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InfoNorth

How Wildlife Research Can Be Used to Promote Wider Community Participation in the North

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INTRODUCTION

Worldwide, researchers are being asked to better communicate their science to the public (Lubchenco, 1998). In Nunavut, Canada, where dozens of research projects take place each year, community consultation and engagement have been legally mandated by the Nunavut Land Claims Agreement (INAC, 1993). Relevant portions of the Act include Sections 5.1.2(h), 5.2.37, and 5.2.38, and Article 33 as it extends to field research. Thus, each research project that takes place in Nunavut must undergo community review as part of the permitting process before any work is authorized.

The permitting and consultation process in Nunavut is complex for those unfamiliar with the existing protocols, and it varies with the scientific approach and duration of a project. Briefly, each research project must acquire permits from various regulatory agencies, which may include the Canadian Wildlife Service, the Department of Fisheries and Oceans, and the Nunavut Research Institute. Most of those permits require evidence of prior consultation with the community that is geographically closest to the study area. Experience has shown that this process is greatly facilitated when the research team has first contacted and consulted with the community on the proposed work and, if relevant, discussed results of previous studies. Given the importance of consultation, some government departments have initiated broader consultation processes that give local organizations the opportunity to comment on any research plan in their jurisdiction, as well as updating them on territory-wide efforts (Gearheard and Shirley, 2007). As part of this procedural review, the community groups that are involved in the review boards have the opportunity to comment on projects and to request more information (ITK and NRI, 2007). The primary purposes of this extensive application, review, and consultation process are to provide northern residents the opportunity to comment on research conducted near their communities and to identify potential risks to the local flora and fauna. Unfortunately, although great efforts have been made to rectify the "fly in, fly out" approach that has sometimes been practiced by researchers in the past (Korsmo and Graham, 2002; Gearheard and Shirley, 2007), many northern community members still report feeling disconnected from much of the research.

There are practical, ethical, and regulatory reasons for involving local communities in research (Pearce et al., 2009). On a practical level, research often depends on community resources, including local knowledge, guides, and equipment, in order to complete work either within the community or out on the land (Gilchrist et al., 2005). Researchers also have an ethical obligation to engage communities in the work, as research findings may be relevant to local management decisions (Pearce et al., 2009). In Canada's North, where land-claim agreements have been signed, researchers also have a legal obligation to engage and involve communities in local studies.

Community involvement in science programs has also been identified as a priority to improve local community decision making, and it is recognized as a key to successful co-management of resources (Fazey et al., 2006; Lebel et al., 2006). Involvement of communities increases local investment and support in completing the project. Timely, relevant, and accessible information delivered as part of a two-way dialogue can also increase community understanding of findings from a variety of disciplines, which can increase community capacity, stewardship, and public participation in local governance related to the environment (EMAN, 2002).

Despite the obligations and benefits of involving local community members, many researchers by their own admission simply do not have the contacts, skills, or resources to actively engage community members beyond the required permitting process (Gearheard and Shirley, 2007). At the same time, many educators in the North would like to incorporate more integrated learning experiences into their teaching curricula, but while researchers are often keen to contribute to educational programs, they lack the resources to do so (Salmon et al., 2011). As a result, although legislation and consultation practices have been implemented, and community members do assist, inform, and learn from research activities (usually hunters, Hunters and Trappers' Organizations (HTOs) members and guides), many northern community members—particularly students and educators from elementary to post-secondary

levels—still feel uninvolved in local research programs, although they may wish to take part. Given that 41% of Nunavut's population is under age 20 (as of 2010; Nunavut Bureau of Statistics, 2010), this suggests a gap in community engagement among almost half of the northern population. Thus, the next generation of hunters, conservation officers, and resource managers is not being fostered, encouraged, and trained within many current research efforts—a missed opportunity.

