

Growing Pressures on Circumpolar North Wilderness: A Case for Coordinated Research and Education

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Abstract—Pressures are growing on undeveloped (wild) places in the Circumpolar North. Among them are economic development, oil and gas exploration and extraction, development of geothermal energy resources, development of heavy industry close to energy sources, and lack of appreciation for “other” orientations toward wilderness resources. An international seminar in Anchorage, Alaska, in May of 2001, was the first step in providing basic input to an analysis of values associated with Circumpolar North wilderness and the constraints and contributors (factors of influence) that either limit or facilitate receipt of those values to various segments of society. This paper proposes an agenda for research, education, methodology development, and establishment of a cooperative infrastructure for accomplishment of these tasks.

Introduction

The word “wilderness” is often envisioned to be at the core of protected areas, such as parks and preserves. However, we propose that wilderness defines a range of interactions between humans and natural environments. In this, wilderness need not designate areas which are delineated and managed but rather apply to all regions, protected or not, for which people hold certain values. The process of legislation that has led to varying degrees of protection of wilderness throughout the Circumpolar North should be considered as a part of the many types of relationships communities and cultures have with natural environments. Human and biophysical variables are intimately linked, both regionally and globally. Thus, thinking of wilderness as a continuum (rather than a series of protected areas) for which appropriate research and education will lead to effective management needs to be encouraged. Moreover, expanding our spatial perception of wilderness areas to those that lie beneath water (for example, marine) and earth (for example, caves) is critical in the integrated management of the wild places of the Circumpolar North.

The Circumpolar North contains a unique community of individual countries that share some similar biophysical and sociocultural features. Some countries in the northern arctic region have established protection of wilderness through legislation or administrative policies, including Finland, Canada, Russia, and the United States (Martin and Watson, in press). Only Canada, Finland, and the United States have nationally based legislative protection, but Russia has an extensive system of strictly protected nature reserves (Laletin and others, this proceedings; Ostergren 1998) for which the Russian people are only now realizing the wilderness values (Ostergren and Hollenhorst 2000). In Iceland, recent legislation has defined wilderness and instructed regional planning efforts to consider recommendations of areas to be so protected (Thórhallsdóttir, this proceedings). While there are no officially protected wilderness areas in Sweden, Norway, and Greenland, wilderness is a common term used to describe the most remote places in these countries (Husby and Henry 1995).

Increasingly, natural and social scientists, communities, policymakers, and resource managers are being confronted with issues that revolve around how “wilderness” should be utilized and, ultimately, viewed as a component of the local, regional, and global culture perceived specifically by distinct groups of peoples. This pressure continues to grow as population growth, influence of technology, ease of access, and appreciation for dwindling natural areas become part of our identity as

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human beings. However, a collective statement of wilderness meaning and values is neither useful nor applicable to specific issues, whether they are social, political, or physical. This is mainly because the physical and ethereal qualities of wilderness vary too greatly to be discussed as a general concept (Watson and others 2001). For example, “wilderness” in the Southeastern United States may have specific constraints that reflect the political history, the inherent physical ecosystem, the historical relationships with particular cultures, and the agency policies that guide management. Such wilderness is not comparable, in the values derived or meanings attached to it, to that found in Alaska. Thus, the challenge lies not only in identifying commonalities and differences on large geographical scales (for example, circumpolar versus contiguous United States), but also in the development of methodologies that allow data to be collected from national, regional, and local populations about values and meanings associated with wilderness in ways that allow summative descriptions and comparisons across human and ecological values as basic input to societal decisions.

The purpose of this paper is to provide summary conclusions about research, education, methodology, and infrastructure needs for Circumpolar North wilderness, based on the set of papers compiled in this proceedings and followup workshops at the time of the meeting. The conclusion will offer a hypothesized matrix of wilderness values and factors of influence to guide future research and education.

