Negotiating the agreement took several years and is a matter of considerable importance to the members of the committee. In addition, the ABWC participates in meetings of the Scientific Committee of the IWC. Hunter representatives and agency personnel attend these meetings and report back to the ABWC. The potential involvement of the IWC in beluga management is a significant concern to the ABWC, and discussions of strategy with regard to the IWC are taken seriously.

The ABWC's funding pays for the annual meetings as well as a portion of the research and management activities conducted under its auspices. Setting priorities for the committee is thus constrained by the resources available to, for example, send representatives to IWC meetings, or conduct aerial surveys, or put satellite transmitters on belugas. Although there are disagreements about what needs to be done, where, and when, the success of past efforts as communicated by reports and updates at the meeting helps instill the discussions with a sense of shared purpose. Whether individual items on the eventual work plan meet with universal approval or not, the overall plan is regarded as a collective one.

Outcome

The significant difference between the ABWC and the two previous examples is continuity. Participants at ABWC meetings know they will see one another at the next meeting. Members make it clear when someone fails to deliver on promises he or she made. The members are able to build up relationships over time, supplemented by working together on field projects and other activities through the year. Hunter representatives have been able to learn a great deal about research methods and results. Researchers and managers have, in turn, learned much from the hunters, not only about belugas but also about the perspectives of the hunting communities and the significance of belugas to Alaska Native cultures. Research questions and techniques are seen as a common set of tools to address important topics, rather than as proprietary expertise to be used to advantage. Thus, hunters suggest the use of satellite telemetry, while researchers ask whether traditional knowledge can address the question at hand. Although not an explicit goal, the meetings have proved to be a useful forum for exchanging knowledge and ideas.

The effectiveness of this process can be seen in the reactions to various presentations or the discussions about research priorities. Genetic analysis of tissue samples has led to the tentative identification of five stocks of beluga whales in Alaska (O'Corry-Crowe and others 1997). Obtaining samples requires the cooperation of hunters, who place a small piece of skin in a tube containing brine solution and send it to the researcher. In presenting his findings to the ABWC, the researcher is able to convey in relatively simple, although not simplistic, terms an overview of the results and their implications. The hunters' enthusiasm about providing samples is due in no small part to this return of information. In addition, hunters from some villages question whether different stocks are present in their area at different times of the year. The ABWC and the geneticist take these questions seriously and request additional samples to provide answers. It is possible that other stocks than the five identified to date may be distinguished through this process of interaction and

cooperation (G. O'Corry-Crowe personal communication 2001).

A technique that has been contentious in other settings is the use of satellite transmitters to monitor animal movements and behavior. Many Alaska Natives regard the capture of animals and the installation of telemetry gear as a form of animal torture and are opposed in principle to the use of this technique. In some cases, hunters have stated that the information sought by telemetry was either unimportant or obtainable by other means, such as through traditional knowledge (T. Brelsford personal communication 2001). Within the ABWC, hunters often identify satellite telemetry as a priority, recognizing that no other technique will provide the information required to understand movements, habitat use, and possible interactions with other stocks. Hunters have long participated in the capture of belugas for this purpose (Suydam and others 2001). In 2000, one hunter was certified by the US National Marine Fisheries Service as a researcher qualified to install satellite transmitters. One interpretation of the willingness of the ABWC members to advocate the use of telemetry is that they recognize the importance of the information to be obtained and believe that this outweighs the impacts to the individual animal. The facts that the hunters participate in setting priorities and selecting methods and that results are reported at subsequent meetings are most likely significant factors as well.

An interesting aspect of ABWC meetings is the process by which new members are socialized to the committee's approach. Many wildlife management meetings in Alaska are contentious on several levels, ranging from the appropriate relationships between tribal, federal, and state governments to the accuracy and reliability of data presented. The ABWC is not immune to these issues, and some members express reservations about some aspects of the committee's structure and composition. Nonetheless, if newcomers enter the committee's discussions in a confrontational manner, other members defend the ABWC and its processes either explicitly or simply by not following up the arguments of the newcomer. The strength of community within the ABWC members is shown by the degree to which boundaries have broken down between hunters and managers and researchers.

Discussion

The three examples shared the intention of bringing together people from different backgrounds and with different perspectives for the purpose of learning from one another and working together to interpret their collective knowledge (Table 1). In all cases, some progress was made in this direction. The workshops offered a chance for researchers to present their findings and questions and for holders of TEK to give their perspective and concerns. By focusing discussions on a specific species or topic, the workshops provided a practical and concrete basis upon which to build a shared understanding or at least greater insight into the reasons behind divergent views. Nearly all participants in the various workshops regarded them as a worthwhile investment of time and effort, although the benefits of better mutual understanding may be diffuse and take some time to accrue.

As a means of accessing and sharing TEK and scientific knowledge, workshops do not allow as in-depth discussions as do documentation or research projects. There simply is not time to cover both the general framework of how knowledge is constructed—a necessary prelude to understanding the knowledge itself—and to delve into the specific details of what is known and what it means. The ABWC example shows that a series of workshops can, to a certain extent, overcome this obstacle, consistent with Wondolleck and Yaffee's (2000) observation that regular meetings can create predictability and momentum. Nonetheless, workshops tend to be opportunistic in the sense that what is discussed depends on the direction taken by discussions, the amount of time available, and the knowledge brought to the discussion by the participants. A TEK documentation study, by contrast, has the ability to seek holders of TEK for that purpose alone, rather than relying on the knowledge of the one or two representatives a community selects to attend a meeting.

