# Chapter 8 – Analysis
## *Linking Inuit and scientific expertise*

### 8.1 Evaluation of the collaborative research approach

In working closely with community members I was continually reflecting upon the methods I employed, attempting to refine things as the project progressed. Presenting research results and analysis can contribute to the understanding of localized sea ice conditions, uses, and change, as well as variations between the three communities. However, reporting on the effectiveness of research methods can contribute to an increased understanding of researcher-community relationships. Therefore, discussions in this chapter can relate outside the realm of sea ice. These sections are more broadly applicable, and aim to inform efforts to work collaboratively with Inuit communities.

#### *8.1.1 Preliminary community visits*

Among researchers working in the North American Arctic, the approach of visiting communities prior to conducting research is increasingly common (Johnson and Ruttan, 1992; Ford, 2000; Jolly *et al*., 2002; Kofinas *et al*., 2002; Krupnik, 2002; Norton, 2002; Thorpe *et al*., 2002). This is also more typical of projects that invite, or require, substantial community involvement. I wish to highlight the importance of these visits because often they receive only a brief mention in methodological descriptions. This lack of emphasis may be due to page limitations in publications, or the difficulty of reporting "results" from such early research interactions. Yet, they are fundamental in facilitating subsequent research relationships and progress. Therefore, preliminary community visits (Section 3.3.1) are deserving of specific attention because they are critical to overall project success. These visits are: i) an important first step in relationship-building; ii) a good orientation to community dynamics and services; iii) helpful in developing future field research plans; and, iv) important to gain insight into community perspectives on the research.

First, visiting each of Cape Dorset, Igloolik, and Pangnirtung prior to finalizing research plans, or commencing interviews, provided the initial personal contact that was critical to overall project success. In northern communities, more emphasis is placed on the value of inter-personal relations than on written correspondence (Ford, 2000; Thorpe *et al*., 2002; Furgal *et al*., 2005). Therefore, this first trip was an important step in relationship-building. It allowed me time to get to know the community members and organizations a little before initiating the formal research process. It also helped to build trust through face-to-face interactions and answering questions at local meetings with targeted small groups (i.e. key local organizations). Since I had no previous community contacts or working relationships with local officials, coordinators, or interpreters it would have been difficult to convene a large group or public workshop. It was also more practical to be a delegate in regularly scheduled meetings, than to request a special meeting (i.e. requiring more time and financial compensation to individuals in attendance). The personal interactions in a small group setting made it easier to solicit feedback and gain the much needed local support. People also asked a lot of (sometimes challenging) questions that helped me gain perspective on local views of research, and the role that community members should have in research. Some examples of these questions include:

- Who is paying for this project?
- What is the pay for being interviewed?
- Where do you come from?
- Who do you work for? (i.e. some concerns for links to government or environmental activists)
- How long will this study take?
- Will you be getting out on the sea ice to learn?
- Where else do you work? (i.e. what other communities)
- Why are you doing this work?
- Are you part of a research group, or working alone?
- When will the information from this study be available?
- You get a degree out of this research, what do we get?

I addressed the questions or concerns as best I could, which was helpful in gaining the support of local organizations and establishing positive working relationships. I was also able to use

feedback from these meetings to refine and revise the project. However, if initial meetings had gone poorly, or there was a lack of interest in the proposed project, this type of preliminary visit would have enabled a re-evaluation of community selection and inter-personal relations.

Second, the preliminary visits also aided with orientation to the community in terms of: i) community dynamics; ii) locally available services; and, iii) an understanding of limitations to my proposed research. One example of this is that in both Pangnirtung and Cape Dorset there is a local visitor's centre. However, in Pangnirtung the Angmarlik Visitor Centre is like a central organization where the coordinator was extremely helpful. She was able to connect me with several people around town, including the arrangement of an elder's group meeting. This centre also acts as a cultural hub with a local library, small museum, and repository for research results. In contrast, the Malikjuaq Visitor Centre in Cape Dorset is locked most of the year unless there is a cruise ship or a large tour group in town. Although it does house cultural exhibits and local tourist information, it is generally unused. So, there was no equivalent networking organization in Cape Dorset as there was in Pangnirtung. This is just one example of the many ways in which these initial trips introduced me to adjusting plans "on the fly".

Third, the preliminary visits helped build a solid foundation for all future fieldwork. They aided in the planning of subsequent research trips (including timing and duration), along with refining project objectives. It was through these initial interactions that repeat visits at different stages of the seasonal cycle of ice formation and decay became prioritized. This eased research planning because I could follow local recommendations rather than having to estimate the best timing to undertake field work.

Finally, preliminary community visits were valuable in learning more about community perspectives on research. It seemed that they found it odd for me to be in town just to meet with organizations, and to talk with people, without actually moving on to interviewing and asking questions. The main interest in the project was sparked by local

concerns for sea ice conditions and change, along with the desire to pass on Inuit expertise to youth and scientists. However, it was sometimes difficult for people to respond without a concrete proposal and plan laid out for them – as though they were not used to being asked for input in directing a project. Sometimes this led to comments like "if you're not going to be interviewing, we don't have much more to say." People are busy with many meetings, committees, and life commitments. Therefore, after expressing interest in the project it was sometimes preferred to move on to other subjects. There was also some (understandable) skepticism about research based on previous experiences with poor results reporting and/or treatment of community members (Section 8.3.1). Despite these few challenges, my approach was well received in the communities overall. They seemed to appreciate that the trip was just to propose an idea, get their feedback, and develop the project further.

### *8.1.2 Semi-directed interviews*

As one of the cornerstone methods of qualitative research, semi-directed interviews have been previously evaluated as a valuable means of eliciting information, and gaining insights into Inuit expertise (e.g. Huntington, 1998; Fox, 2002). However, since it is not customary to ask questions in Inuit culture – learning would be undertaken through listening, watching, and practicing (Section 8.2.2) – there are some limitations to the value of interviews to adequately represent the depth and complexity of Inuit knowledge.

Strict question and answer sessions are suggested to be avoided within Inuit communities, which is why structured interviews or questionnaires are generally inappropriate for northern community-based research (Ferguson and Messier, 1997; Huntington, 1998; Ford, 2000). Sea ice processes are hard to describe in isolation; therefore, they would not be well represented within a constrained questioning structure. I also tried to minimize the drawbacks of the unnatural context of interviews to transmit information by allowing the interview to flow as much like a discussion as possible. To do this, I had to learn how to ask questions

appropriately. My original interview guide asked how each person would describe certain ice conditions in Inuktitut, based on the scientific terms I had learned in the literature. These did not lead to very rich responses, and sometimes even created confusion. As we worked through the questions further, Ikummaq suggested that we ask people to describe the freezing or melting processes. We found that it was more effective to begin the interview by asking for a description about how the ice begins to form in the fall, which eventually led to explanations of floe edge dynamics, tidal cracks, and polynyas. Wind and current influences were often incorporated into these descriptions, but when this did not occur it was easier to ask for clarification in the context of the overall process description. This sequence of explanation then naturally led to the processes of melting. Starting with one timeframe and continuing in sequence, following the seasonal ice cycle, also facilitated my comprehension of explanations. Therefore, this revised interview guide transformed the interview process. After one question it became common for hunters or elders to offer long explanations, or stories, that incorporated nearly every question that I had intended to ask. Their exceptional ability to tie together the components of a complex process into a comprehensive explanation highlighted: i) the holistic aspects of Inuit understandings of environmental processes; and, ii) personal connections to sea ice cycles or changes.

Leading questions or statements should also be carefully avoided within interviews so as to minimize the researcher's influence on knowledge/experiences shared (Fox, 2002). Such questions are especially inappropriate for Inuit participants since they may not openly disagree if they feel there might be a sound basis for the question (Ferguson and Messier, 1997). This could result in participants responding positively even without any personal knowledge of the issue (Ferguson and Messier, 1997). Worse would be that the interviewer could lose credibility, as it is considered impolite to ask such questions and may be construed as intent to mislead (Ferguson and Messier, 1997). In transcribing interviews I found that some of my clarifying

questions were unintentionally leading at times, although these were infrequent and interviewees seemed to understand where I was coming from. In addition, it is important in Inuit culture to wait until the person is done speaking before asking another question. This was sometimes challenging when I was trying to keep up with an explanation while making mental notes to ask for clarification. Occasionally I could not stop myself from interrupting when things became confusing. Nevertheless, semi-directed interviews are beneficial in aiding to conceptualize individual experiences (Bennett, 2002b). They provide an important interpersonal context and allow participants the opportunity to ask questions, tell stories, make comments/suggestions, and share experiences. Such settings may not be conducive to the traditional means of Inuit teaching (Section 8.2.3), but they were invaluable to introduce me to the detailed terminology, environmental relationships, uses, changes, and socio-economic implications of sea ice in each community.

The importance of a reliable, supportive, dedicated interpreter to the success of the project, and the collaborative research process itself, cannot be overemphasized. Often referred to as a translator, I employed the title interpreter because they do much more than strict translation. They often act as a:

a) **research assistant** → helping to set up and take down maps and equipment for interviews; helping to organize, schedule, and follow up on interviews; helping to plan equipment, food, and gas requirements for sea ice trips;
b) **local liaison** → helping to establish and maintain contacts with local organizations and key interview participants (during field work and when I was not in the community); helping to communicate or distribute information around town;
c) **guide** → guiding me on sea ice trips; arranging for a guide, and accompanying us to help with interpretation on sea ice trips; taking responsibility for my safety and well-being while traveling on the ice; teaching me about ice conditions, hunting, and safety while traveling on the ice;
d) **project ambassador** → supporting the project to other community members, friends, family, organizations, etc.; they worked with me most closely, and most consistently, so they knew the most about the project and could describe our objectives, answer questions, or clarify misunderstandings when I was not around;
e) **translator** → in the literal sense, by translating written documents from English to Inuktitut; and,

f) **collaborator** → helping to analyze or revise results; clarifying misunderstandings or misinterpretations on my part; providing feedback on interview methods, field work plans, project results; co-authoring papers/posters.

Furthermore, in order to effectively "translate" a concept from Inuktitut to English, or vice versa, they have to interpret the meaning and explain it as closely as possible in the other language. This takes a skilled person, fluent in both languages. For this project they also needed to be knowledgeable of the highly specialized sea ice terminology (especially the older, more sophisticated terms that the elders use). Therefore, interpreters themselves essentially had to be hunters, or have experience on the sea ice, to accurately interpret interviews. They are a bridge between the researcher and the community, thus they can enhance the project or be a detriment to progress. The success of the project is inherently tied to the interpreter-researcher relationship, as well as the community-researcher relationship.

I am fortunate to have worked with four talented, interested, and committed individuals. Their involvement in the project was invaluable, as they:

- helped in identifying and contacting people to interview;
- facilitated the interview process, enabling communication between myself and the unilingual Inuit;
- improved the types and formats of questions that I asked, making the interviews both easier to translate and easier for the participant to respond;
- interpreted cultural differences along with languages (e.g. the way people acted, expressed things, or asked questions – or not); and,
- continued to help me learn about Inuit culture, perspectives, and practices outside of the interview setting.

However, working with people always poses some element of challenge:

- there can still be misunderstandings, even with the use of a skilled interpreter, because different mindsets can result in different interpretations (especially if this is not noticed, expressed, or clarified early on);
- it is sometimes difficult to adequately explain specific concepts between English and Inuktitut, so points may be missed or misinterpreted;
- the relationship of the interpreter to other community members can affect the people who are interviewed, or the depth of the interview (i.e. there are tight family, lifestyle, and religious groups in each community, and thus some may be better represented than others); and,
- interpreters have their own lives, which must understandably take priority over research and work; because of the daily challenges experienced by many in northern

> communities (e.g. family problems, lack of employment, suicide, substance abuse, health problems, childcare responsibilities, etc.) there were times when interpreters were unable to make a scheduled interview, were hard to get a hold of, or were not available on certain field research trips.

These are all important considerations for research in a northern community context, both for the selection of an interpreter and in finding a similarly skilled, reliable "back-up". Some of these challenges can never be fully addressed or alleviated, but I feel that we made the most of our opportunities. By working closely with interpreters to develop and conduct the research we covered as many people and as many topics as was feasible. By maintaining frequent contact, and organizing for direct involvement in terminology/results revisions, we also minimized the chances of misunderstandings. I attribute much of the success of this project to the skills, patience, and ongoing contributions of Andrew Dialla, Pootoogoo Elee, Eric Joamie, and Theo Ikummaq. They acted as teachers throughout the research process, and many of my reflections on methodology were instigated by our shared conversations and experiences.

