PROTECTED AREAS OF THE ARCTIC

Conserving a Full Range of Values

CAFF

Conservation of Arctic Flora and Fauna

EDITORIAL TEAM:

Project lead: Jim Johnston, Parks Canada
Lead author: Jeanne Pagnan, Twin Dolphins Consulting, Canada, Contributing Author, Gregg Legare
Graphic Design and layout: EarthLore Communications
Map and graphics preparation: Ian Joyce, Parks Canada

CONTRIBUTORS:

Heikki Eeronheimo, Metsähallitus, Natural Heritage Services, Finland
Ellen Fritts, Alaska Department of Fish and Game
Jan-Petter Huberth Hansen, Directorate for Nature Management, Norway
Mette-Astrid Jessen, The Ministry of Environment and Nature, Greenland Home Rule
Aevar Petersen, Icelandic Institute of Natural History
Vladimir Pischelev, Russian Ministry of Natural Resources
Gunn-Britt Retter, Arctic Council Indigenous Peoples' Secretariat
Tamara Semenova, Russian Association of Indigenous Peoples of the North
Page Spencer, United States National Park Service
Sune Sohlberg, Swedish Environmental Protection Agency

CONTRIBUTING INSTITUTIONS:

CAFF Secretariat, Iceland; Parks Canada,
Department of Foreign Affairs and International Trade, Canada, United
States National Park Service.

ISBN: R62-355/2002E
0-662-32674-1

Citation: CAFF (Conservation of Arctic Flora and Fauna), Protected Areas of
the Arctic: Conserving a Full Range of Values. Ottawa, 2002

Photography:

Photo page 8, UNEP/GRID-Arendal and the Norwegian Mapping Authorities Environmental Unit

Phtoto page 20, Zapovedniks and National Parks of Russia, M. Logata 1998

Photo page 26, Minister of Public Works and Government Services Canada/Natural Resources Canada,
Geological Survey of Canada, 2002

EarthLore Communications Archives

TABLE OF CONTENTS

Blank

EXECUTIVE SUMMARY

Arctic protected areas, like all protected areas, hold value for society. Just as there is a wide diversity in protected areas, there is likewise, a wide diversity in the values they protect and represent. Furthermore, these values are not static – they change over time. Historically, areas have been specially protected primarily because of their direct uses and benefits for people and cultures. Over the past century or so, societies have also been setting aside areas for other values, including as habitat for wildlife, for geological or scenic uniqueness, for ecological functions or for sheer aesthetic appeal. Collectively, these latter values are termed "natural" values. In general, most protected areas in the Arctic were established primarily to protect their natural values. Even as they protect, most areas now allow traditional uses and may promote other uses, as well.

The Arctic is a unique ecosystem encompassing nearly 30 million km^2. It includes an ocean, multiple seas and a surrounding land mass of over 14 million km^2. The Arctic crosses eight countries each with its own protected area regime and national and regional protected area agencies. The Arctic contains vast natural resources including oil, gas, minerals and forests. Despite this wealth, the Arctic has, until recently, remained relatively immune to major development pressures affecting more temperate or tropical zones. However, this is gradually changing and the Arctic is increasingly a focus for industrial development.

The Arctic has high cultural and natural values summarised in this document. It is home to many ancient societies including the Inuit of North America, the Saami of northern Europe, Russia and Scandinavia and at least 40 distinct peoples of Northern Russia and the Aleutian Islands. Each group has its own distinct cultural, traditional and lifestyle values. The Arctic also contains much of the world's remaining pristine and undisturbed landscapes, most of the Northern Hemisphere's supply of freshwater in the form of glacial ice and the great rivers that flow from Eurasia and the Americas into Arctic waters, abundant mountains, wetlands and marshes, the vast Arctic plain called the tundra, and great stretches of forest. Vegetation ranges from the dense covering of alpine meadows to the occasional solitary plant surviving in the high Arctic desert, to large kelp forests along the coasts. The Arctic hosts a surprisingly wide array of resident insect, bird, mammal and fish life, and includes several of the richest fishing grounds in the world. During the short, intense spring and summer seasons, the Arctic also hosts millions of migratory animals from around the globe. All of these values, to a greater or lesser extent are preserved in the Arctic's protected areas.