Priority Research Issues

Watson and others (2001) summarized 26 research issues, identified at this Circumpolar North Wilderness Workshop, within four general categories of information needs:

1. Subsistence and other traditional uses.
2. Arctic and subarctic ecosystems.
3. Awareness and appreciation of multiple orientations toward Circumpolar North wilderness.
4. Understanding the threats to Circumpolar North wilderness character.

Subsistence and Other Traditional Uses

Wilderness research and research on wilderness values in the United States has mostly ignored the issue of traditional values associated with lands protected as wilderness, since in most cases assimilation or subjugation of native peoples has limited or destroyed cultural ties to wild places. In general, however, wilderness research has progressed from early studies in the 1960s, which focused mostly on recreation values of wilderness, to more recent investigations of societal values associated with wilderness protection and greater emphasis on ecological and scientific values (Wright 2000). Unfortunately, very little research has been conducted on the interaction between subsistence uses and other wilderness uses. Traditional recreation motivation research and recreation conflict research has little applicability to understanding and managing multiple value orientations toward wilderness resources.

The Wilderness Act of 1964 did not specifically authorize or address the issue of subsistence uses in wilderness. In contrast, the Alaska National Interest Lands Conservation Act (ANILCA) of 1980, which added 56 million acres (22.6 million ha) to the National Wilderness Preservation System, did address the issue of subsistence for those areas set aside as wilderness in Alaska. In recognition of the special relationship between rural Alaskans and public lands in Alaska, specific provisions allowing continuance of subsistence hunting and gathering were included in the Act. Historic uses, such as snowmobiles, motorboats, aircraft, and temporary fishing and hunting camps were also specifically allowed. However, considerations of the impacts of technology on both culture and natural resources in the fragile arctic environment were not extensive. Moreover, a recognition of the need for continued understanding of complicating factors such as climate change and population growth remain absent.

There is a continued need to understand how wilderness designation interacts with these activities and the meanings attached to them. Recent attention drawn to the Arctic National Wildlife Refuge by efforts to increase oil and gas exploration brought some interior Alaska native people to the conclusion that extending wilderness protection to these lands would not only meet the purposes set out in the United States Wilderness Act of 1964 and provide assurance that ANILCA purposes are met for subsistence, but in addition, would help protect the role of the caribou in maintaining the identity of some native people (James 2001). The role of wilderness in protecting traditional ecological knowledge (Huntington, this proceedings), and the value of traditional ecological knowledge in making wilderness stewardship decisions are relatively unexplored.

Arctic and Subarctic Ecosystems

Unique and fragile, arctic and subarctic ecosystems can be extremely difficult to restore (Thórhallsdóttir, this proceedings). There is currently a need to compile environmental inventories of the Circumpolar North and share information on monitoring activities across northern countries. This information is critical in order to understand the long-term effects of resident and industrial activities in the northern ecosystems, but is generally unavailable. These impacts may vary significantly in different geographical or vegetative zones of the arctic (Khitun and Rebristaya, this proceedings). Comparative studies on the levels and types of impacts on wilderness resources must extend to include local uses such as reindeer herding, hunting, berry picking, ecotourism, resource extraction, and motorized use (Gunnarsson and Gunnarsson, this proceedings; Sippola, this proceedings). Climate change impacts to vegetation and wildlife are expected to be of critical importance to the future of the people who live in the Circumpolar North. A synthesis of studies that will better forecast these changes is needed. In addition, the consideration of uncertainty in prediction, based both on data collected and perception of risk, needs to be ascertained to more effectively understand how societal behaviors may affect biophysical environments.

Of critical importance in some places is the need for methodologies to assess landscapes for ecological productivity, energy potential, and scientific uses in order to evaluate their importance for protection as wilderness (see for example, Thórhallsdóttir, this proceedings). An urgent need is to establish a hierarchy of importance for protection based on these values and a clear understanding of the factors that constrain or contribute to attainment of these values.

Generally, those countries without wilderness protection need more knowledge about the uniqueness of their own arctic and subarctic ecosystems and an understanding of the merits of protection as wilderness. This type of protection could also be extended to meet other conservation, resource utilization, or economic development goals. In an analysis of potential tradeoffs, we need to understand what the important wilderness characteristics are and how to measure them in a way that provides a priority listing of the most threatened places and characteristics.