### *8.1.3 Participatory mapping*

In addition to the types of questions asked in the interviews, the visual element provided by incorporating maps proved to be valuable in triggering: i) memories of sea ice conditions or travels; ii) stories of sea ice travel or hunting; and, iii) descriptions of ice conditions or terminology. At first the maps were not an interactive part of the interview process, they were saved until the end and were then the specific focus of questions and descriptions. However, early in the second field research trip Ikummaq suggested that we alter the process to include maps as part of the interviews from the outset. This meant that the map was in front of the individual throughout the interview, and they were free to refer to it, draw on it, or write on it any time. Questions were no longer directed specifically at the map, rather the interviewee would frequently incorporate the map to: i) focus on a specific geographic area; ii) explain a particular ice condition or localized process; and/or, iii)

demonstrate stories or travel routes. This use of maps was effective as it led to richer interview responses, as well as more features/terms/indicators actually being drawn on the maps. Inuit are visually orientated people, as well as very spatially oriented and adept (Morantz, 2002). This came across clearly with the use of maps, and became an important complement to both my questions, and interviewee responses. This has also been the case with other environmental topics (Turner and Hiernaux, 2002; Smith, 2003; Cronin *et al*., 2004; Natcher, 2004) that are geographically influenced and may be difficult to describe with words alone. Furthermore, the maps as a visual aid helped to improve communication between myself and the interviewee (Section 8.3.3.4). It provided a medium through which people were able to bridge simple descriptions with their experiences of sea ice.

Despite the advantages of using maps as part of the interview process, there were also some short-comings of this representation of the local and regional landscape/ocean expanse around each community. First, by using a 1:250 000 map scale, three or more map sheets had to be combined to show ocean areas around the general vicinity of each community. I was frequently reminded that even this coverage was inadequate in showing the areas that people have actually traveled, or that they wished to describe, in terms of ice conditions or hunting grounds. So, there is an inevitable tradeoff between map detail, coverage, availability, and size. Employing 1:500 000 maps sheets would not provide enough shoreline detail to indicate fine scale features (e.g. tidal cracks, travel routes, or even polynyas) but it would adequately show the extent of sea ice use. On the other hand, 1:50 000 maps would greatly enhance the detailed map representation, but these are not readily available for many areas of the Arctic (and their format and dates vary greatly). It would have been impractical to add more 1:250 000 maps sheets since the map extent already exceeded most regular table sizes (i.e. would have been unwieldy in small interview spaces). Therefore, map scale and size is an important

consideration depending on the features of interest and the requirements for large or small scale coverage.

Another challenge with using multiple 1:250 000 maps sheets was that the area around each community actually crossed two Universal Transverse Mercator (UTM) zones. Therefore, the digitization and post-processing involved was tedious and time-consuming (Section 3.3.3.2). Due to the different zones each map sheet had to be digitized separately, followed by data re-projection into a common coordinate system. This was relatively straightforward, although necessitated individual feature editing to match some of the areas that touched UTM boundaries. Due to slight differences in the map sheet registration on the digitizer, as well as minor manual error, they did not always provide a continuous line to link the same features drawn over two map sheets. These necessary steps did not alter the data itself, but it can be a challenge to ensure map accuracy and precision after several rounds of data processing.

Further to some of the short-comings of the maps themselves, some people interviewed were not used to interpreting maps. Therefore, it was difficult for them to identify with the two-dimensional surface and to draw sea ice features. Although maps are a western/ southern/scientific way of representing the physical world, it was deemed the best option in terms of standardization and availability. However, even people who felt they were not familiar enough with maps to employ them in delineating sea ice conditions were able to recognize important terrestrial features and associated placenames. By visualizing the areas as if they were traveling there, interviewees could use the map with incredible precision to indicate important features, dangerous areas, or aspects of change. Interestingly, this process of orienting themselves to familiar travel routes or landmarks highlighted my own assumptions on directional preference for map placement. I had fastened the map to the table facing the interviewee, with north pointing upwards away from them. This seemed like a natural map position, but depending on the community (and where people normally traveled)

some interviewees had difficulty associating with the map until they could position themselves as they normally traveled. For example, in Pangnirtung this meant that people preferred to be looking out of the fiord, as if they were beginning their journey to Cumberland Sound (i.e. facing west). In other cases, where interviewees were more familiar with map use, they were comfortable with any way the map was situated. They could interpret areas around the community regardless of their viewing angle.

Sea ice itself is a challenging feature to represent on a map because it is dynamic, cyclical, and variable. Therefore, different people would draw a feature with a different conceptualization in mind. This meant that points and lines could be used for the same kind of feature, depending on how the individual thought of that feature. Furthermore, frequent caveats were made by interviewees when drawing features such as the floe edge or tidal cracks, cautioning that the interpretation of the line should be either approximate, or as representative of only one year. It was continually mentioned that these features were variable with each year, and even within a year, and thus map representations were not to be taken as fixed positions. Once all the features were compiled this aspect of variability became clear. Yearly variations were often represented through different peoples' representation of like features, yet the geographic consistency of delineations still provided a good indication of actual positioning. The consistent overlap of feature placement between interviewees (albeit with slightly varying local extents), as well as hunters' agreements with the map compilations provided in reporting trips, support confidence in the approximate map locations delineated.

While acknowledging the short-comings of incorporating maps into interview and sea ice analysis, this component was one of the most fascinating parts of the project. Interviewees seemed to prefer discussing the map rather than being asked a string of questions. When it was in front of them almost every response incorporated a map reference. The maps also sparked comments and explanations that enhanced interview responses. Finally, the maps

were an effective means of shifting the focus away from the individual, so people seemed more comfortable discussing the map than speaking directly to me or the interpreter.

### *8.1.4 Experiential sea ice trips*

Traveling on the sea ice was highlighted by many interviewees as being critical for learning about ice conditions, Inuktitut terminology, and travel safety. Sea ice cannot be adequately described indoors, in an interview setting (Section 8.2.3). Therefore, elders and hunters insisted that I should have some of this experience. As a result, it became a priority for me to get out on the ice whenever possible. This type of experiential learning and research was a personal challenge for me in many ways, such as: i) giving up control; ii) facing the elements; and, iii) conquering fears. It was much more than participant observation. My experiences were most critical, and my observations were as much of the people as the surroundings. The cold was somewhat arduous, but it also provided perspective on what it is like for hunters who are traveling whenever the ice is safe enough. It was also sometimes difficult to rent equipment, plan trips (i.e. according to weather and peoples' schedules), and find reliable guides while balancing costs and interview/focus group plans. Despite my multiple research trips at different ice formation and decay stages, it was impossible to capture and experience all potential ice conditions and stages myself. It was even more challenging to try to represent my experiences of these trips in this thesis. Most of the accounts are based on recollection, and it was very much a personal experience. Furthermore, with no consent forms required for the actual trips, it is difficult to assess: i) where to draw the line between stories employed for sea ice instruction and personal stories; ii) what types of pictures are appropriate (i.e. sensitive about the act of hunting or preparing meat); iii) how to incorporate video into interpretations; iv) how to separate my impressions from the actual experience the hunters/guides were trying to provide; and, v) how to separate my interests of providing educational materials and conducting research.

On each trip I was well taken care of. The hunters were patient, careful, and even protective. I felt fortunate to be taken on the ice, as gender roles in Inuit society would mean that it is uncommon for women to be on the ice hunting with other men, particularly men who are not their husbands or direct family members (Section 3.3.2.1.1). I believe this gendered relationship also influenced:

- the manner in which things were demonstrated to me (i.e. directly and patiently explained);
- the types of experiences we had (i.e. mostly sea ice travel and observation, hunting only when there was a particularly good opportunity, and careful explanations around dangerous features); and,
- the amount of responsibility given to me (i.e. almost always a passenger on the snowmobile or in the *kamotik*, and no offers of firearms use or hunting attempts).

For my personality, and my objectives for the sea ice trips, this treatment was ideal and considerate. However, it may have been a very different experience if I were a male researcher doing the same kinds of trips on the ice, for the same purposes.

Most of the challenges of experiential sea ice trips were internally driven by my own personality, expectations, and experiences. However, there were also great benefits of this practical learning. The sea ice trips provided valuable photo and video opportunities. These means of recording ice conditions and expert explanations aided to provide visual sea ice representations in order to link sea ice terminology or descriptions. Consequently, after these trips I learned the sea ice terms much faster, and was able to visualize the specific conditions as elders described them. I gained tremendous respect for the danger and dynamism involved in sea ice travel and hunting. These trips helped me realize the practicality of sea ice knowledge and terminology, as related to weather, current, wind, ice, and snow indicators, as well as placenames or landscape/icescape features. This type of geographic knowledge cannot be adequately understood without experiencing it.

### *8.1.5 Focus groups*

The focus groups conducted in Cape Dorset and Pangnirtung proved to be valuable interactive sessions. Each group session was small, with a specific objective (i.e. linking sea ice terminology to photographs, or verifying the seasonal chronology of freeze-up and break-up). These were an important complement to semi-directed interviews, and experiential sea ice trips. Employing all three methods in concert allowed for broader triangulation (Baxter and Eyles, 1997; Yeung, 1997). Specifically, focus groups were beneficial to the research process for several reasons:

1. **The group setting helped ensure broader accuracy of research results.** → It was fascinating to watch how people were accounting for local dialect variations and individual expertise. Depending on where the elders had grown up, each was an expert on the particular area where they had lived prior to community settlement. I was surprised at the dialect variations that stemmed from that, despite having lived in the same community for many years. Typically, a consensus on each topic, photo, and term was reached through discussion, but it also became clear that there were elements of deference for: i) the most experienced, respected elder; and/or, ii) the person most familiar with a particular hunting ground or travel route.
2. **Focus group interactions helped limit the potential for misunderstanding on my part.** → My analysis of interviews and/or experiences on the sea ice were useful in linking photos to terminology. Yet the focus group highlighted some of the areas where I was unclear, or I had misunderstood an explanation. My use of pictures and Inuktitut terms was rendered more accurate after having discussed them with community experts.
3. **Targeted group sessions mean that community experts are involved in some aspects of interpretation/analysis research stages.** → This is important in the collaborative research approach, and the beginning of moving towards a research partnership.
4. **Focus groups provided valuable insights into varying individual perspectives.** → Based on the interviews I expected that each of the elders would be in quick agreement with most photos or terms. However, bringing people together and having visual representations of sea ice brings up many more topics that were not introduced in the interviews. Therefore, discussions were dynamic and revealing in terms of what each elder was trying to get across. As mentioned earlier though, consensus was nearly always reached, and in the process the older Inuktitut terminology (or locally varying dialects) were highlighted. None of these aspects would have come out of interviews alone, so they were important additions to my results interpretation.

As in most aspects of research, there are also challenges in working with interactive qualitative methods such as focus groups. First, conducting a focus group through an interpreter is demanding for both the facilitator and the interpreter. For me, it was difficult to

follow the discussions since there was frequent back and forth between elders. It was impossible for the interpreter to translate everything without losing the thread of the discussion. Therefore, it is hard to interject to ask for clarification. It is also difficult to evaluate how things are going or when it is necessary to re-focus the group. There are many things that I missed, but the elders and the interpreter were patient as they would stop to explain particular terms or ice conditions when the discussions had resulted in a consensus. For the interpreter, it is equally hard to keep up with simultaneous translation as to remember all the details to translate when there is a pause in conversation. Inevitably some aspects were missed, and although the session was taped with a digital audio recorder, it is confusing to transcribe overlapping speech and with minimal translation.

Second, whenever involving more than one person it can be more difficult to organize and coordinate sessions. Both the preparation and the execution of the focus group were more time-consuming than interviews. However, the unique results and insights into inter-personal dynamics are worth it.

Third, because inter-community dialects (and even pronunciations) were elucidated through focus groups it became more challenging to represent Inuktitut terminology to the satisfaction of each elder. These variations related back to particular camp leaders or families having their own way of speaking (although it is still understandable to other families). Therefore, compromises were necessary where one term could not be agreed upon. In those cases two to three dialect variations would be represented (or a more traditional Inuktitut term would accompany the recently used term for the same ice condition) to ensure that the language components were as representative of the community as possible.

Fourth, inviting people to group sessions highlighted the blurry boundaries between relationship-building, knowledge-sharing, and research. It raised the issue of how to distinguish between talking to people, and conducting research. Focus groups conducted in

the third research trip were formally scheduled, with invitations extended to specific individuals (Section 3.3.2.3). Therefore, honorarium amounts were mutually agreed upon prior to the group session. In contrast, the group sessions in the fourth research trip (Section 3.3.2.3) were promoted as informal drop-in sessions. These aimed to provide participants an opportunity to see interim results, and to provide feedback where they felt revisions were necessary. However, those who showed up stayed for hours, carefully reviewing results. This was much appreciated on my part, but it was not anticipated. I had not planned to provide honoraria for dropping by, but individuals expected to be compensated for their time after staying for several hours. So the informal sessions turned into focus groups, and participants were given honoraria accordingly. People are accustomed to being paid for attending meetings, as well as for participating in interviews or other aspects of research. Therefore, it is important to clarify expectations and to establish honorarium amounts prior to meeting in groups, in order to avoid potentially awkward situations. There is also potential for concern where expectations may become unreasonable (e.g. chatting over lunch could be construed as requiring payment).