The limitations of the workshop are not an indication of a weakness in the approach. Rather, they demonstrate the uses to which workshops are suited and help identify the purposes for which they are inappropriate (cf. Capes 1960, Jorgenson and others 1981). If the goal is to gather and apply TEK or scientific knowledge, a workshop needs considerable preparation beforehand and is more useful as the culmination of a larger study than as an isolated event. With its thorough preparations, the BSSI took a big step toward collaborative research on sea ice, although the follow-up or lack thereof will determine the long-term significance of the event. The ABWC annual meetings are part of a continuing process of collaborative research and communication, the effectiveness of which is apparent in the sophistication of the committee's discussions, their success in fostering a productive and collaborative research program, and the completion of a comanagement agreement with the National Oceanic and Atmospheric Administration. In the *Exxon Valdez* oil spill

Table 1. Comparison of key elements in each of the workshops described in this paper

	Barrow Symposium on Sea Ice	*Exxon Valdez* Workshops	Alaska Beluga Whale Committee
Duration	One-time event	One time events (in different villages)	Annual event
	Three days	Most <1 day	Usually two days
Scope	Five case studies on aspects of sea ice	Specific research project(s) related to recovery from the oil spill	Beluga whale research and management
Goal	Share knowledge and analysis of case studies	Describe project(s) and results, analyze findings	Share knowledge and analysis about belugas, plan annual research program
Participants	Sea ice scientists and biologists; local Native whalers and elders	Scientists and community members	Scientists, managers, hunters (tribal representatives)
Preparation	Cooperative selection of case studies between researchers and local participants	Preparation of presentations by researchers	Preparation of reports on past year's activities by all participants, including research results, harvest reports, etc.
	Documentation of case studies from TEK interviews, literature reviews	No community preparation other than announcements of upcoming event	
Previous collaborative experience of participants	Extensive for organizers and local participants (a long history of interactions); generally high for most other participants	Limited for all participants	Fairly high at start, especially for some members; now very extensive for all due to participation in previous meetings of the ABWC
Expected follow-up	Further collaborative research	Further interactions between researchers and community, including collaborative field work	Implementation of cooperative research program
Actual follow-up	Some participants have worked together, but no formal follow-up projects to date	One researcher worked with one community on field work and tracking of birds implanted with satellite transmitters	Cooperative research program carried out
Overall outcome	Fruitful exchange of information, ideas, and analysis	Some sharing of information, primarily from scientists to community members	Productive exchange of information, ideas, and analysis, leading to a strong, collaborative research program and strong relationships between members

workshops, the researchers were reporting on extensive research and were thus well prepared. The community members, on the other hand, had little opportunity to think about and discuss the specific topics on the agenda before the workshop began. In consequence, although the *Exxon Valdez* workshops were a useful forum for reporting results to the communities, they were less useful as a means of exchanging scientific knowledge and TEK.

A related aspect of preparation has less to do with planning than with making use of existing relationships among participants. Clearly, it is not always possible to

plan workshops around people who already know one another. Nonetheless, both the BSSI and the ABWC were able to capitalize on a long history of collaboration among many of the individuals taking part. Both have invested a great deal of time and effort in preparatory work specific to the actual meetings, but both were able to build on a sense of trust and understanding that already existed. The *Exxon Valdez* workshops lacked this foundation, which may have contributed in part to the relatively superficial level of information exchange. Vayda and others (1991) emphasize that events are determined by people rather than by a "process" in and of itself, and the role of individual participants in workshops must not be overlooked in a search for procedural mechanisms that promote successful communication.

Conclusion

The strength of the workshop approach is that, when successful, it provides participants with a common reference point that can serve as a summation of what has been done or as the basis for future work and decision-making. In the case of efforts that seek to draw on both TEK and scientific knowledge, workshops can be a valuable and efficient means of exchanging and interpreting information from disparate perspectives for a variety of purposes. In this paper, we have attempted an introductory look at the way three workshops or series of workshops have functioned. Together, the examples illustrate the importance of, among other factors, preparation, continuity, and experience with communication and collaboration. No single factor determines success, and the relative importance of each variable depends in large part on the specific goal or goals of the workshop. Clearly, however, success depends on a great deal more than assembling people in the same room.

We hope that further research will provide a more systematic basis for analyzing workshops as a means of communication between holders of traditional and scientific knowledge. Several lines of inquiry are important. The common elements of successful workshops and the interplay between them need to be identified, based on a larger and perhaps more diverse sample. The various factors that affect success and their relation to the context and goals of the workshop need to be evaluated, particularly with regard to identifying distinct categories of workshops to provide more specific analysis and guidance for those planning such events. Potentially divergent measures of success among workshop participants must be examined to determine whether the benefits of workshops are equitably shared among participants. The role of workshops in comparison or conjunction with other means of drawing on both scientific knowledge and TEK needs to be better understood in order to make the best use of workshops as a component in a larger collaborative research or management program. The widespread use of workshops today makes such research imperative if holders of scientific and traditional knowledge are to get the most out of these events.

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