Here we describe a series of outreach programs led by Environment Canada that involved elementary schools, high schools, and college students, with special focus on a collaboration developed with the Nunavut Arctic College (from here on referred to as the college). This program overcame many of the challenges mentioned above and brought together students, educators, and wildlife researchers in mutually beneficial learning experiences. We review this program as a tangible example of how wildlife researchers can interact with community members and offer a set of lessons learned that we hope will help educators, researchers, and managers work together to create similar programs.

THE RESEARCH PROGRAM

Arctic marine birds are an important component of northern ecosystems, both as species harvested for eggs, meat, and down and as indicator species used to detect changes in marine environments (Provencher et al., 2009, 2012). Consequently, marine bird studies are important to local communities, researchers, and wildlife managers. Environment Canada (specifically the Canadian Wildlife Service and the Science and Technology Branch) is tasked with monitoring and studying migratory bird populations in Canada for the purpose of their conservation. As a result, several long-term monitoring programs have been established since the 1970s to study marine birds in Canada's North (Gaston et al., 2009).

Marine bird research in Nunavut often includes cooperation with northern communities. Local HTOs are consulted in hiring guides to travel in the area of colonies and collect hunted birds to study avian diet (Provencher et al., 2012), contaminants (Mallory et al., 2007), marine pollution (Provencher et al., 2009), and parasites (Mallory et al., 2007). Birds collected with hunters are later dissected, and multiple tissue samples are archived within the National Wildlife Specimen Bank (Braune et al., 2010). The labor-intensive collection and processing of such samples takes place in the lab after the field season is finished, and these activities provide an opportunity to engage people not directly involved with the collections themselves.

CHRONOLOGY OF THE OUTREACH PROGRAM

Community involvement in the Environment Canada northern marine bird scientific programs, including assistance from local guides and community consultations, has occurred for decades. More recently, during the International Polar Year (2007 – 08; IPY), a new education initiative, entitled "How Seabirds Can Help Detect Ecosystem Change in the Arctic," was developed as part of the Canadian IPY project (see Provencher et al., 2012 for more details). As part of the project's science outreach initiative, Environment Canada partnered with the college in Iqaluit to provide students with hands-on experience dissecting birds. In the first year of the program, a PhD student spent two days working with 12 students from the college's Environmental Technology Program in Iqaluit, and lectures by an Environment Canada researcher provided a general introduction to marine birds and background for the project. The workshop was intended to provide hands-on training and an overview of marine bird research in Arctic Canada.

The workshop was repeated in 2008 and 2009, involving more students each year. In these years students were also offered short-term employment after the workshop to help finish the dissection and related tissue preparation of remaining birds. Following the 2009 workshop, two students also traveled to Ottawa to gain experience by working at the National Wildlife Research Centre for an additional week. This exchange was valuable to the students for adding to their skill base and building their own resumes and contacts within the larger research community. Both students continue to work in northern research.

In 2011, Environment Canada initiated a new study to examine avian disease, contaminants, and endoparasites in eider ducks (*Somateria mollissima*). Birds collected by researchers and local hunters in Cape Dorset, Nunavut (GN Permit #WL-2011-029), were used to hold another workshop in Iqaluit and expand the program. This time, researchers from Environment Canada, the college, Carleton University, the University of Saskatchewan, and the Government of Nunavut Department of Health and Social Services developed a program, expanding the workshop to include concerns regarding wildlife and human health. A question-and-answer format was used to create an open dialogue in which students raised questions about human health and the nutrition of country foods, and both health and bird researchers discussed how their concerns were, or were not, being addressed through ongoing research.

In 2011, the Fur Production and Design class (hereafter, the design class) also joined the workshop to learn about marine bird research in Nunavut and to teach and learn about how eider skins are used in traditional design. One of the design students taught workshop participants how to cut an eider skin in the traditional way used for making baskets and slippers (Fig. 1). The science students were then given the option of dissecting their practice birds using either a scientific cut or the traditional cut. Finally, the remaining bird meat was shared through the college Inuit Studies Program.