Arctic protected areas provide a greater array of global, national, local and community benefits for nature and for people than is generally realised. Unfortunately, many of these benefits are difficult to quantify and cost. As a result, they are often poorly accounted for in conventional resource evaluations and in land use decisions which are often heavily weighted towards economic arguments. The result is that many analyses of protected areas considerably undervalue their role in providing societal and ecological benefits. In reality, the Arctic's protected areas provide considerable long-term economic benefits in terms of revenues and employment to the countries and, especially, to local communities. One important source of economic benefits is tourism, which generates considerable direct and indirect benefits.

This document discusses this multitude of values found in Arctic protected areas. It presents case studies that demonstrate how protected areas conserve such values. The case studies also show that protected areas in the Arctic generate positive spin-off effects and add considerable value to societies that are often far wider and diverse than the direct conservation benefits for which the areas were originally established.

Each Arctic country maintains a national system of protected areas, of which Arctic protected areas are but a part. Overall, the Arctic countries employ a

combination of protected area approaches in their national systems. Even though a protected area may be established primarily to protect one set of conservation values, it will generally preserve a range of values and can generate a host of benefits and opportunities for uses that are complementary and sustainable.

With over 17% of the Arctic landmass under formal protection, it may seem that the level of protection of the Arctic is adequate. However, this statistic is deceptive. For example, it disguises the very low protection afforded the marine environment. It also discounts the fact that if the nearly one million km^2 Greenland National Park is removed, the percentage drops by half.

In order to sustain protected areas, the values they preserve and their long-term benefits, it is necessary to have adequate funding, trained staff, good governance systems, functioning enforcement and political and local support. In parts of the Arctic, funding for protected areas is not keeping pace with rising costs or has been reduced. Some governance systems are outdated and may no longer to be adequate to deal with today's realities and pressures, while still effectively conserving the values for which the protected areas were established in the first place.

Attitudes towards protected areas have changed. In the past, it was commonplace for governments to set aside large tracts of land in very remote areas to protect natural values. Where opposition occured, it tended to be very localised. One reason is that the Arctic did not attract much serious attention from industrial interests including the oil, gas, mining, forestry and transportation sectors. That is quickly changing. As a consequence, there is often pressure to open up existing protected areas to alternate uses that appear to offer greater monetary benefits and job opportunities but may not be compatible with the conservation objectives of the protected areas. Indeed, there is sometimes pressure to abandon the protected area designation. Governments and local peoples alike are faced with difficult, seemingly contradictory decisions on whether to support existing or proposed protected areas or to favour industrial development. The debate can fracture communities and split governments with various sections favouring the resource industry and the income it brings, and others favouring environmental and cultural protection. These groups cherish different sets of values and the challenge is to accommodate both without compromising either.

Another challenge facing the Arctic's protected area systems is the significant gap in protecting key areas such as forests and the marine environment. There also remains a lingering perception in some quarters that protected areas are islands set apart from the people they serve, a perception often reinforced by past protected area governance regimes and decisions.

Despite growing pressures, there is much reason for optimism for the future of protected areas in the Arctic. In most of the Arctic, protected area systems are evolving to better accommodate the legitimate concerns and aspirations of local people, indigenous communities and the business sector. There are many multi-stakeholder forums in place. Management responsibilities and decision-making are being shared more frequently with local governments, with indigenous peoples in co-management settings, and with the private sector. Another reason for optimism is that the values of protected areas and the benefits they can bring to communities and to the ecosystem are becoming better known and appreciated.

Резюме

Все охраняемые территории, в том числе и в Арктике, ценны для общества. Охраняемые территории отличаются большим разнообразием, и таким же разнообразием отличаются охраняемые и представляемые ими ценности. Эти ценности, к тому же, не постоянны - они меняются со временем. В прошлом территории специально охранялись главным образом в связи с их непосредственной пользой и значением для людей и культур. В течение последних ста лет различные страны выделяют особые территории, имея в виду охрану и таких других ценностей, как места обитания диких животных, геологические и ландшафтные особенности, экологические функции и чистая эстетическая привлекательность отдельных районов. Перечисленные только что ценности совокупно называются ”природными”. Большинство охраняемых территорий в Арктике создавалось в основном с целью охраны их природных ценностей, хотя все они продолжают использоваться традиционным образом, а во многих допускаются и другие способы их использования.

В настоящем документе демонстрируется многообразие природных и культурных ценностей, взятых под защиту на охраняемых территориях приполярной Арктики. В нем рассматривается несколько конкретных случаев и приводятся примеры из разных районов приполярной Арктики, показывающие, как ведется работа на охраняемых территориях в Арктике, и дающие представление о разнообразии и великолепии этих территорий. Документ предназначен для всех, кто интересуется охраняемыми территориями Арктики и ценностями, которые они охраняют.