Finally, considerations of management strategies for the marine and coastal environments of the Circumpolar North has lagged behind other areas of the world. Co-localization of human activities, ranging from industry to tourism, with these ecosystems may create critical stresses for which restoration is difficult, if not impossible. In addition, movement away from single-species management, such as that applied to fisheries, will be absolutely critical to maintaining regional resiliency and productivity.

Awareness and Appreciation of Multiple Orientations Toward Wilderness

Wilderness interpretation is a relatively new tool for accomplishing wilderness stewardship objectives (Duncan and Martin 2002). There is a need for research to support wilderness interpretation in the Circumpolar North. Such research could support efforts to create awareness and appreciation of the different orientations toward wilderness across different social groups. However, before such work is useful in the Circumpolar North, an analysis of the broad meanings and identities,

activities, experiences, and motivations for utilizing wilderness needs to be accomplished. The Wilderness Act represents a culmination of discussion and debate over the desire to keep some areas of the country available for recreation in a state closely resembling conditions found by the earliest European settlers. Leopold (1966) felt that travel by packtrain and canoe was part of the American identity, and unless some expansive areas without development in which to practice these activities were protected, we would lose our appreciation for these primitive travel skills. However, this “founding conservationists’ view” reflected in the 1964 United States Wilderness Act represents just one orientation toward the wild lands of Alaska (Kaye 2000). There is an acute awareness that wilderness provides diverse experiences that reflect the diversity of American identities. Yet, few of these identities, beyond a narrow demographic reflected by the founding conservationists, have been explored or are understood. Obviously, such a marked data gap poses severe challenges for management within and outside the Circumpolar North.

There are as many different legal orientations toward wilderness in the United States as there are differences between countries. ANILCA, for example, extends legal orientation toward wilderness to include subsistence activities. This legal extension reflects the native perspective, described more as traditional relationships with these relatively intact, extensive ecosystems that are kept that way through wilderness classification. To native people, however, wilderness may be identified as a homeland, not a place without humans, confounding these multiple legal orientations. Currently, an understanding of the broad and diverse identities and meanings of the natural environment referred to as “wilderness” has not been obtained.

There is also the orientation of the relatively uninformed. Today, increasing attention is given to wild places of the United States arctic. Mass information campaigns surrounding recent debates in Congress have heightened awareness and appreciation of the threats associated with expanded mineral exploration and drilling in fragile portions of the arctic that have previously been protected. Relationships with these places are only now beginning to develop for much of the United States population. There is the fear that arguments for protection or exploration are poorly defined, largely emotional, and based on poor understanding of the many values associated with these places. There is not a single set of values, but many, associated with these places. Visitation to these areas is expected to increase due to ease of access, increased media attention, and the growing belief that they are more threatened than they were before. A largely poorly informed public exists, who have not visited and may never visit the arctic zone of Alaska, as well as an increasing number of first-time visitors attracted by the increasing debate over the future of these places.

There are certainly economic orientations toward the wild places of the Circumpolar North, as both a traditional means of livelihood for native people (Sippola, this proceedings), and as nontraditional economic stimulation through ecotourism influences on local and regional economies. Ecotourism promotion and management can pose threats to cultural identity of native people (Saarinen 2001) and to the environment that attracts the tourists, but ecotourism may also have value extending beyond the economic, including the promotion of “ownership” values, which ultimately lead to stewardship. Providing necessary services for the inexperienced, to view these magnificent places in a way that is nondestructive to the environment, can be a valuable asset for protection of those places, while also influencing the personal attitudes and beliefs of these visitors.