Although the traditional use and hunting of marine birds had always been discussed in the workshop, the involvement of the design class in 2011 allowed the students to

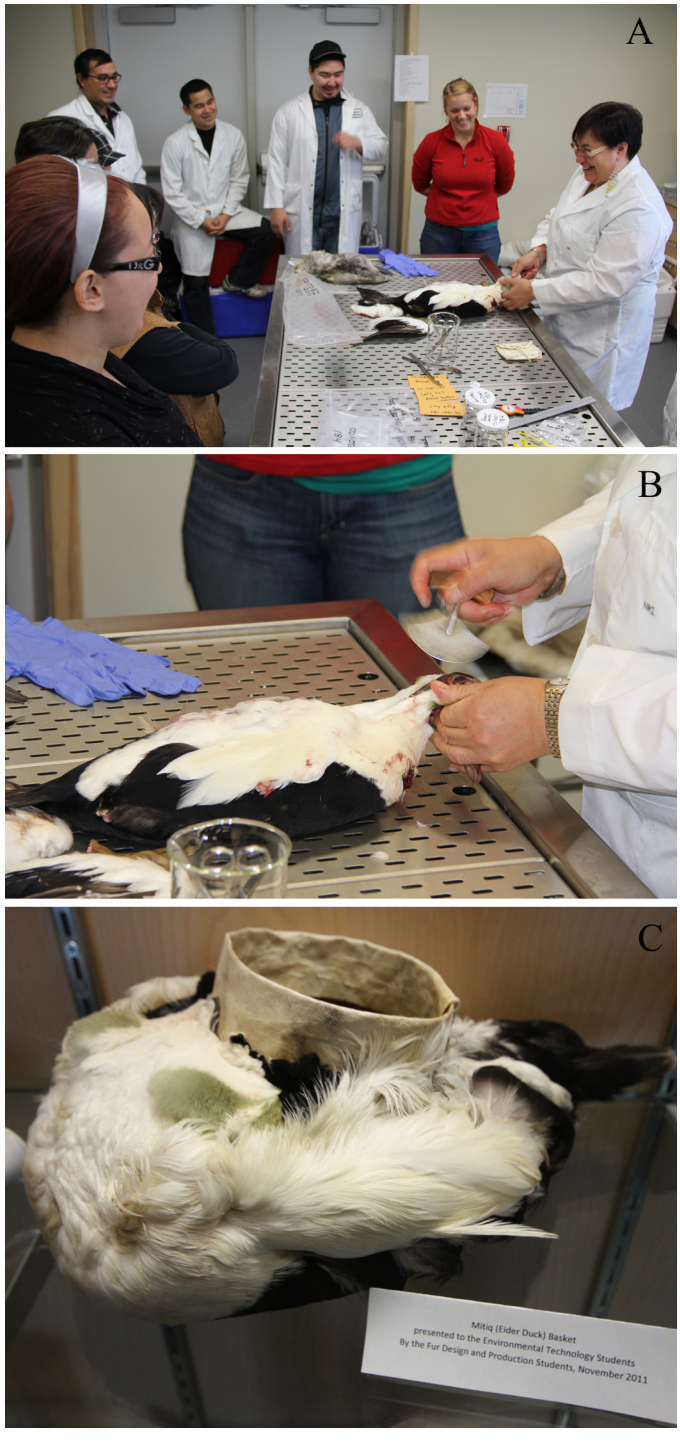

FIG. 1. A) A Fur Production and Design student at the Nunavut Arctic College teaches researchers and biology and design students how to remove the skin of a common eider duck in the traditional way used for making slippers and baskets; B) The demonstration of removing the eider skin with an ulu, a traditional Inuit knife; and C) an eider duck basket made by the Fur Production and Design Class after their participation in the marine bird dissection workshop in 2011.

showcase their own traditional skills in the context of a research program and teach fellow students, instructors, and researchers how eider skins were traditionally used in making baskets and slippers. This new component of the program greatly added to the workshop, and several of the science students chose to process their specimens in the traditional way and donate the skins to the design class for their own clothing projects.