Finally, focus groups can sometimes lead to more confusion or work to sort through the different responses. Nevertheless, I feel they were an important complement to other research methods. They helped with aspects of results triangulation and terminology accuracy to ensure that my interpretations were as close as possible to the intended meanings of a particular term or explanation. These group sessions were thus part of the reporting and verification process, as well as the beginning of efforts to improve communications between community members and scientists.

#### *8.1.6 Communication strategy*

Developing an effective and appropriate communication strategy (Section 3.4) was crucial in gaining, and maintaining, community support for/involvement in my sea ice project.

This began in the initial contact phase, and continued throughout the entire research process, whereby reporting and knowledge-sharing were essential to each research phase (Section 3.1.1.7). I found that developing the communication strategy from the outset, and maintaining ongoing communication with community members and organizations throughout the project, was advantageous for several reasons:

- initial and ongoing contact improves community awareness of research objectives, methods, and findings;
- early and continuous communication builds community familiarity with the researcher, and increases the researcher's visibility and recognition;
- providing interim results and requesting feedback throughout promotes two-way dialogue;
- providing interim results and requesting feedback throughout improves the accuracy of representing the community perspective;
- ongoing communication enables progress towards true collaboration;
- continued dialogue helps researchers and communities to understand each other's experiences, interests, and concerns; and,
- a sound communication strategy establishes a foundation for research partnerships.

The communication methods employed throughout this research process are important to examine for their relative strengths and weaknesses in a northern, community-based research context. Through a refinement of my communication strategy I attempted to incorporate the elements that community members themselves suggested would be the most appropriate ways to report on project progress/results, including:

- written materials (bilingual in English and Inuktitut, although not everyone can read, or pays attention to written materials (AE1; IN1; JoM1; LU1)
- the Internet (but Internet access and speed can be a problem) (AN1; LU1)
- video (AN1, LU1; JoM1)
- audio (AN1; JoM1)
- in person (AN1)
- over the radio (IN1; KS1)
- presented in a (community) meeting (SS1; EN1)
- making results available to the public (in any way) (AE1; KS1)
- incorporating results into school programs (AE1; KS1)

Interim reports (Section 3.4.1) along with informal meetings/presentations (Section 3.4.2) alleviated some of the local concerns of the lack of reporting from previous projects (Table 8-1). Although they did not provide results per say, their recurring nature helped to

**Table 8-1:** Summary of the strengths and weaknesses of various communication methods used in the overall communication strategy.

| Communication method | Strengths | Weaknesses |
|---|---|---|
| **Interim reports** | - provides updates throughout the research process<br>- opportunity for community review of preliminary results<br>- shows who had been involved and the topics covered<br>- direct form of communication<br>- brief overview of project progress | - time-consuming to write and mail reports to each person/organization involved in/supportive of the project<br>- translation time required can cause delays in sending reports<br>- some people do not pay attention to mail, or written materials |
| **Informal meetings/ presentations** | - useful to propose the project, gain valuable feedback, and gain support from local organizations/coordinators – continued communication<br>- small group numbers, and joining previously scheduled board or council meetings, assures attendance of key people<br>- raises awareness about the project in the community | - people attending are not always interested<br>- the informal aspects make them difficult to formally incorporate in results or analyses<br>- time-consuming to prepare for<br>- difficult to appropriately target the age or audience composition |
| **Radio shows** | - reaches a broad community audience in a short time<br>- useful to propose a project, present updates, or present results<br>- informs community members who were not involved<br>- easy for people to provide feedback or ask questions | - hard to gauge community response to information presented<br>- cannot incorporate visual aids or explanations<br>- limited radio hours due to funding, permits, or lack of volunteers<br>- lack of air time when important community events are underway |
| **Posters** | - visual summary of interim or final results – greater interest than reports<br>- accessible in public places – more likely to be read or referred to<br>- raises awareness of the project beyond those who were involved | - time-consuming to create and print<br>- large format can take up too much space on office walls (either no room, or other information/posters have to be taken down) |
| **Information pamphlets** | - brief, easy to read, and more appealing than reports<br>- easy to distribute, whether in person or not - can reach a broad audience | - pamphlet size does not allow for much detail on the project<br>- a one-way form of communication, does not elicit much feedback |
| **Results summary reports** | - condensed point-form results with visual aids highlights key results<br>- results can be directly mailed to individuals/organizations that were involved in/supportive of the project | - challenging to adequately summarize results and still provide an informative and useful overview of research findings<br>- lengthy documents are of little interest, and are costly to translate |
| **Public meetings** | - personal contact was emphasized throughout the project<br>- valuable discussion forum, encourages involvement of people who had not participated in the project directly | - difficult to organize (requires local help and several days in the community to arrange for food, drinks, and adequate advertising)<br>- poorly attended, does not reach a large audience |
| **Maps** | - maps are of most interest, they have the most potential for practical use<br>- community members can relate to, and interpret, results more easily<br>- valuable learning and communication tool, always sparked discussion | - static, two-dimensional representation does not adequately reflect the dynamics, dangers, and yearly variations of sea ice conditions<br>- some people are not familiar with reading or using maps |
| **Copies of audio/video tapes, transcripts** | - most detailed accounts of interviews, un-edited full length interviews<br>- provides access to original statements made by each individual involved | - can be an overwhelming amount of information<br>- not everyone knows where to find this information<br>- storage space may limit the amount of time materials are kept |
| **Website** | - project information, timeline, summaries, and other documentation is widely accessible | - Internet access can be slow<br>- not everyone has access to the Internet or can use computers<br>- does not provide directly practical information |
| **Informal communication** | - most personal, and so the most relaxed<br>- covers diverse topics, important for gaining community context | - ethical considerations for directly incorporating these communications into research results |

maintain ongoing contact with individuals and organizations. Interim reports sent to each individual involved in the project helped to reassure people that they were not forgotten, and that their contributions were valued. Similarly, informal meetings and presentations allowed for ongoing updates which provided additional opportunities for local support and feedback (Table 8-1). These types of meetings proved to be the most productive, and the most feasible, over the course of the project (Table 8-1). Preparing for the meetings, and especially writing/sending the interim reports, was time consuming to maintain a timely reporting schedule (Table 8-1). However, these efforts were worthwhile since they were among the most direct (i.e. personal) means of keeping people informed. From a few comments I received in each community, people were happy to receive interim materials and updates. They appreciated even brief reports, so they were aware of project progress. However, mailing written reports may not be effective for everyone. Some elders do not pay much attention to written materials (Table 8-1). Furthermore, the high school class presentations I conducted in each community (grades 9 – 12) were an important step towards informing and involving the youth. These presentations were perhaps not critical to the research itself, but they were a way to: i) give back to the community; ii) provide students with ideas for project or career options; iii) learn more about sea ice around their community; and, iv) encourage involvement in educational programs. However, not everyone in a group will be interested, and it can be challenging to appropriately target the age and/or composition of the audience (Table 8-1).

Going over the local radio (Section 3.4.3) is one of the most effective ways to reach a broad community audience (Table 8-1). I found that this method of communication was most valuable in the initial stages of the project due to the higher numbers of comments and suggestions that I received. During the reporting stages it was challenging for me to effectively summarize the results in a 10-minute radio slot and still provide a meaningful, representative indication of what the project achieved. It is also hard to gauge community views over the

radio (Table 8-1), but at least it is assured that many people hear it. Some challenges with radio station staffing and air time also hindered the number or duration of radio opportunities in each community (Table 8-1). As a complement to on-air communication are visual or written project summaries such as posters (Section 3.4.4) and information pamphlets (Section 3.4.5), respectively. These are effective because they are accessible in public places such as the Hamlet Office, school, or HTA. For posters this means they are referred to more often, and for information pamphlets it facilitates distribution (Table 8-1). Furthermore, both provide short project summaries. Posters would be more appealing to those who are visually oriented, and pamphlets to those who prefer to read (Table 8-1). The drawbacks to posters include the fact that they can be time-consuming to create, and sometimes they take up too much space to be feasibly showcased in local offices (Table 8-1). As for the information pamphlets, they do not incite much feedback (Table 8-1).

In terms of communicating research results, I incorporated written results summaries, public meetings, maps, and copies of original audio/video/transcript data. It was challenging to effectively collate and summarize results chapters (Section 3.4.6) without refining things so much that the points were too general and vague (Table 8-1). These documents also had to be translated, whereby the per page translation cost is another impetus for having short summaries (Table 8-1). Along with the results summary reports I arranged for an open public meeting (Section 3.4.7) in each community to provide a summary of the results in person. Presenting the results in person was deemed important, but such meetings were considerably harder to organize, and less well attended, than initially anticipated (Table 8-1). Interestingly, the meetings drew people who had not participated in the project, whereas I had anticipated the opposite. In addition, from discussing these experiences with others in each community it seems that open meetings were not of much interest for several possible reasons:

a) it was spring time, and although the kids were still in school many families were out traveling or hunting in the evenings nearing 24-hour daylight;
b) it was playoff hockey time, so people may prefer to watch the game than attend a meeting;
c) some people are overloaded with meetings to attend, so meetings that are not mandatory are not appealing;
d) some people have no interest in the project;
e) when there are family issues that need to be taken care of, they are understandably prioritized over meetings; and,
f) some people do not have transportation and thus may not have been able to get to the meeting location (e.g. some elders cannot walk across town).

Based on these experiences, it might be advisable to only attempt such public meetings: i) in the late fall or winter when most people are in town; ii) when there is another large meeting going on to which it could be added to the agenda; iii) when direct invitations are sent out to people, instead of an open invitation; and/or, iv) at the end of a longer research trip, so that more time is afforded to informing organizations and the researcher has had more presence in the community prior to the meeting. These meetings were still beneficial in that the people who did attend seemed interested and appreciative of learning more about the project results. However, it may be more valuable to present the research results in smaller, more informal meetings such as in the preliminary community visits (Section 3.3.1).

Additional results reporting was provided through compilation maps (Section 3.4.8) and copies of original audio/video/transcript data (Section 3.4.9). The maps drew the most attention, and seem the most likely materials to be of practical use to community members (Table 8-1). Many of the experienced hunters were interested to see how conditions were represented, or what areas were missed. However, for the younger hunters it was somewhat of a learning tool to locate ice conditions where they may not be familiar with the area (Table 8-1). The maps were also important discussion pieces. They got people talking to each other about particular places, routes, hunting grounds, and even stories (Table 8-1). Hunters are well aware of the short-comings of maps (Section 8.1.3, Table 8-1), but they still found that they were a valuable representation of sea ice conditions, dangers, and change. In contrast, while

the audio/video tapes and interview transcripts provide the most detailed accounts of research outcomes, the volume of information can be overwhelming and thus referred to infrequently (Table 8-1). Furthermore, it is important to consider where the results will be stored because sometimes space limitations in a local office are such that older reports get thrown away (Table 8-1). Therefore, it can be difficult to maintain continuity of the research results, or even to access previous research done in the community. In addition, when results or reports are deposited in a central location, often people are not aware that they are there – despite a researcher's best efforts to inform people (Table 8-1). So, people may think that reports were never made, when in fact they are sitting in the community. This is why it was important to have radio shows, community meetings, results summaries, and information pamphlets to highlight where results were made available.

The website (Section 3.4.10) was perhaps of most use to other project partners in southern or academic institutions (Table 8-1). I did not monitor traffic to the site, but only in the fall of 2005 did the communities gain access to high-speed broadband Internet. It is not yet a popular option for locating information for the middle-aged hunters and the elders who were most directly contributing to the project (Table 8-1). However, youth in the schools are avidly using the Internet on a consistent basis, so this tool could become increasingly valuable for future communications with younger generations. Another consideration for the lack of utility for a project website is that it is not of direct practical importance to community members (i.e. in comparison to weather forecasts or satellite image access) (Table 8-1).

Informal communication (Section 3.4.11) is the most personal interaction, and thus is possibly the most valuable and informative (Table 8-1). A lot of valuable cultural and community context was provided in informal settings. These informed my own self-reflection and research process, but they could not be formally incorporated into the results (Table 8-1). This was one of the most challenging aspects I found with the collaborative research approach.

It was sometimes difficult to separate the research process from my own personal learning and experience.

Developing and implementing a communication strategy requires a lot of time and effort. Within this project, maintaining and improving communication throughout the course of the research took up nearly half of all the time dedicated to the project. These efforts can easily go unnoticed in communities, as well as in academic institutions, and yet they are imperative time investments to ensure successful and representative research. Communications, and ongoing alterations according to what is most locally effective or appropriate, are essential if we are to improve our collective capacity to link Inuit and scientific expertise in a practical, useful manner.