Арктика - уникальная экосистема, охватывающая примерно 30 миллионов кв. км. В этот регион входит океан, несколько морей и примыкающая суша, площадью свыше 14 миллионов кв. км. Арктика распространяется на восемь стран, в каждой из которых имеются свои охраняемые территории и общенациональные и региональные управления охраняемых территорий. Арктика богата природными ресурсами, в числе которых нефть, газ, полезные ископаемые и леса. При всех этих богатствах Арктика остается относительно незатронутой ходом бурной хозяйственной деятельности, которая наблюдается в более умеренных и тропических зонах. Это положение, однако, постепенно меняется, и Арктика все в большей степени становится объектом промышленного развития.

Арктика обладает значительными культурными и природными ценностями, которые кратко описываются в настоящем документе. Например, Арктика - место проживания многих древних народов, включая инуитов Северной Америки, народ саами в Северной Европе, России и Скандинавии и еще по меньшей мере 40 отдельных народов на Севере России и на Алеутских островах. У каждого народа свои собственные ценности в области культуры, традиций и быта. В Арктике находятся также многие из тех регионов мира, где сохраняются первозданные и непотревоженные ландшафты, большая часть запасов пресной воды Северного полушария в ледниках и великих реках, текущих из Евразии и Америки в Северный Ледовитый океан, обширные горные районы, увлажненные земли и болота, бескрайняя арктическая равнина - тундра и

значительные по протяженности леса. Растительность варьирует от густого покрова альпийских лугов до редких одиноких растений в пустынных районах высокоширотной Арктики и широких полей бурых водорослей вдоль побережья океана. В Арктике встречается удивительное многообразие насекомых, птиц, млекопитающих и рыб, которых вылавливают в нескольких рыбопромысловых районах, относящихся к числу богатейших в мире. В течение короткого, но буйного периода весны и лета в Арктику мигрируют также миллионы животных и птиц со всего земного шара. Все эти ценные особенности сохраняются в большей или меньшей степени на охраняемых территориях Арктики.

Охраняемые территории Арктики приносят природе и населению всего мира, страны, района или отдельного поселка больше благ, чем люди обычно себе представляют. К сожалению, многие из этих благ не поддаются измерению с точки зрения количества и стоимости. В результате они часто плохо учитываются при обычных оценках ресурсов и при принятии решений по вопросам землепользования, которые во многих случаях определяются главным образом экономическими соображениями. По этой причине авторы многих исследований охраняемых территорий сильно недооценивают их роль в качестве источников социальных и экологических благ. В действительности, охраняемые территории Арктики могут приносить и приносят значительные долгосрочные экономические блага в области доходов и занятости как своим странам, так и, в особенности, местным населенным пунктам. Одним из важных источников существенных прямых и косвенных экономических благ является туризм.

На примере ряда конкретных случаев в настоящем документе характеризуется несколько охраняемых районов Арктики и показывается широкий набор защищаемых на них ценностей, среди которых запасы пресной воды в Арктике, многообразие ее живой природы, увлажненные земли, леса, океан, первозданные ландшафты суши и моря, геологические богатства и ее народы и их традиции. Речь идет о следующих охраняемых территориях и их ценностях: Свалбард, Норвегия, район охраны белых медведей; Таававуома, Швеция, район увлажненных земель; Национальный парк имени Уро Кекконена, Финляндия, район лесов; Охраняемая территория Брейдафьордур, Исландия, известная особыми качествами примыкающих морских районов; Национальный парк Денали, Соединенные Штаты, район гор; и Камчатка, Россия, славящаяся своими вулканами и гейзерами. К другим рассматриваемым примерам относится Национальный парк Ауюиттук, Канада, с его особыми ландшафтами суши и моря и хорошими условиями жизни населения; полуостров Таймыр, Россия, и Кативик, Канада, отличающиеся биомногообразием и традиционными методами природопользования; Национальные парки Вунтут и Иввавик, Канада, со своеобразной культурой коренных народов и тесной связью их жизни с северным оленем-карибу; и Национальный парк Гренландии, располагающий ценными возможностями для научных исследований. Эти конкретные примеры ясно показывают, что каждая охраняемая территория сберегает ценности и приносит своей стране побочные выгоды и существенные блага, по своим масштабам и разнообразию далеко выходящие во многих случаях за пределы тех охранных задач, которые первоначально ставились при ее создании.