In addition to the formal workshops, researchers and graduate students had several informal visits to local schools as travel opportunities presented themselves. When researchers had birds in hand and time was available, they contacted local schools to inquire whether teachers would be interested in participating in a marine bird dissection demonstration. Over the course of the college collaboration, six demonstrations also took place at elementary schools and high schools in Cape Dorset and Sanikiluaq, Nunavut, and at both the high school and the French school in Iqaluit. Through these additional school demonstrations, researchers reached young students within the community where the birds are harvested.

With the growth of this program, the team of educators and researchers has gained extensive experience with the collective needs of students and education programs and the resources required to ensure success. On the basis of five years of workshops and demonstrations, we have identified eight key elements needed to develop a successful program of this magnitude (Fig. 2).

KEY ELEMENTS FOR PROGRAM SUCCESS

An Integrated Educational Experience

The marine bird dissection workshop has regularly been an educational component of a larger ongoing research program concerning the health of marine birds. Graduate students and researchers intentionally secured additional funding and integrated the needs of the existing college curriculum and course calendar. Topics that were highlighted in the workshop did not always align strictly with scientific priorities. Rather than try to present a complete and comprehensive view of the entire scientific program, which includes breeding phenology, physiology, disease pathology and epidemiology, population dynamics, and toxicology, a few key messages were communicated instead. These included linkages between bird health and human health and what the diet of marine birds can tell us about changing environments, topics that were connected to the college curriculum.

The Importance of Relevant Material

Classrooms require learning materials that focus on locally relevant topics. Further, it is more interesting to students when classroom topics are presented in a local context as it helps to connect with their own priorities and values (Simmons, 2000). Wildlife studies are often relevant to northern residents as many people in Nunavut are active

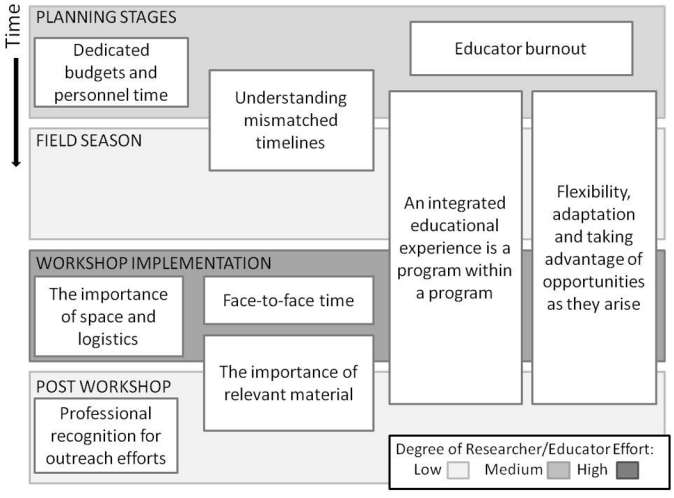

FIG. 2. Timeline and the associated effort required when undertaking meaningful long-term outreach collaborations in the North.

fishers, hunters, and trappers and regularly spend extended periods camping. For example, harvested wildlife maintains key dietary and cultural relevance to Inuit (Kinloch et al., 1992), and people want to know the state and health of local wildlife. Wildlife presents an instant and interesting conversation starter. Programs that reflect the use of local ecological and societal systems help to encourage a personal connection with the material being presented (Simmons, 2000).