**8.2 Community perspectives on working with researchers**

Underlying the entire research process is the issue of research relationships between Inuit and scientists. Challenges or opportunities would arise in field research depending on a person's past experiences with scientists or their perspectives on what researchers do and why. In order for scientists to learn from Inuit about sea ice, or to link Inuit and scientific knowledge on sea ice, Inuit have to be willing and interested in working with researchers (Laidler, 2006b). To find out what community members think of working with scientists I asked into: i) previous experiences with researchers; ii) methods of research reporting; and, iii) views on working with scientists (i.e. analysis codes: experience with scientists, learning from each other, reporting of research results, scientific methods, working with scientists (Section 3.3.3.1)). The comments provided in the interviews are important to share so that researchers – myself included – can better understand, and thus respond to, community perspectives on northern research and those who undertake it.

Efforts to link Inuit and scientific sea ice expertise, in a manner that broadens both knowledge bases, requires consideration for the underlying differences in: i) life experiences; ii)

methods of learning or investigation; and, iii) goals for understanding sea ice (Laidler, 2006a). Cultural and epistemological differences influence these distinguishing characteristics of Inuit and scientific knowledge (Section 2.1.1). As researchers we are mainly familiar with western-influenced ways of thinking, according to the particular discipline in which we have been trained. Even in speaking the English language, our thought processes are very different from Inuktitut speakers. Therefore, this section aims to familiarize the reader with some of the Inuit perspectives on scientific means of monitoring or characterizing ice conditions and change. It is hoped that an enhanced comprehension of local viewpoints can contribute to more practical ways of intersecting different knowledge systems.

### *8.2.1 Previous community experience with researchers*

Of the three communities, elders and hunters in Cape Dorset seem to have the least experience working with researchers (Figure 8-1). Common research topics in Cape Dorset focused on: artifacts, carvings, art work, placename mapping, climate or weather change, caribou and seal skin clothing, and wildlife. Two of the elders interviewed had also acted as teachers in school programs where children were taken out on the ice and taught about how to use a harpoon, and how to test ice safety. In contrast, people in Pangnirtung have worked with researchers the most (Figure 8-1). They have been asked, or assisted in, research about a range of topics, including: life in the past, wildlife (seals, beluga, caribou, falcons, arctic char), sea ice conditions and change, weather prediction and change, climate change, clouds, minerals, lakes, glacier changes, carving, hunting, and travel safety. Six people had assisted scientists with data collection such as beluga or arctic char tagging, lake coring, and mineral sampling. Three had acted as guides, taking researchers to and from field sites safely, and one had been a teacher in an ongoing university summer field school (run through the University of Winnipeg). Igloolik was similar to Pangnirtung in terms of the number of people having worked with researchers before, but there was also a higher number who had never been involved in research (Figure 8-

1). Those who had research experience were interviewed on, or assisted with, projects that focused on: sea bottom animals, lake or ocean fish, marine mammals, plants and Inuit traditional knowledge. Furthermore, several people had also been: i) involved in the Igloolik Oral History Project of the Inullariit (elders') Society, run through the NRI (Igloolik branch); ii) working with Isuma Productions in terms of Inuit heritage; iii) employed by the NRI; or, iv)

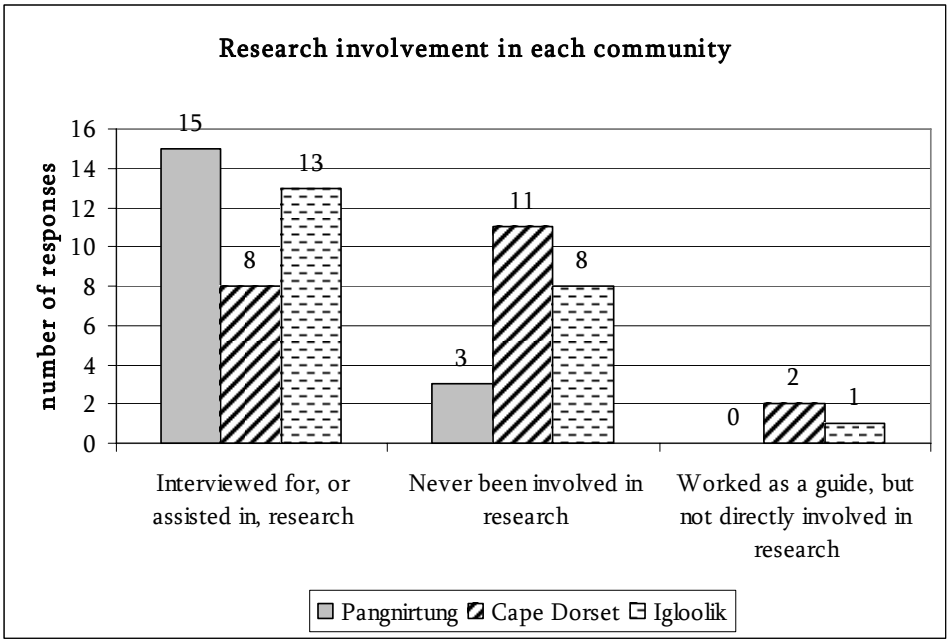


**Figure 8-1:** The number of people previously involved, or not, in research in their communities.

involved in making their own videos. Elders and hunters in Igloolik seem more actively involved in research, as seven had acted as research assistants in collecting samples for biologists, geologists, or photographers, four had worked as guides, and two had worked as interpreters. Furthermore, one person had previously worked as a wildlife officer, so he had experience working with numerous scientists and biologists, as well as developing survival courses and materials.

### *8.2.2 Life experiences*

One of the most prominent differences between Inuit and scientists are the life experiences that influence the way they learn, and come to understand, sea ice characteristics

(Laidler, 2006a). Inuit live in the Arctic, so they experience sea ice dynamics, variability, and change in ways that affect their daily lives (Laidler, 2006a). In contrast, scientists study the sea ice environment, which may or may not occur daily and is typically removed from experiences that would physically affect life outside the workplace (Laidler, 2006a). Therefore, the implications for Inuit understandings of sea ice can literally be a matter of survival, while for scientists the implications are more theoretical by nature (Laidler, 2006a). Granted, scientists refine their understandings through years of practical experience and learning from others in an academic setting, but the intimate relationship between hunters and the sea ice necessitates a different form of learning than from books, journal articles, and scientific field work and/or experiments (Kawagley, 1998; McGrath, 2003; Bennett and Rowley, 2004). Rather, experiential and practical learning through sea ice travel and use are critical in the development of Inuit sea ice expertise (Nelson 1969, Freeman 1984, Riewe 1991, Immaruittuq *et al*., 2000; Aporta 2002). Gaining first hand knowledge on sea ice is vital for safe ice travel and navigation, making each experience a lesson and the observation of others an essential component of learning (Laidler and Elee, in press). People are learning about the ice through hunting or traveling on the sea ice. It is not a formalized teaching, and often the hunters interviewed explained that as youth they did not even realize they were being taught; traveling with their fathers or other family members was mainly how they learned (JI1; MJ1; MM1). When people were mobile (i.e. not yet settled in the communities), observing the ice, the weather, the environment was a way of life. It was intertwined with daily and seasonal routines, it was not a conscious decision (ME1; MM1; TI2). Young boys were taught through demonstration, as they would observe older hunters going about their hunting techniques, preparation routines, or sea ice navigation (EM1; KS1; MJ1; MoK2; NQ1; TI2). Their experiences would thus follow a natural progression of watching others, trying it for themselves in a supervised or controlled setting, and then with their confidence building they would venture off on their own (MoK2; EK1; NQ1).

Furthermore, individualized experiences accumulate as part of a self-teaching process, through trial and error, and most importantly through constant sea ice use (AQ1; EK1; DaN1; NQ1).

> "A lot of information [I'm] giving out is self-taught, a lot of it came from different sources of people. When [I] was a youth, [I] would travel with different companions, and from those different people [they] had different knowledge bases. So therefore, [I] was learning different things from different hunters, when [I] was was first getting out and about, and [I] was traveling, just accompanying other hunters. And then afterwards [I] learned a lot of it by [myself], through trial and error." (Qamaniq, 2004)

Therefore, a person's experiential education was dependent on the types of hunting and travel that their family undertook, who they hunted with, and their relation to the individual (MJ1; SA1).

> "So the difference he finds, for example himself (Ammaq) and myself (Ikummaq). He grew up around his father, and his father was the only one that he was accompanying when he was young, on hunting trips. Whereas myself, I went with cousins, uncles, brothers, whoever was going out pretty much. And he stuck to his father. In our culture we find that when you have a situation like this, they're more hesitant to ask their father about certain items, there's less communication than, for example, between me and my cousin. So we confer more than they would. So therefore, what language that might have been taught on those trips wasn't done when he was out hunting with his father. Whereas if you take a person like myself, going out with brothers, uncles, aunts, not aunts, cousins, we talked more I think. And I wasn't hesitant to ask questions either. And he was hesitant to ask questions. So therefore the language probably didn't come out exactly as it did to some of us, the language that had been taught. The knowledge was there, the language isn't." (Ikummaq explaining based on Ammaq, 2004)

Inuit have lived on, and used, the land and sea ice for generations. Therefore, community members feel that if scientists want to learn about these environments they should be asking Inuit – learning from Inuit (AN1; KS1; DAq1; MA1; AI1; JoP1; EP1; DI1; JoM1; MM1; PQ1; JI2; ME1; LI1).

> "[I] can understand the fact that in the 1970s the Inuit literally battled and fought with scientists, wildlife officials, because of the fact that Inuit were using what they already knew, what they had already experienced…In utilizing that information, every time they tried to explain to the kallunaat[1] what it was, the kallunaat would say 'no, this is not true, we have our own theory, this is how we see it'. And that was literally in Inuktitut what you call 'backward people', because of the fact that

[1] *Kallunaat* refers to white people, or southerners, in Inuktitut.

> they think they do have an understanding but that literally they don't. And this is the time when the elders and the scientists are to meet half way and then start utilizing their knowledge to work together towards bridging that gap in order for them to have a clear understanding where things are coming from….And [I'm] always hopeful that the scientists can get off their high chair and come down to being a human, human enough to understand that Inuit way of life. This is the life that [we've] lived and [we] know what [we're] talking about. You know you don't have to be a rocket scientist to understand some of the issues up north. So [I'm] just hopeful that [we] can work together, you know for a better future." (Ishulutak, 2004a)

If scientists are not consulting local Inuit experts then some interviewees felt that they are taking the long way around, they will be less efficient (MJ1; AE1; QT2).

Because scientific means of studying the sea ice are typically conducted outside the community, and even beyond the physical sea ice context (i.e. remotely through satellite imagery or sporadic field work), some community members see no value in scientific information. Nevertheless, the majority of respondents felt that because of the different ways of relating to sea ice, that Inuit and scientists have a lot to learn from each other. Therefore, working together was seen as being potentially beneficial to both (AN1; OO1; EP1; LU1, DAn1). If scientists and Inuit each do their own studies, more mistakes can occur, so by working together they can keep an eye on each other (MM1). Hunters saw themselves as having the knowledge about ice conditions and the environment, and scientists as having the technology (DQ1; AT1, NQ1, ZA1) and the ability to put it all together (AU1). Therefore, in the community context Inuit knowledge is considered more concrete and practical (MJ1), while scientific knowledge is more abstract, or uncertain (TI2).