Another orientation is that of the Circumpolar North. Alaska, for example, while part of the United States, has a tremendous mix of indigenous and nonindigenous people and a rich history of association with Russia, Canada, and the United States. In this context, it is not only the history that is unique, but also the traditional relationships between people and the landscape that differ from elsewhere in the United States. Biophysically, the fragility of the ecosystem requires careful consideration, and the degree of integrity of ecosystems is different from much of the world. Policy actions need to be more cognizant and appreciative of the Circumpolar North orientation. There needs to be greater sharing of information between scientists in the Circumpolar North (in contrast with existing links between scientists in Alaska and the sub-Canadian United States), positive communication, and cooperation in education programs (ARCUS 2000).

Understanding Threats to Circumpolar North Wilderness Character

The increasing pressure across the arctic north to develop energy resources and to attract ecotourism, while balancing global needs, will have significant and unprecedented effects on the wilderness character and overall biophysical integrity there. There is an acute need to understand the ways in which these forces constrain receipt of wilderness values, how they impact the “functionality” of wilderness socioculturally and biophysically, and how these constraints can be mitigated so that reasonable economic evolution is not blocked. Overwhelmingly, scientists have identified a need for synthesis of literature on the major threats (internal and external) to arctic and subarctic wilderness, and are continuing work to test the success of various approaches to mitigate those threats. There is also a need for regional, national, and international comparative studies on the effectiveness of alternative management approaches to protect wilderness values, including examination of comanagement and collaborative planning and management options (Pfister, this proceedings; Stadel and others, this proceedings). Overall, there exists a need to determine the most effective models for interaction between local people and managers. Specifically, there is a need to understand what policy mechanisms most appropriately incorporate the range of views concerning what to protect about wild places, and to develop implementation strategies that best accomplish these goals. Moreover, these considerations must be extended to marine environments.

Priority Education Issues

The knowledge gained through scientific investigation or from the documentation of local history can be useful in helping decisionmakers and community members make more informed decisions about wildlands in the Circumpolar North. In the past, we have focused a great deal of attention on the conflicts between human uses and ecological protection values. While we acknowledge that people have been living in a sustainable fashion in northern environments for a long time and wish to continue at least a partially traditional lifestyle, there is also a need to realize that there exist national and international values associated with these natural environments. The goal is to emphasize the need for finding compatibility between the array of different values associated with these wild places (Klein, this proceedings), and the challenge is to develop management plans that incorporate both acute (local) needs and more constant (regional and global) pressures, both physical and socio-cultural. Educating managers and the public about the history of these places and the many meanings people have for them provides greater insight into the effects of alternative stewardship actions. Understanding stress thresholds across multiple dimensions of discipline and scale are critical in prescribing long-term, compatible management practices.

Education needs include informing diverse and distant visitors that people do live in the circumpolar wilderness. Traditional subsistence activities have been occurring there in similar patterns for many generations and continue, at least for the foreseeable future. The Circumpolar North environment is a fragile one that will not sustain large increases in subsistence activities, although these activities are key elements of the identity of the people who live there. Residents and nonresidents alike need to understand that the Circumpolar North is not an isolated region. It is interdependent with other regions of the Earth, susceptible to external forces such as pollution, exploitation of tourism resources, and political pressures. Most of the political power of countries responsible for northern areas, however, resides in the south (Gladden, this proceedings). The education of legislators, parliamentarians, borough managers, and other political forces about the range of unique values associated with sometimes very distant, wild places is important. The incorporation of the wilderness concept into K-12 and higher education curricula will be critical in the Circumpolar North. Furthermore, our current approach of conveying arctic and subarctic systems as purely biophysical or sociocultural needs to be restructured to reflect the complex influences of diverse variables.

Currently, there is relatively little protective status extended to northern areas, although we know that there are growing threats to the relatively intact ecosystems and cultures. Education about these ecosystems and cultures will require work to maintain the presence of artifacts that will help us understand historic conditions.

We have reached a stage where the considerations mentioned above, having become complicated or exacerbated by exponential population growth, new technologies, and globalization pressures, need to enter the wilderness debate in a frank and objective manner. Without these considerations, the future of multiple uses of circumpolar natural environments is threatened.