Understanding Mismatched Timelines

Research program timelines are often quite different from those of educational institutions. In the North, wildlife fieldwork and collections typically occur in the summer (May to August), when students and instructors are not in school. By contrast, the best time for educational workshops to occur is during the late fall and early winter months, when student programs are well underway and instructors are looking for educational resources to enhance their curricula. As a result, timing for an educational program can be a challenge. Clearly, effective workshops can rarely be tacked onto the end of a field season (despite the economic advantage and logistical simplicity this would offer for researchers). In light of this timing mismatch, research programs must plan prior to the field season how samples and collections will be stored for use in subsequent outreach and education programs. In our case, knowing that samples had to be prepared and stored well in advance of the autumn school year meant that samples had to be frozen and stored in Iqaluit annually (which required local facilities and collaboration between Environment Canada staff). Initially, this organization of samples was a challenge, but we found that the benefits of the student help during the dissections greatly outweighed the early organizational time investment.

Dedicated Budgets

The cost of working in the North can be prohibitive for many scientific and outreach projects. Successful outreach programs typically require dedicated funding of their own to ensure equipment purchase and to cover shipping, travel, and accommodation costs (Salmon et al., 2011). One reason that this workshop has been successful and continues to grow is that it has been identified as a program priority by both Environment Canada and the Nunavut Arctic College. Each year, ancillary grants and funding have been secured for the workshop and its associated costs. Without this funding, the workshops would not have been possible. Few science budgets can support such large outreach projects, and thus it is essential for science programs to establish collaborations with other agencies that support complementary outreach and education programs. In our program, the Nasivvik Centre for Inuit Health and Changing Environments has been a key funding source for this annual workshop. Often, programs with such targeted funding are able to achieve multiple objectives and unplanned successes that arise through sharing of common priorities (Pokiak and Pokiak, 2011). We have found that these successes cannot be achieved without dedicated funding that supports direct interaction.

The Importance of Logistics and Appropriate Space

The availability of suitable facilities greatly helps learning activities. Students, researchers, and educators alike are more stimulated and comfortable in well-lit rooms with space that meets their needs. While it is true that dedicated spaces are not a necessity for engaging educational experiences, having a room with the proper equipment, lighting, and space for people to interact, participate, and view demonstrations easily is a great benefit.

In the early years of the workshop, the dissections were held in a variety of venues; none were directly associated with the college program, as the college did not have facilities appropriate for carrying out marine bird dissections. Although these venues allowed us to hold the workshop, often they had poor lighting and ventilation and lacked enough space for students to gather around to observe and subsequently try the dissection techniques (Fig. 3A). In 2009–10, the college constructed new buildings that were purposely designed for science education through funding provided by the Government of Canada's Arctic Research Infrastructure Fund. In 2011, the workshop was held in these new facilities, where laboratories were fully equipped (Fig. 3B). The new space provided good lighting, ventilation, and ample space. Having a larger, dedicated space also allowed the researchers and instructors to expand the number of participants.

FIG. 3. A) Workshop space at Nunavut Arctic College used from 2007 to 2009. B) New laboratory facilities built with federal funding in 2010.

Face-to-Face Time

Many northern outreach events and projects are conducted successfully through the Internet-based platforms that link researchers and students (e.g., the PolarConnect webinar series sponsored by PolarTREC, http://www.polartrec.com/). However, the importance of interpersonal interactions cannot be underestimated (Gearheard and Shirley, 2007; Pokiak and Pokiak, 2011). One of the strengths of the marine bird dissection workshop is that students, educators, and researchers spend considerable time learning together. The students are offered time and space to highlight their own skills, ask questions, and interact with researchers on a one-to-one basis. Through this process students come to realize how their efforts in processing the samples contribute to the overall scientific program. This helps instill in students the will to complete the project successfully and forges a social contract that encourages researchers to return the next year to share results of the teamwork. These face-to-face benefits increase student engagement and camaraderie, creating a sense of community that included both researchers and local residents in a joint venture of shared interest.