> "[T]hey should work together, but there's a lot of things that they wouldn't be in agreement much, I think. It's only what I think ok? It's not what is. Ok if you look at scientific journals, there's all these 'ifs', and 'when', and 'maybe', and you know, if you ever read scientific journals, 'it could have been', 'should have been', there's nothing definite about let's say the findings in a scientific journal, it's all guesswork. Whereas with hunters there's no guesswork. As a matter of fact, if there's guesswork involved in your hunting, you're not successful. Everything that you use for your hunting, it has to be concrete, it has to be something that you can rely on that's definite. So therefore if you're hunting you have to be definite, there's no maybes, there's no ifs, there's nothing like that, it is as it is. And guesswork is out of

> the question, if you're guessing as you're going you're not going to be successful. And I find these two ways of doing things, where the hypothesis is thus, so therefore they try and figure out what the hypothesis is going to prove, and in doing that you forget everything else. Whereas, a hunter looks at everything and then comes up with the hypothesis at the end. So there's these two ways that I think could conflict along the way, but if they were to work together it would be beneficial for both. The Inuit might learn how to guess, the researcher might learn how to be more concrete." (Ikummaq, 2004b)

> "…let's say we would go back in the 1960s, we are nothing to scientists. We are just poor smiling Eskimos to them, to the scientists, they know everything….Those days they know everything. I got those information from my uncles, they used to get frustrated trying to explain to the guy and that guy didn't believe. Nowadays like I told you I travel some places, we are trying to work the traditional knowledge, compare it to western science. Somewhere it never fits together, you have to go around that and try to explain both of them, try to explain, and sometimes they don't understand what is going on. The people who are living in that area and the scientists come in, they know everything, they come from university, and they think they know lot of things. Here to there is totally different. You go to Broughten [Island] from Pangnirtung, it's different. So scientists intend to have the whole Baffin Island same thing, but every place is different so sometimes we seem to be lying when we try to explain something to the scientist. Because he has a written text that was done in Pond Inlet, somewhere, he tries to use that in Pangnirtung area. Pangnirtung is totally different from Pond Inlet so that's difficult. And they wanted to try and put things together, it's a lot more understandable when they work together…But nowadays a lot easier, it's 2000 now, it's not '60s now, it's a lot easier to explain. But the most frustrating is, us we don't have even grade 12, but scientists have university degree, that's a difficult situation we have, that we don't have grade 12, he doesn't believe what we are saying. But we live here….[it's] like being a father, the kid trying to be the boss when he wants something, at first it's very hard to stop him doing that eh? It's like scientific and traditional knowledge colliding together." (Papatsie, 2005)

Despite the emphasis on enhanced consideration of Inuit expertise in research, there is also a recognition that as lifestyles change in northern communities (Duerden, 2004; Armitage, 2005) there will be a need for more formalized teachings. Using the ice is no longer a way of life for today's youth (Ford, 2005; Ford *et al.*, 2006a; Ford *et al.*, 2006b), so they have a lesser understanding of ice conditions, dangers, changes, variability, uses, terminology, etc. (ME1; MM1; TI2). Without using the ice every day sea ice expertise is quickly lost (TI1). Therefore, in the long run working together with scientists was seen

as providing more information on ice conditions and change (SK1; JoP1; MoN1), as well as improving the quality of the findings (DAn1).

### *8.2.3 Methods of sea ice investigation and knowledge acquisition*

Because of the vast expanse of sea ice cover around the poles, satellite imagery is currently one the most commonly employed methods of monitoring and assessing sea ice conditions and change in the polar regions (Mysak and Manak, 1989; Johannessen *et al.*, 1999; Parkinson *et al.*, 1999; Huntington, 2002). Therefore, this scientific means of remotely monitoring sea ice will be employed as an example to explore Inuit perspectives on scientific methods. Having gained some insight into the life experiences that contribute to learning about sea ice (Section 8.2.2), we can focus specifically on satellite image interpretation/use in the three communities. This will aid to find some common ground or mutual benefits in linking sea ice expertise based on different modes of knowledge acquisition.

Through years of personal interaction with, and inherent observation of, the marine environment Inuit hunters have gained individualized knowledge that cannot be learned through hearsay or observation alone (LI1, EN1; MM1; AT1). Within the community context, learning about sea ice inside, or away from the ice, was considered inappropriate since it will be impossible to use that information if a person has never seen the condition described (JAk1; MoK2; AQ1; EK1). Furthermore, it is harder to teach indoors because it is more difficult for the elders or hunters to think of all the important features, terms, or conditions when it is not in front of them (AA1; AP1). Therefore, traditional teaching methods would be to undertake practical tasks that require the use of sea ice knowledge (MoK2; AT1; AQ1; EK1; AA1; AP1; QT1) and the interpretation of environmental indicators (MJ1; TI1). Knowledge is passed on orally, and through repetitive experience (LI1, EN1; MM1; JN1; TI1; ZA1; MJ1). This transmission process provides 'information packages' that enable hunters to undertake real-time evaluations of ice stability and safety (Laidler, 2006a). While the more elderly and active

hunters prefer to rely on this method of learning and using the sea ice (AA1; AI1; AQ1; HP1; NP1; PP1; QT1; ZA1), other community members are interested in the potential utility of satellite imagery to assist their travel navigation or assessment of ice conditions (AT1; DQ1; JaM2; JoM1; JS1; LU1; MJ1; MoK1; TI2).

When asked for opinions on the use of satellite imagery to study the sea ice (based on images in Appendix 13), people in all three communities responded positively that they felt the technology can be useful (AN1; AT1; JaM2; JM2; JoM1; LE1; LN1; ME1; MoK1; MoN2; SK1). Despite the interest in using satellite imagery, very few of the interviewees are actively using images on a regular basis (Figure 8-2). This is most prevalent in Igloolik, and then Pangnirtung, while in Cape Dorset no one responded as having used satellite images before (Figure 8-2). The imbalance between having seen, and having used, satellite imagery for sea ice

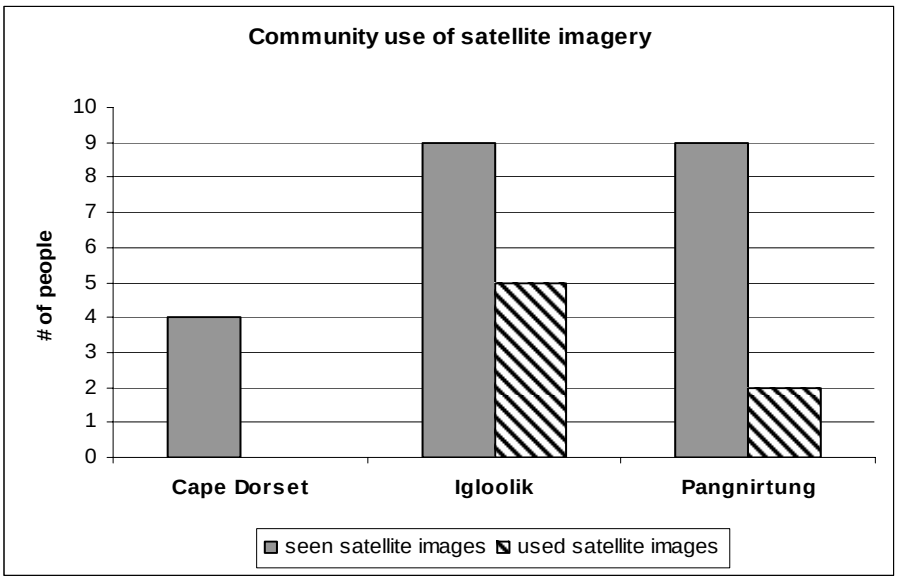


**Figure 8-2:** The number of people who have seen, or used, satellite imagery of ice conditions.

navigation may be due to the fact that: i) Internet access is slow in northern communities (AN1; AE1) (although by the fall of 2005 high speed broadband access was available and may affect responses if this question was asked now); ii) Internet access is not available to everyone (e.g. hunters often rely on employees of the government building, hamlet office, or HTA office to

download the images) (AN1; AE1; DAq1; HP1; LU1); iii) not everyone knows how to use a computer (AN1; AE1; DAq1; HP1; LU1); iv) the imagery can be difficult to interpret (DAq1; DI1; DQ1; EI1; HP1; MaN1; NP1); and, v) there is limited imagery available for free (AE1; SK1). Nevertheless, some community members are already putting satellite imagery to use in several ways, by:

- consulting images to evaluate the ice conditions before leaving town (AN1; JaM2; JoM1; LE1; LN1; ME1; MoK1; MoN2)
- planning travel routes, especially for boat travel (AT1; DQ1; JM2; JS1; LE1; LU1; K1; TI2)
- assessing ice conditions in places that people would not normally see (either they are too far away or the ice conditions are too poor to access them) (AT1; JaP1; LN1)
- identifying areas of open water (AY1)
- understanding the progression of break-up (LN1)
- incorporating them in search and rescue operations (ME1)

Community members also recognize some of the short-comings of using satellite images to evaluate conditions used for sea ice travel. One is that the images only provide a 'bird's eye view' of the ice, and most hunters prefer to be evaluating the ice 'on the ground' as they travel (NP1). Therefore, there is a disjuncture with the *in situ* experiential methodology employed by community members and the remote, coarse resolution investigations undertaken by scientists. It was frequently reiterated that just looking at images cannot do justice to the ice conditions, you have to be there to really know what the ice is like (DAn1; DI1; DQ1; LQ1; MA1; MaN1; TI1). Another factor is that there is no indication of snow in the images, so it is difficult to tell how thick the ice is (LQ1). This also links to the fact that hunters feel that the images cannot tell them enough about related factors such as the currents, wildlife, weather, etc. (EK1; MA1). These would need to be accounted for in order to properly study or evaluate ice conditions in a manner that would be beneficial at the community level.

Interestingly, the real value associated with the satellite imagery – also the main application of satellite imagery within a community context – was the ability of radar images to provide clear delineations of ice versus open water. Therefore, the most frequent use of the

images was in the summer to indicate areas without too much moving ice, thus rendering them accessible by boat (AT1; DQ1; JM2; JS1; LE1; LU1; K1; TI2). In Igloolik especially, satellite imagery was deemed useless during the winter, where the only way to really know the ice conditions is to use it (DAn1; DI1; DQ1; EI1; LQ1; MA1; TI2). Referring to satellite imagery in the winter was more prevalent in Pangnirtung, but the focus was on the identification of open water conditions, and thus the position of the floe edge (AY1; JI2). Therefore, satellite imagery is already being used as a complement to Inuit expertise. It is valuable to see ice conditions or features in areas hunters cannot normally access, or that are far from the community. Also, hunters are increasingly asking about scientific results when they find things that they cannot explain (e.g. why certain changes are happening).

Some hunters are combining the best of both satellite imagery and local expertise, in order to provide a more comprehensive view of ice conditions. Furthermore, younger or more inexperienced hunters are beginning to incorporate satellite and GPS technologies into their methods of learning about the sea ice (Aporta, 2004; Aporta and Higgs, 2005). They do not have the local expertise to fall back on, so they may ask for older hunters' advice, along with referring to GPS locations or recent imagery to plan or navigate ice routes. Therefore, life experiences, along with methods of learning about, and understanding, the sea ice are intimately related to the goals which inspire interest in sea ice.

### *8.2.4 Goals in investigating or using sea ice*

Broadly speaking, Inuit communities value, and seek, sea ice knowledge that promotes reliable personal safety assessments, harvesting success, and weather prediction (Laidler, 2006a). In contrast, scientists seek an understanding of the physical and internal processes of ice formation, decay, and motion, while also aiming to identify long term trends in sea ice extent, thickness, and distribution (Laidler, 2006a). While both Inuit and scientists value reliability of observations and expertise, an underlying variation between goals leads to a

different focus on ice conditions or change. Scientific studies are predominantly time-focused, aiming to create reliable time-series and uniform, chronological data sets (Krupnik, 2002). On the other hand, Inuit knowledge focuses mainly on developing detailed, localized accounts of sea ice characteristics and environmental influences (Kofinas *et al.*, 2002; Krupnik, 2002; Norton, 2002; Oozeva *et al.*, 2004). Therefore, the assessments of reliability within Inuit expertise are derived from the age or experience of the person making observations/warnings/ predictions (MoN1; ME1; JN1; AT1; ZA1; AN1; EP1; MJ1; EE1) rather than on statistical significance. Since the information is stored in peoples' minds (JQ2), and passed on orally (LI1), Inuit sea ice expertise is passed on through demonstration and explanation. This contributes to the goal for Inuit understandings of sea ice – to enhance the safety of travel and the success of hunting – with such information being accepted as true based on the person who is sharing it (MK1; TI1). Therefore, local expertise, especially the older ways of teaching and learning, are likened to the quality of education received at university (MK1). There is great pride taken in providing accurate information, thus there is hesitancy for Inuit elders and hunters to speak of things that they have not been directly experienced and/or verified (LI1; EN1). Only after a certain number of experiences, accumulated over years of hunting and traveling on the sea ice, does an individual obtain responsibility for their knowledge (i.e. becoming an adult) (JI1). In contrast, it is recognized that for scientific expertise to be considered accurate and reliable, it must be in writing (i.e. published) (LI1). This too takes many years of learning, experience, and trial and error, but in a very different context (i.e. formalized education). This links to the scientific goals of refining the accuracy and understanding of sea ice processes, ocean-atmosphere influences, and physical characteristics through empirical evidence and experimental modeling.

Along with the differences between the temporal and spatial focus of scientists, and the relationship focus of Inuit, the variations between Inuit and scientific goals for

using/investigating the sea ice are reflected in the terminology they use (Laidler, 2006a). Scientific terminology and jargon are notoriously hard for the layperson to comprehend (Norton, 2002), and yet Inuit ice vocabulary is perhaps even more challenging (e.g. Nelson, 1969; McDonald *et al.*, 1997; Oozeva *et al.*, 2004). Inuktitut terminology refers to ice states and processes, along with human interactions with the sea ice (Nelson, 1969; Aporta, 2002). Scientific sea ice classification focuses on physical characteristics (e.g. size of ice pans, thickness of sea ice), while the verb-based nature of Inuktitut recognizes interactions between humans and the environment through the process of naming sea ice (Aporta, 2002). Therefore, scientific terms may have universal meaning to those who are familiar with the literature, but local languages such as Inuktitut are not easily understood when separated from the experiential processes in which they were derived (Laidler, 2006a).