Priority Methodological Issues

Circumpolar scientists believe that research today needs to be more pluralistic and more integrated across disciplines than in the past. In all areas of natural resource management, multiple views and “ways of knowing” must be considered. More holistic approaches to problem definition are needed and, therefore, research methodologies that extend across cultures and across the physical and social sciences are in demand. Research on the different orientations toward northern wilderness needs to concentrate more on understanding and awareness than on the expectation that there is one truth.

There appears to be growing acceptance of qualitative methods in natural resource management research, particularly with recent interest in collaborative participation in developing and implementing management plans for parks, refuges, forests, and other public lands. However, there remains a significant lack of baseline information upon which to develop and guide future research and monitoring. Qualitative research, in concert with quantitative techniques, offers a depth of understanding needed to develop testable hypotheses to test effects of management actions.

Currently, there is the perception that more effective interdisciplinary pursuits of research in the Circumpolar North is inhibited by each discipline having its own language, methodologies, and biases. While this is at least partly true, there are a growing number of native and nonnative scientists who have broad training in multiple disciplines and who are offering novel approaches to “understanding.” True understanding, it can be argued, comes about from a careful and rigorous examination of variables simultaneously (as in the “western scientific method”), as well as with an almost intuitive sense of pattern, which is obtained through generations of observation (as in the “native way of knowing” or “traditional knowledge”).

Currently, almost all research regarding natural environments focuses on tangible values that can be incorporated into tradeoff analysis. However, the concept of “tradeoffs” is too economically focused. It offers no framework outside of fiscal considerations. Cross-cultural and cross-disciplinary communication, thus, will be even more important if we are to develop frameworks that anticipate and describe diverse and multiple values, both tangible and nontangible. In large-scale assessments of wilderness values, economic values are usually overrepresented and receive too much weight. While recreational values are well articulated, local, rural, or indigenous values are not well represented, and the values associated with the size of ecological units is less often considered. New, more inclusive assessment methods must broaden to include a variety of assessment methods. Matrix frameworks are commonly being used to guide setting priorities in research, education, and strategic planning.

Limitations associated with use of quantitative methods with particular cultures are being overcome through use of semidirected interviews and other qualitative methods (Glaspell 2002; Kluwe 2002). Some of the other promising trends in social science or cross-disciplinary research methods include:

1. Efforts in the Circumpolar North to map local knowledge and values.
2. Efforts in Alaska to map critical “hotspots” where regions of high productivity converge with human activities.
3. Research projects that integrate quantitative and qualitative methods.
4. A call to challenge others to incorporate different types of knowledge into research, including traditional ecological knowledge.
5. Greater frequency of efforts to implement cross-discipline studies, for example, HARC (Human Dimensions of Arctic System Science) at www.nsf.gov/pubs/1999/nsf9961/nsf9961.htm.

To encourage these trends, circumpolar scientists suggest a continued dialogue across disciplines at workshops and seminars focused on Circumpolar North

methodological issues; expect interdisciplinary efforts to cost more time and money; encourage shared geographical study locations for integrated research; and recommend the development of performance criteria that reward interdisciplinary problem definition and product development.

Priority Infrastructure Issues

There is an historic lack of infrastructure support for accomplishment of the Circumpolar North research and education priorities listed above, and of the continued dialogue necessary to advance development of needed methodological and analytical tools. Development of opportunities for academic exchange should extend across disciplines and across cultural boundaries within the Circumpolar North.

Goals for enhancing infrastructure support should be to provide access to diverse forms of information, provide information to a wide group of stakeholders who can use it for informed discourse on wilderness issues, provide expertise to review diverse topics related specifically to wilderness issues, and bring a diverse group of interests to a common discourse in a nonadvocacy forum to exchange information and increase efficiency of decisionmaking. An initial priority is to develop within the university system of Alaska a center for exchange of information and provision of scientific and educational expertise to provide firm leadership on the priorities established above. Seeking support of interested parties, obtaining political commitment from Federal and State land stewardship agencies, and deciding on a "framework" of mission and method of operation are needed. Assembly of relevant data sets, books, articles, stewardship plans, proceedings, and knowledge about wilderness issues into one accessible collection is necessary as basic input to developing proposals to accomplish identified research and education priorities.