Educator Burnout

Educator burnout must also be recognized as a challenge, not only in the North but in schools everywhere. Although science outreach programs help teachers meet some of their curricular needs, these interactions are in addition to their regular activities and therefore almost always generate extra work for them. Teachers have a complex job; they must cover the curriculum and respond to the changing and varied needs of their students. In small communities, there may be only a few key teachers willing or able to take on the extra work associated with extra-curricular outreach programs. As a result, many researchers likely go away thinking the college is not interested, whereas in reality the real problem is a lack of time and staff to take on new projects. Educators and teachers are more likely to dedicate what little extra time they have to collaborations that are organized, require very little extra commitment from them, and better enable them to cover aspects of the curriculum they are required to teach.

The marine bird dissection workshop and other classroom visits were highly successful for teachers, in part because the researchers and graduate students deliver the program with very little additional commitment from the teachers other than time and space set aside in the classroom. When researchers first approached the schools and teachers, they asked if they could come into the classroom to share their research, clearly stating that they would provide both the equipment and the instruction. The researchers also sought teachers' insight to assess what the students were learning, and subsequently they adapted their material to better fit the existing curriculum.

Recognition of Education and Outreach Efforts

A recent review of education and outreach during the 2007–08 IPY (Salmon et al., 2011) indicated that although many researchers enjoyed doing science education and outreach programs, they were discouraged by the lack of professional recognition for these types of activities within the academic community. This was especially true when resources and time were increasingly limited (Salmon et al., 2011). The lack of academic recognition for outreach projects remains problematic (Salmon et al., 2011).

In small northern communities, positive or negative word-of-mouth and informal reports can make a great difference to returning research programs as they pass through the permitting and funding processes (as demonstrated in Gearheard and Shirley, 2007). During IPY, outreach was mandated as part of science program funding. Similarly, funding bodies such as the Northern Contaminants Program and the Nunavut Wildlife Management Board assess applicants not only on their scientific merit and productivity, but also on the basis of their outreach achievements in the North. Even in the North, where informal and formal outreach programs are strongly encouraged, greater

recognition of programs that provide relevant skills, knowledge, and meaningful interactions is needed.

CONCLUSIONS

Overall the marine bird dissection workshop brought students from two very different programs at the college together with researchers and educators from five different agencies, institutions, and programs working in the North and the South. The students benefited from the skills and hands-on experience, and the educators gained knowledge and context for their own work with the students. The researchers benefited from having an able-bodied group of people to help process samples and interacting with people with a wide range of experiences with bird species.

The most important theme that runs through all of the key components is that meaningful outreach projects need to be made a priority: they require devoted space, committed time to develop relevant educational material, and dedicated planning for how to collect and process samples in anticipation of student assistants. Without devoted time and energy, even programs that are well planned often fall short of their potential, but with targeted resources generated by both researchers and educators, many research programs can expand to include wider community participation.

In the larger context, true community involvement in research programs needs to be promoted beyond those people who are already involved in research consultation (e.g., HTOs, hunters) and recognized as a way for a wider range of goals to be achieved. For example, by actively engaging groups that are outside this normal consultation stream, such as those that consist mostly of women (i.e., design programs), one can also engage a group that plays a critical role in promoting sustainable development and fostering changes in behaviour and attitude (Gregoire and Lebner, 2001).

Although the last few decades have brought great improvements in how northern communities are involved in the research conducted in their local area, research programs are still not reaching their full capacity to engage wider community audiences. The "fly in, fly out" approach has lost ground, but programs that incorporate local skills and knowledge from the broader community, beyond those individuals formally involved in the application review and consultation process, are lacking. The experiences of this workshop support the idea that modern, Western views of science and traditional knowledge can be integrated in a science curriculum that enhances both northern communities and research programs (Van Eijck and Roth, 2007).

Furthermore, younger members of the community need to be more actively involved in northern research in order to foster the sense of connectedness to the research being undertaken and the desire to be more involved. As a large portion of Nunavut's population is under age 20, research programs should be encouraged to move beyond just consulting, interviewing, and hiring elders and hunters. Researchers must create programs that train, engage, and foster skills in the next generation of community leaders, thus meeting the long-term and future needs of northern communities and northern science.

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