Within Cape Dorset, Igloolik, and Pangnirtung it was highlighted that in order to learn sea ice terminology you have to use it. Otherwise, a person cannot understand what people are talking about when they mention a certain ice type, they would not know what to look for (MA1; AA1; JaM1; LI1; MoN1; TI1; MJ1; QT2). For this reason there are more sea ice terms for conditions that are used more (NQ1; TI1; LQ1), and it is easy to forget the terms when not using the ice regularly (PP1; MJ1). Along with sea ice and local lifestyle changes being experienced in each community, sea ice terminology is also changing. Older Inuktitut terminology is not as commonly used, so distinctions were made between traditional and modern terms (JaM1; JQ1; PV1; AT1; DI1; SA1; LQ1; AA1; OO1; PP1; EP1; OM2; MJ1; QT1; QT2). Community members are using the traditional terms less because they are using the ice less, and so more modern terms are being incorporated into the sea ice lexicon (JAk1; AT1; DI1; AA1; OO1; PP1; EP1; OM2; QT1; QT1). When people move into a community, or have not used the ice in a while, they have to learn everything all over again (JAn1; SK1). Residential schooling for middle-aged Inuit meant a loss of Inuktitut language and terminology (OO1; SK1;

JAn1; EN1; Elee, personal communication). Even for the younger hunters, they are not as familiar with sea ice terminology because their schooling has been more formalized (LQ1; JAn1; SK1). This may be a combined result of more English instruction and less time on the ice. While Inuktitut is increasingly being emphasized in the school system, English is still predominantly used in classrooms and is becoming more common in homes and schoolyard interactions (AN1). Therefore, elders and active hunters feel strongly that Inuit youth should know more about the older ways, they want to pass on this knowledge in an effort to carry on Inuit culture (LI1; LI2; MoN1; MoK2; MoN2; DI1; TI1; TI2; AA1; OO1; QT1). Terminology and local expertise are essential components of this educational process, and contribute greatly to enhancing the safety of sea ice travel for people who are less familiar with particular sea ice dangers (AA1; AE1; LE1; LI1; MoK2; MoN1; OO1; OM1). While the goals of Inuit knowledge accuracy and transmission remain consistent with previous times, community members are recognizing the necessity of incorporating the school system (and some elements of formalized education) to facilitate the learning process (MoK1; EP1; AE1). Some hunters and elders feel that their knowledge would be more believable if they worked with scientists (LE1; JS1).

> "Again, with the knowledge of the hunter, knowing again his surroundings in good detail, it would be beneficial to the person who's doing the study. What [I notice] about today, for example the youth wouldn't believe [my] knowledge if it's not written down. They're more into written material, something that they can see, and if a scientist has done a study on ice and that is presented to the youth, more than likely the youth will believe him because he has something written. Even though [I've] got all that information in [me], because [I don't] have anything written they wouldn't believe [me] as much as they do the researcher. So therefore, [I find working together] beneficial in that what reports are coming out of it would include the knowledge of the guy using it, for example the hunter. The hunter's knowledge would now become documented, and them working together would be beneficial in that sense." (Irngaut, 2004)

The emphasis on documenting local knowledge in order to provide written versions was highlighted as essential to rendering it more accessible to youth, and the school curriculum (DI1).

> "…[I've] begun to understand more of how scientists work in trying to gather information. And the reason why [I'm] accepting it now, [I'm] thinking for the future of our children and our grandchildren in order for them to be able to have something on paper to understand what, how the changes have evolved over a period of time. And especially for the rest of the world to understand the environment that we live in." (Nuvaqiq, 2004)

Beyond the inter-generational gaps in sea ice and terminology use, observations of changing ice conditions have also been linked to changing sea ice terminology. A part of the Inuit culture may be lost with the changes in sea ice conditions, since there would be no time to learn about the conditions with an abbreviated or altered ice season (PQ1). The ice terms themselves would not necessarily change, but if a particular condition no longer occurs then the term might no longer be used, or it would be employed at a different time of year (JQ1). Overall, elders and hunters want to teach others (including scientists) (Qappik, 2004b; Ishulutak, 2004b; MK2), but especially the younger generations (MoN1; MoN2; AT1; PP1; MK2; OO1; JAk1). They do not want the language and terminology to be lost (OM2), so there is increased interest in collaboration as traditional methods alone are not as effective in communicating with youth. Scientists too are interested in learning more about localized conditions, and the influences of these conditions on community life, in order to better tailor their studies to northern needs (e.g. Nichols *et al*., 2004; Ford, 2005; Furgal *et al*., 2005). Furthermore, there is great potential for the enhancement of scientific research quality and accuracy where Inuit expertise could provide a type of "ground truthing" that is impossible to gain through field work alone. Therefore, the integration of new, and different types of knowledge, could improve the ability of both scientists and Inuit to reach their goals related to sea ice use or investigation.

## 8.3 Linking Inuit and scientific expertise

### *8.3.1 Overcoming skepticism and misunderstandings*

Some Inuit remain skeptical of the value of research to northern communities (e.g. Nuttall, 1998; Wenzel, 1999; Furgal *et al*., 2005), a sentiment echoed by other Indigenous groups (e.g. Deloria, 1995). This stems from concerns about: i) the intrusive nature of research methodologies; ii) a lack of local involvement in research; iii) poor communication with affected populations; iv) short field seasons; v) inadequate acknowledgement of credit; and, vi) conflicts over data ownership (Bielawski, 1984; Nuttall, 1998; Wenzel, 1999; Duerden, 2004; ITK and NRI, in press). Some manifestations of this general skepticism were encountered in the context of my thesis research, mostly revolving around researchers' motives and the use of research results. These perspectives seem to derive from misunderstandings about the purpose of research, as well as previously unpleasant research experiences. Some examples include beliefs that:

- scientists provide misleading information, mainly with regards to wildlife (scientific results vs. local observations/experiences, conflicts over establishing quotas)
- information given by community members has to be bought back
- researchers are profiting financially from the information they are given
- researchers are just out for personal acclaim (AI1; EE2; OM2; JaP1; JQ1)

These ideas about research may be due to limited interaction with researchers, or may be based on experiences with a few projects conducted in a different era, with a different mentality.

> "[The researcher's] frame of mind would be they come in, they get the information, and they use it out there on their behalf. Forget what this guy said. That was their mentality then and that's one of the reasons why [I] never really got to working with them, even though [I] would have been able to work with them." (Ivalu, 2005)

Unilingual hunters, and especially elders, have had less direct interaction with scientists, and generally do not understand the processes or purpose of research – 'if you're not going to be using the ice, why would you study it?' For these reasons, some hunters are more confident in the utility and reliability of Inuit knowledge (AQ1). On the other hand, bilingual hunters,

especially those who have participated in the formal education system (i.e. middle-aged Inuit who have experienced both traditional Inuit, and southern, schooling) have a better grasp of both the advantages, and challenges, of working with scientists. Because of this, the middle generation of Inuit may be either the greatest proponents, or opponents, of northern research.

In addition, misunderstandings can be amplified through misinterpretation between languages. As such, the importance of a skilled and committed interpreter is emphasized (Section 8.1.2). If translations are unclear, if the interpreter is not supportive of the research, or if the interpreter is not allowed to make suggestions for improving questions or clarifying responses, it can compound communication problems. Without effective language skills in both English and Inuktitut, the subtleties of interview responses can be lost.

### *8.3.2 Local concerns with collaboration*

The majority of Inuit elders and hunters interviewed believe that it is a good idea for Inuit and scientists working together (i.e. 48 out of the 52 people who were asked "Do you think that Inuit should, or could, work together in studying the sea ice?"). But despite this positive response there was no shortage of community concerns expressed with regards to the practicality of collaborating with scientists. Some of the challenges identified include:

a) conflicting personalities
b) conflicting knowledge bases and tools used to study the ice
c) language barriers
d) decision-making (who is in charge, and how receptive they are to suggestions – specifically with regards to sea ice travel – either Inuit or scientists)
e) superiority (scientists deemed dominant)
f) what factors to consider in sea ice or wildlife studies
g) appropriate level of compensation (payment for time, services, or interviews)

(MJ1; EE2; QT1; TI2; DQ1, AI1; LQ1; JoP1; JAn1; MoK2; MM2; AQ1; EN1)

Some of these challenges are described by Qattalik (2004) and Maniapik (2004c), respectively.

> "…it's beneficial for them to work together, that it can be a learning experience if the [researchers] are willing to learn. A lot of times you can have a scientist who comes here, knows everything, doesn't want to listen to the hunter, no matter what he says. A lot of times that has happened in the past, and [I keep] that in mind. And also, if those two are working together the Inuk would have the knowledge

> about the ice, wherever it may be. And then, if the researcher says they want to study ice and the Inuk says it's too dangerous to go there, then they conflict. More than likely the person in charge would be dominant in that they would have to go there, and face danger wherever they go. But the Inuk would know that it would be dangerous to be traveling through there. And if that happens they cannot work together. If any bit of conflict occurs. And if vice versa, let's say the researcher knows, by looking at previous photographs, that it would be safe to go traveling somewhere for some length of time that the hunter hasn't been using, then it can be beneficial for the hunter as well, using the knowledge of the researcher about that area that hasn't been utilized in recent times. So it can work either way. But then…if there's any conflict of any sort in how the study is going to be, where they're going to go, then more than likely it won't work at all. But if they're in agreement on what's to be done, when it's to be done, and both of them are quite in agreement on what the final outcome is going to be, then it would be very beneficial to both." (Qattalik, 2004)

> "Like every human being hunters talk among themselves on their observations and what they've gone through. A lot of times [I've] heard after these hunters have been interviewed by anybody, they usually complain that they don't pay much. And then [I think] that [the researchers] forget to consider the fact that these hunters have their own lives. Like they had things to do today and they're taking time out of their lives and their livelihood to assist a researcher or scientist. And some scientists take them for granted and don't pay very much or don't give much back. And that's why [I] put forward those ideas to employ someone for a while. That would be looked on more favourably…[Like myself for example, I'm] a carver, that's what [I do] for a living. And [I'm] taking time out of [my] carving schedule because [I know] what this project is and [I know] how important it is." (Maniapik, 2004c)

Perhaps the most prominent concern expressed in interviews was the lack of research reporting from studies where people have participated, assisted, or contributed.

> "[I don't] remember getting any results directly sent to [me], but [I know] for a fact they were writing down a lot of information when they were measuring, taking weight, and collecting samples, they were constantly writing in their journals. So therefore [I know] for a fact that they were collecting information. And then later on somebody told [me] that these are the writings that were done when they were collecting samples then. So that information [I] found out was existing, it's in existence, in that it was shown to [me] at a later [date], way later…" (Kunuk, 2004)

In Pangnirtung, ten people had never heard back from researchers they had worked with, or been interviewed by, while there were three in Cape Dorset and four in Igloolik (Section 8.2.1). Individuals who had not heard back from researchers to whom they had shared information –

especially when they were promised correspondence – felt as though the information may have been sold (EI1) or simply thrown away (ME1).

> "[A]round town, or anywhere in other communities, [I don't] see or hear it brought out in public…[I haven't] seen that come back. It seems like all the people that have interviewed [me] over the last few years, it's like they forgot about [me]. They say they'll bring information back to the community, but they don't." (Kellypalik, 2004a)

> "[I'm] not trying to pick bones with anybody, [I] just [want] to know exactly where this is coming from. You know personally there's been a lot of research done for personal benefits. There's been so-called journalists that comes up and says that they're doing a project so-and-so, and then they just leave and they get paid for it and we get no feedback, no results." (Maniapik, 2004a)

Without hearing back about the results, people do not know what happened to the interviews they provided and thus do not see if, or how, it has helped (AU1; EE1; EI1; JoM1; LU1; ME1; MK1; ZA1). Ulayuruluk (2004) explained that he understood that results are often published in scientific journals, but he would have to look hard to find them (i.e. they are not very accessible). However, some results of wildlife filming were seen on television (LQ1; TI1), which seemed to be appreciated.

Further to concerns with the lack of results reporting, there was some ambivalence about whether or not research is beneficial to the communities themselves. The main benefit of participating in, or contributing to, research was the financial gain (AU1; EK1; EN1; LI1; ZA1). For the most part interviews were seen as being too rushed (EN1; MoN2) and not covering enough detail (AQ1; DI1). However, some people were also quite happy to be interviewed, just knowing that it will help other people in some way. Ulayuruluk (2004) found working with biologists enjoyable because they were entertaining, and Qamaniq (2004) considered it useful. Frustrations would arise though, when people described their own project ideas – they found it very hard to find, or secure, funding to conduct their own research/education program (OO1; AE1).