The founding principles of such a cooperative center should include:

1. The lands, waters, and people of the Circumpolar North are diverse and exceptional; their role in the world is significant and increasing in importance.
2. The landscapes and seascapes of the Circumpolar North are ecologically whole but fragile.
3. The lands and waters of the Circumpolar North sustain human life while providing essential spiritual values.
4. The issues and problems of the Circumpolar North require unique collaborative and creative solutions.

Proposed Values and Factors of Influence Matrix to Guide Research and Education

As a summary of knowledge gained from the papers presented at this international Circumpolar North seminar, and by using the research, education, and methodological priorities presented in this paper, a matrix can be developed that can contribute further to decisionmaking about priorities (fig. 1). This matrix currently presents 20 different values that are ascribed to Circumpolar North wilderness. Some values may be particularly important to specific cultures or stakeholder groups because certain groups may place strong weight on a specific set of these values in association with the wild character of even a single place, and may influence arguments on which areas to protect as wilderness. There is not necessarily agreement, either across the Circumpolar North countries or among stakeholder groups for a single area, about the most important values derived from protecting wilderness character, but the process of understanding the unique orientations toward the wilderness resource needs a common framework to guide discussion and knowledge building.

The columns of this matrix represent the factors that are believed to influence the realization of the values listed in the rows. Each cell of the matrix indicates an interaction between an influencing factor (sometimes a constraining influence and sometimes a contributing factor) and a specific value. Summaries of existing knowledge, or decisions about prioritization of education objectives or allocation of scarce resources for research, can be made within this framework.

The future of wilderness in the Circumpolar North rests on the successful and coordinated synthesis and implementation of these priority research and education

Wilderness values	Factors of influence (facilitating and constraining)									
	Collaborative planning and management	Scientific studies	Political conflict	Nature tourism	North-South regionalism	Appreciation of "other" orientations	Globalization	Energy exploration and development	Heavy industry development	Fragmentation of ecosystems
Watershed protection										
Cultural identity										
Spiritual inspiration										
Education										
Economic well-being										
Natural biological diversity										
Scientific studies										
Protection of rare objects										
Protection of continuous or large areas and populations										
Protection of objects of epistemological significance										
Pristine (lack of human impact)										
Protection of objects of international significance										
Geological diversity										
Scenic diversity										
Lack of technological advantage										
Sustainable lifestyles										
Traditional ecological knowledge										
Aesthetic/experiential/recreational										
Wildlife viewing										
Harvesting for sport										

Figure 1A—Values and influencing factors associated with Circumpolar North wilderness.

Wilderness values	Factors of influence (facilitating and constraining)						
	Traditional/historical uses	Commercialization and ecotourism	Funding and technical support	Leadership in communities	Fragility of ecosystems	Poor recovery from human disturbance	Poaching and other illegal violations
Watershed protection							
Cultural identity							
Spiritual inspiration							
Education							
Economic well-being							
Natural biological diversity							
Scientific studies							
Protection of rare objects							
Protection of continuous or large areas and populations							
Protection of objects of epistemological significance							
Pristine (lack of human impact)							
Protection of objects of international significance							
Geological diversity							
Scenic diversity							
Lack of technological advantage							
Sustainable lifestyles							
Traditional ecological knowledge							
Aesthetic/experiential/recreational							
Wildlife viewing							
Harvesting for sport							

Figure 1B—Values and influencing factors associated with Circumpolar North wilderness.

issues. The establishment of a Center for Wild Lands and Waters at the University of Alaska will facilitate focused and objective approaches to understanding, managing, and utilizing wilderness for the diverse communities who value it. As global pressures are exerted on wilderness areas throughout the Circumpolar North, our careful consideration of the diverse relationships humans have with it becomes especially critical. Failure to provide coordinated and effective management will impact not only the sociocultural elements that interact with wilderness but also the fundamental biophysical systems upon which life on earth depends.

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