Despite dissatisfaction with the lack of results reporting and local research benefits, elders and hunters remain interested in working with researchers on topics that are important to them. By working together Inuit would have more access to research results and to other information of interest (AN1; JM2), along with more say in defining research topics (PP1; OM2; AN1). Preliminary visits, ongoing reporting, and effective communication are essential to begin overcoming skepticism, minimizing misunderstandings, and addressing local concerns.

### *8.3.3 Effective communication*

To enhance collaborative research relationships, communication needs to begin early and be nurtured throughout the research process. This will be influenced by the personality of the researcher(s), interpreter(s), and contributing team member(s). There is no easy formula for ensuring effective communication, but the more issues, concerns, questions, ideas, and interpretations can be discussed, the more clearly understood they will become for all project partners and participants. This element of transparency in community-based research is receiving increased attention in academic and community circles, as communication is the primary means of conducting, analyzing, and presenting research (Ford, 2000; Furgal *et al.*, 2005; ITK and NRI, in press).

#### *8.3.3.1 The role of the interpreter*

As discussed in Section 8.1.2, the role of the interpreter is central to facilitating communication. These highly skilled individuals would ideally be full project partners as they are the most familiar with both community and researcher perspectives. With both local expertise and formalized education, they have the best tools to understand where different worldviews overlap, and how they may potentially be linked. For example, interpreters that I worked with would comment that they could understand a particular written translation into Inuktitut because they are bilingual, but for a unilingual Inuk they would not understand some English-to-Inuktitut translations. There were other times where interpreters were capable of

explaining a sea ice concept to me, as described by elders using more traditional Inuktitut, only because they had experienced these conditions and were familiar with the more nuanced terminology themselves. Both these scenarios would not be possible if they were unable to combine their school and traditional teachings to interpret between different ways of knowing. Despite the skills of the interpreter to facilitate interview conversations, several elders still wished they could communicate with me directly (EN1; LI2). They wanted to share their experiences fully, and no matter what the competency of an interpreter it cannot replace direct communication between individuals fluent in the same language. The role of the interpreter in research has not been adequately investigated in the literature, and much more would be required to comprehend their influences on the accuracy and quality of research.

*8.3.3.2 Concepts in Inuktitut*

Understanding Inuktitut to the point of becoming fluent would take years, and perhaps never manifest, especially when living outside of northern communities. However, even when employing an interpreter it is valuable to know some characteristics of Inuktitut to help understand interview statements and create communication materials. One important distinction for environmental research is the different directional concepts between English and Inuktitut. While north, south, east, and west are understood by Inuit with even minimal grasp of English, the most traditional directional references are between the cardinal points (i.e. northwest, northeast, southwest, southeast), along the lines of the prevailing winds (TI1). Directional concepts in Inuktitut are also more complex (MacDonald, 1998). This increases the chance of misunderstanding or confusion when interpreting directions because the Inuktitut term for NW will often be used in translations from the English reference to North (TI1). A second distinction to note is that there are short (i.e. simple), or long (i.e. more sophisticated and descriptive) ways of saying the same thing in Inuktitut (PV1). This means that although some people employ the same root word, they can be providing greater or lesser depth to their

explanations depending on their capability in Inuktitut. This has implications for interpretation (i.e. if the interpreter is familiar with the more complex terminology), as well as for results analysis (i.e. may not be two different words, but one provides more context than the other). A third element is that there are no idioms or metaphors existent in Inuktitut (SA1; Ikummaq, personal communication). Therefore, such references completely lose meaning when they are translated, and may cause confusion with the reader or the interview participant. For example, I found out on my second to last research trip that the title of my project "Ice, through Inuit eyes" would be translated literally as "ice in the eyeball of Inuit." This would not make sense to those unilingual in Inuktitut. These are just a few examples to highlight that individuals who are functional in both English (i.e. educational setting) and Inuktitut (i.e. the traditional setting) would be the key means of providing opportunities for intersections of terminology and expertise on sea ice.

*8.3.3.3 Sea ice terminology*

Based on interview results, and the subsequent conceptual models that were created for each community, we now have a very basic platform from which to build our shared understanding of sea ice terminology and conditions. It can be difficult to link English and Inuktitut sea ice terminology due to the nuances of localized terminology referring to practical uses, or specific ice conditions only observed up close (TI1; MJ1). There is also the added complexity of contextual references whereby different variations of a term will be used depending on whether a person is describing a condition to you from a distance, while on the ice, or while the process is actually occurring (AA1). It is important to note that Inuktitut terminology is very descriptive, so the names are not necessarily always ice-specific. They can be simple descriptors (e.g. thick and thin, the same words in Inuktitut could be used for ice or a piece of wood), similar to English (PV1; SA1; TI1). This means that terminology analysis alone cannot be used to represent Inuit expertise on sea ice, but it is a critical foundation to being able

to interpret localized descriptions and assessments of change. On top of this are the dialect differences that surface both within communities, and between communities (NP1; PP1; PV1; QT1). Nevertheless, just as between communities (Section 7.2), there is overlap between Inuktitut and scientific ice descriptions based on major features or seasonal processes (Table 8-2). This helps to identify common sea ice processes/conditions that are being referred to. An emphasis on terminology may also improve working relationships by developing a shared lexicon, and expanding our awareness of unique sea ice terms or conditions only described in one language or another.

**Table 8-2:** Overlapping Inuktitut and scientific terminology for sea ice (based on the closest approximations of meaning).

| Cape Dorset terminology | Igloolik terminology | Pangnirtung terminology | Scientific terminology |
|---|---|---|---|
| *sikuvaliajuq* | *sikuvalliajuq* | *sikuvaliajuq* | freeze-up (early stages) |
| *qinnu* | *qinu* | *qinnuaq* | frazil/grease ice |
| *sikuliaq* | | | ice rind |
| *sikuaq* | *sikuaq* | *sikuaq* | nilas |
| *qaikuin* | *aqsajutak* | *sikuallaajuq* | pancake ice |
| *qinnu* | *qinu* | *qinnuaq* | slush |
| *sikuaq* | *sikuaq* | *sikuaq* | young ice |
| *qanguti* | *qanguti* | *qanngut* | frost flowers |
| *siku* | *siku* | *siku* | first-year ice |
| *tuvaq* | *tuvaq* | *tuvaq* | fast ice |
| *sinaaq* | *sinaaq* | *sinaaq* | floe edge |
| *nagguti* | *nagguti* | *nagguti* | crack |
| *ikiqtusijuq* | | *ikirniq* | flaw |
| *ajuraq* | *aajuraq* | *aajuraq* | lead |
| *saqvaq* | *aukkarniq* | *saqvaq* | polynya |
| | | *nuttaq* | fracture |
| *ivuniit* | *ivuit* | *ivuniit* | ridge |
| *qullupiaqtuq* | *qaliriiktinniit* | *qallirittipalliajuq* | raft |
| *qillait* | *killaq* | *killait* | thaw hole |
| | *tikpaqtuq* | *tikpaqtuq* | dried ice |
| | *tuvarliqtuq* | *tuvarluqtuq* | rotten ice |
| | | *maujaraq* | shore melt |
| *qapvaq* | *sikutuqaq* | *qavvaq* | multi-year ice |

*8.3.3.4 Visual aids in communication*

Visual tools are also effective means of overcoming some aspects of language barriers. These could play an important role in enhancing communication (between community members, or between community members and researchers), as well as linking different types

of sea ice knowledge. Using maps as part of the interview process proved to be valuable in sparking conversations, explanations, and spatial delineations of sea ice features (Section 8.1.3). This form of depicting sea ice greatly enhanced my comprehension of the verbal descriptions provided in interviews. It can also be an effective way of presenting – and in some cases legitimizing – Inuit sea ice expertise to scientists. The compilation maps that were produced based on individual drawings were also seen by community members as: i) valuable research outputs; ii) an informative way to present research results; and, iii) an educational tool to convey local sea ice expertise to Inuit youth, or other researchers (based on feedback from public reporting meetings (Section 3.4.7)). Therefore, mapping efforts can facilitate the transition from research result to educational resource (Section 8.1.3). Furthermore, this type of illustrative conveyance enabled more direct communication between myself and the interviewee. My interpretation of their intended meaning became less dependent on the English translations provided by the interpreter. For these reasons, maps and other visual forms of portrayal (e.g. video, pictures, gestures, illustrations) augment both researcher-interviewee interactions and the quality of research results. When incorporated into interactive sessions, graphic aids can also contribute to enhanced knowledge-sharing when participants discuss what types of maps, visual materials, or other formats would most appropriately represent their knowledge. This may additionally provide opportunities to learn which scientific products (e.g. satellite imagery, ice charts, Internet forecasts, weather warnings, etc.) are commonly consulted, or considered valuable, in daily activities.

*8.3.3.5 Multiple components to a communication strategy*

The effectiveness of communicating within a collaborative research context, especially across cultures, is contingent on the communication strategy employed and the amount of effort expended by all involved. The advantage of developing a communication strategy lies in the combination of various communication methods. The strengths of one method can account

for the weaknesses of another. Therefore, multiple means of communicating with community members and organizations ensures that at least some of them are effective. The appropriateness of methods will vary with each: i) individual involved; ii) supporting organization; and, iii) type of project. Therefore, the more variety or modes of communication, the more likely that a few will appeal to each interested person. In developing a communication strategy it is helpful to know what has worked previously, and in what context (Section 8.1.6) (Huntington *et al*., 2002; Furgal *et al*., 2005; ITK and NRI, in press). Many responses to the different forms of communication were shared across the three communities, and to some degree I believe they would be shared across other Nunavut communities. However, individual community characteristics must be incorporated when establishing and maintaining contacts (i.e. to account for the fluctuating nature of community dynamics or current events).

*8.3.3.6 Communicating to a broader audience*

Researchers (myself included) have a lot to learn about communicating to a public audience, much less another culture. In response to Laidler (2006b), Dr. Roy (Fritz) Koerner, emeritus scientist at the National Glaciology Program of the Geological Survey of Canada, rightly pointed out that no one teaches scientists how to make their results interesting to northern students or the general public (Koerner, personal communication). It is difficult to effectively summarize scientific results in an accessible, yet informative presentation. And despite concerted efforts to involve community members or report results, some people are simply not interested or they forget about the efforts made by previous scientists (Koerner, personal communication). Therefore, complaints about a lack of results reporting may indeed be warranted (Section 8.3.2), but in some circumstances previous reports may have been lost, people were not aware of them, or they were forgotten as more pressing daily issues took precedence. By continuing to explore the effectiveness of communication and a collaborative

approach to research we can improve our understanding (linguistically and conceptually) of what people mean when describing a particular phenomenon, environmental or otherwise. The advancement of such inter-personal and language dynamics may even necessitate targeted, systematic studies with this specific focus. This would enable other projects to employ the most appropriate communication methods and tools to: i) interact with community members; ii) move towards equal contributions in a collaborative research project; iii) generate more accurate and locally representative research results; and, iv) facilitate practical linkages between Inuit and scientific expertise.

### *8.3.4 Appropriate topics*

Moving towards the practical intersection of Inuit and scientific expertise requires a topic of mutual interest or concern to both northern and academic communities. Without a common goal it will be difficult to reach, or maintain, equality in collaborative contributions and benefits. Not all northern research topics require full collaboration, nor is it desirable (ITK and NRI, in press). For example, characterizing tundra vegetation with empirical indices derived from remotely sensed imagery will draw less local interest for collaboration than beluga tagging to determine whale population and health estimates. The sea ice focus of this thesis was of great interest to community members because they are experiencing so much change in local ice conditions. Therefore, they wanted to document and communicate their expertise on the subject. This was a strong foundation upon which to collaborate. Moreover, the expertise elicited through the research process provides ample opportunities to link with scientific expertise on the same subject. Beyond common interest, the distinguishing characteristics of Inuit and scientific sea ice knowledge are what also render them complementary (Laidler, 2006a). When both groups are willing to learn from each other, and when their joint contributions can expand the understanding of environmental or socio-economic processes, is when the greatest opportunities arise for collaboration.

One example of complementary knowledge contribution incorporates the differing life experiences, methods, and goals in evaluating sea ice extent and stability. Satellite imagery can be acquired for large or small spatial scales, but its temporal resolution is limited to the past thirty years or so (Riedlinger and Berkes, 2001). In complement, Inuit expertise covers a range of spatial scales (local to regional). It also incorporates a temporal scale spanning present and living memory to historical recall through oral traditions and localized knowledge-sharing (Riedlinger and Berkes, 2001). Because Inuit tend to acquire their knowledge in an experiential manner (Sections 8.2.2, 8.2.3) they can relate the potential effects of local weather events to altered ice conditions, as well as how such circumstances may affect the distribution, behaviour, or well-being of a variety of marine bird, fish, and mammal species (Laidler, 2006a). Their perspectives can also provide broader conceptions of sea ice in community and wildlife contexts. In complement, scientists can offer more technical and detailed accounts of ice thermodynamics, dynamics, and physical interactions, as well as their interactions with global climate and ocean circulation (Laidler, 2006a). Monitoring and modeling efforts are often undertaken at scales that are too coarse to account for regional, much less local, variations in ice conditions (Copley, 2000; Demeritt, 2001a; Duerden, 2004; Nichols *et al.*, 2004). To date, they also tend to be conducted outside the context of the human dimensions of climate change. However, because of the ways in which Inuit and scientists interact with sea ice, as well as the methods they use to evaluate ice conditions, they can provide some of the missing components that aid the other in their goals for sea ice use or analysis (e.g. cross-scale linkages). Scientists could benefit from localized Inuit expertise to improve interpretation of satellite imagery. This would help address frequent laments of the lack of ground truthing data available for remote regional scale observations. It could also improve efforts to create climate change assessment models, especially where socio-economic implications are considered. Without direct involvement of Inuit, the appropriate parameters and outcomes are more likely to be ill-

defined and representative of artificial circumstances. In turn, Inuit can benefit from the regional perspectives and systematic assessments provided through satellite imagery and change detection. This may improve local hunters' ability to evaluate distant ice conditions prior to travel, and thus complement their local expertise to minimize accidents. Furthermore, scientific investigations could target local concerns or project ideas sparked by the inability of local experts to explain some environmental phenomena or trends.

Further to appropriate research topics, collaborative research needs to provide opportunities for two-way dialogue, contributions, and benefits. More often it seems that researchers learn from community members, and gain from publishing study results, but that few practical benefits accrue to the communities who provided the original materials. While community members are interested in contributing to scientific research, they also want to learn about – and utilize – scientific studies or technologies for their own purposes. For example, frequent access to recently taken imagery was of great interest to many of the interviewees (AE1; AI1; AN1; AT1; AY1; EE2; JI2; JM2; LQ1; LU1; MK2; SK1). They recognize the value of this coarser scale monitoring to evaluate changes in ice conditions and extent, and want to use it for their own purposes (AI1; DAn1; JAn1; MM1). At the same time they would require additional training in image interpretation, and would welcome more results from related scientific studies (AT1; EN1; JaM2; PP2). This way, there would be a balanced sharing of information – and ideally benefits – from both sides, inherently expanding the nature of collaborative research. Therefore, in order to overcome some of the skepticism of the value of science (natural or social) to northern communities (Section 8.3.1) some of the responsibility falls on researchers to convince community members that their study is meaningful, and will have implications or benefits at the local level (Laidler, 2006a).

### *8.3.5 Rigorous research*

There remains some inertia and inflexibility in gaining acceptance of the reliability of Inuit knowledge in the broader science community (Huntington, 2000). This may be due in part to the conventional requirements for evaluating scientific validity (i.e. numerical evidence, journal publications, generalization, replicability) (Schenider, 2001) that are hard to provide within a social science, qualitative, community-based research setting. Subjectivity has been used to contest the credibility of findings that are outside the realm of objectivity, hypotheses, and statistical evaluation (Collings, 1997). While it is recognized that subjectivity can also affect the development of climate models or sea ice parameterizations (Demeritt, 2001a), natural sciences are more advanced in their development of rigorous evaluations of data/model accuracy and reliability (Laidler, 2006a). However, when I say accuracy and reliability of knowledge, I do not mean Inuit knowledge itself – for only Inuit can evaluate the accuracy of their knowledge within their specific cultural context – but rather the presentation of Inuit knowledge within social science research results. A systematic process for assessing the accuracy of Inuit knowledge presented in research (i.e. the degree to which it reflects what Inuit shared with the researcher) has not been developed. However, it is suggested that this is a desirable endeavour (Wenzel, 1999; Duerden, 2004) because:

1. individual statements can be too quickly (and inaccurately) generalized to represent all Inuit;
2. knowledge varies in quantity and quality between members of any given community, it is constructed, created, and modified in specific social and environmental contexts; and,
3. local knowledge can be influenced by the researchers themselves through research methods or analysis. (Nuttall, 1998; Wenzel, 1999; Ellerby, 2001; Searles, 2001).

Therefore, working in a collaborative context requires that researchers move beyond the minimum methodological descriptions described by Davis and Wagner (2003) to:

- specify the methods and reasoning for local expert selection;
- outline the purpose and details of data collection methods;
- explain what information was considered "data";

- detail the criteria employed for evaluating information credibility, transferability, dependability, and confirmability (within the local context); and,
- disclose the methods of documentation (and communication), acknowledging their relative strengths and weaknesses. (Lincoln and Guba, 1985; Baxter and Eyles, 1997; Huntington, 2000; Searles, 2001; Davis and Wagner, 2003)

Granted, such evaluations are not straightforward, especially where the results can have local implications through inter-personal dynamics or community-researcher relationships. Research (especially conducted by non-Inuit), can never capture the intricacies of the relationship between Inuit and sea ice, but through diverse methods such as participant observation, social science evaluations, or evaluations from other community members (i.e. triangulation) (Baxter and Eyles, 1997; Yeung, 1997; Baxter and Eyles, 1999; Wenzel, 1999; Huntington, 2000) it can provide a picture that is as representative of Inuit knowledge as possible. Improving the transparency of the research process, along with an evaluation of methods, would simultaneously improve the quality of data interpretation. This then enables other researchers to learn from previous experiences or mistakes (Davis and Wagner, 2003). Such disclosure of research methods (and the subsequent reliability of results) also provides enhanced opportunities to practically link different forms of expertise. It would facilitate: i) a greater degree of confidence in information; ii) assessments of potential uncertainty; and, iii) an improved understanding of different research approaches.

In the process of ensuring rigorous social science research, there are added challenges of avoiding decontextualization (Nuttall, 1998) and responding to community interests and feedback (Laidler, 2006a). This is especially difficult to overcome when attempting to link Inuit and scientific knowledge. It is perhaps more feasible to acknowledge the limitations in this realm than to think they can be fully accounted for. From my own experiences, the act of interviewing, discussing sea ice indoors, communicating in English, and interpreting interview statements all decontextualize the Inuit expertise that was shared with me – before even reaching the knowledge representation stage. The practical nature of Inuit knowledge

acquisition, and the experiential elements of knowledge transmission, along with the nuanced complexities of sea ice terminology and environmental influences, can never be fully conveyed. Although I did my utmost to ensure rigour in the research process (Section 3.3), to verify information with community members (Section 3.4), and to accurately represent community expertise (Section 3.5), it is impossible to avoid decontextualization. Transcribing interviews, creating conceptual models, and providing written or map documentation all occur outside the context in which knowledge was originally gained, produced, and shared. Nevertheless, this does not detract from the value of the research. Community members felt strongly that their knowledge should be documented and made available in written format (AE1; DI1; EP1; JS1; LE1; MoK1; MoN1). They felt this was a way to provide educational materials to younger Inuit, as well as to be taken more seriously by scientists. Rigorous research ensures that these efforts are undertaken with paramount consideration for community perspectives and reliability of information. However, the limitations are well understood by community members. Research results would never replace the contextual knowledge which they continue to rely upon, and convey, through the use of the sea ice environment.

***8.3.6 A long-term process***

Working together collaboratively, and finding ways to practically link Inuit and scientific expertise, is undeniably a long-term process. It takes time to establish research relationships, and to negotiate mutually acceptable roles for community members and researchers throughout the research stages (ITK and NRI, in press). This is an ongoing process of compromise, revision, and refinement in order to: i) minimize skepticism and misunderstanding; ii) address local concerns for collaboration; iii) establish, maintain, and improve communication; iv) choose an appropriate research topic; and, v) undertake rigorous methodological evaluations. However, where both Inuit and scientists are motivated by the

results stemming from joint efforts there is incredible potential for advances in collaborative research methods and outcomes.

Community members are interested in collaboration, but they want to ensure that their wishes are taken seriously, that research reporting is timely and informative, and that Inuit knowledge is represented accurately and appropriately. Even though not everyone in Cape Dorset, Igloolik, and Pangnirtung is using the sea ice, it is still deemed important to understand what is going on with ice conditions, and to be able to travel on the ice (MK2; PP1). Despite the potential challenges, Inuit elders and hunters generally felt it would be good to work together. There is no way to control the environment, but at least by working together we can know more about what is going on (AP1; JS1). Elders want to share what they know (EN1) and are concerned about losing the knowledge base as elders pass on (KS1).

> "…most definitely…like we don't have a choice anymore because of the factors we're, we have to deal with those and get the information from our elders, the knowledge that they have of the land the sea ice. And with the cooperation of scientists and the elders we may be able to have more information for not only for the hunters today to have that knowledge but for the benefit of our children and their children to be able to have that information available and to have an understanding of how it has evolved over time." (Nuvaqiq, 2004)

To facilitate more collaborative research, Inuit elders and hunters in all three communities provided some suggestions for how scientists could improve working relationships that are perceived to have been science-biased for too long. These include:

- Inuit prefer to work with scientists face-to-face
- researchers should work in communities more frequently
- researchers should work in communities for longer periods of time
- researchers should inform communities of their research results more often, and not only when something drastic happens
- researchers should be more visible in communities
- reports should be translated into Inuktitut
- researchers should help hunters access satellite imagery or other information of interest
- researchers should be willing to learn from Inuit
- researchers should get more hands-on experience with sea ice
- there should be a fair sharing of knowledge (i.e. elder or hunter learning as much from the scientist as the scientist does from the Inuk)

- community members should be invited on ice breakers when they are anchored near town
- Inuit knowledge should be considered in addressing complex northern topics
- Researchers should inform community members where field camps will be set up
- Inuit and researchers should come to an understanding of how to work together
- Researchers should work with the most knowledgeable Inuit with regards to traveling or hunting on the sea ice (usually referring to elders), not everyone uses the ice frequently and thus not everyone is equal in their knowledge of the sea ice
- Considering hiring fewer people, for a longer period of time, to go into more detail on a particular topic

(NP1; QT1; MK2; AN1; EE2; AT1; DQ1; AI1; EI1; LQ1; SA1; JaM2; JoP1; MaN1; JoM1; JAk1; MM1; LI1, MoN2; EP1; EN1)

The last two points are further elaborated by SA1 and MoN2, respectively.

> "…But what [I have] noticed over the years, for example if [I find] there's activity happening out there, for example somebody is out there doing some studies on the ice, and then it's mainly let's say the researcher, plus a guy he just picked up from the street, one who had a snowmobile, some gas to blow, and time on his hands, young guy…[I feel] that people like [myself], or the older folks who use the land, who use the ice, should be on those, in that they would be able to see what those people are doing, and again share it among people who are using the ice, as opposed to the street person that's now going out with that researcher. [I feel] that the hunters should be more involved in cases like this." (Ammaq, 2004)

> "[I] always [wonder] why people do these half-way interviews where they sort of touch on important topics such as the ice but they never really go all out, like spend a lot of time with [me] and then [I] can teach you a lot. That's [my] problem. [I'm] wondering maybe it's got something to do with funding or something. If you spend a lot of time with one person then that one person can teach you a lot instead of like spending a couple of hours and try to get his entire life experience in that couple of hours." (Nuvaqiq, 2005)

I would add to that in order to link disparate forms of expertise it is important to:

- consider different epistemological claims
- recognize that both Inuit and scientific expertise are socially and culturally influenced
- be willing to learn from each other
- ensure mutual interest
- foster mutual respect
- incorporate visual communications
- establish long-term relationships with community members and organizations
- understand the local and scientific relevance of research
- manage the challenges involved
- tailor the research approach to community needs

I think the more researchers can communicate the purpose of their studies, report back on their results, and involve community members in any feasible manner, we can improve the mutual understanding and benefits of research in the Canadian Arctic. These efforts will, in turn, contribute to the advancement of linking Inuit and scientific knowledge on topics of common interest. This is an especially important undertaking when dealing with complex issues (e.g. sea ice in the context of local conditions, community use, and climate change) that cross human and environmental systems as well as temporal and spatial scales. Ultimately, I believe that Inuit are requesting mutual respect from researchers. The more we can work towards reciprocal research relationships, the more we will be able to learn from each other.

> "All researchers and university students that come up here to do research, they all have to be aware of the knowledge that they are being given. They have to respect the knowledge that they are being given. And they have to make sure that the knowledge that they receive is used for the proper purposes." (Evic, 2005)