В настоящем документе указывается, что у каждой из стран Арктики есть своя собственная система охраняемых территорий, в рамках которой арктические охраняемые территории составляют лишь часть более широкой национальной сети. В документе дается краткое описание этих систем. В целом страны Арктики сочетают в своих национальных системах разные подходы к охраняемым территориям. Даже если охраняемая территория создается в первую очередь с целью охраны определенного набора ценностей, она, как правило, защищает ценности в пределах более широкого диапазона и порождает множество благ и возможностей для дополнительных и устойчивых способов природопользования.

В целом, при том, что 17% поверхности суши в Арктике официально охраняются государством, может показаться, что уровень охраны Арктики относительно высок. Однако это впечатление обманчиво. Например, эта цифра скрывает тот факт, что морская среда охраняется очень мало и что, если исключить примерно один миллион кв. км Национального парка Гренландии, общий процент охраняемой суши резко упадет. Для того чтобы обеспечить устойчивость охраняемых территорий, ценностей, которые они защищают, и долгосрочных благ, которые они приносят, необходимо адекватное финансирование, обученный персонал, хорошая система управления, действенная система обеспечения соблюдения законов и содействие со стороны политического и местного руководства. В некоторых частях Арктики финансирование охраняемых территорий отстает от роста затрат или сокращается; системы управления несовременны и не соответствуют реальностям и проблемам нашего времени настолько, чтобы эффективно охранять ценности, ради которых и создавались эти охраняемые территории.

Отношение к охраняемым территориям изменилось. В прошлом правительства охотно выделяли большие территории земли в очень удаленных районах для защиты природных ценностей. Возражения против этого носили узколокальный характер. Это, в частности, объяснялось тем, что Арктика не привлекала к себе серьезного внимания со стороны промышленных интересов, включая нефтяные, газовые, горнодобывающие, лесохозяйственные и транспортные отрасли. Такое положение быстро меняется. В результате часто высказываются требования открыть имеющиеся охраняемые территории для альтернативного использования, сулящего значительные выгоды с точки зрения прибыли и новых рабочих мест, но не соответствующего целям охраны природы, для которых эти охраняемые территории были созданы. В некоторых случаях требуют даже упразднения статуса охраняемой территории. И правительства, и местное население оказываются перед трудным и противоречивым, на первый взгляд, выбором - следует ли поддерживать существующие или запланированные охраняемые территории или отдать предпочтение промышленному развитию. Дискуссия по этому вопросу может расколоть население и правительства на различные группы, выступающие либо за развитие ресурсодобывающих отраслей и за приносимые ими доходы, либо за охрану окружающей и культурной среды. Эти группы защищают разные наборы ценностей, и задача заключается в том, чтобы удовлетворить и тех, и других, не жертвуя интересами ни одной из сторон.

Системам охраняемых территорий Арктики необходимо решить еще одну проблему - значительный разрыв между степенью охраны таких важных областей, как леса, и морской среды. По-прежнему бытует мнение, что охраняемые территории - это островки, отделенные от людей, чьим интересам они служат. Это мнение часто укреплялось прошлыми системами управления охраняемых территорий. Все это заставляет задуматься над следующим вопросом: является ли дальнейшая охрана природных и культурных ценностей в Арктике первоочередной или достаточно важной задачей, чтобы успешно конкурировать с альтернативными способами природопользования? И еще: является ли выделение земель и вод путем специальных законодательных мер лучшим и единственным методом охраны этих ценностей?

Несмотря на растущие трудности, у нас есть все основания для оптимизма в отношении будущего охраны Арктики. В большинстве районов Арктики создаются системы охраняемых территорий, рассчитанные на удовлетворение законных интересов и устремлений местного населения, общин коренных народов и бизнеса. Имеется много общественных многосторонних организаций для обсуждения соответствующих проблем. Местные власти все чаще осуществляют управление и принятие решений совместно с коренными народами и частным сектором. Оптимизм внушает также и то обстоятельство, что все больше о больше людей понимают и высоко ставят ценности, защищаемые охраняемыми территориями, и блага, которые они способны принести общинам и экосистемам.

I. INTRODUCTION

Protected areas come in all sizes and shapes ranging from the monuments at Angkor in South East Asia to the vast plains of the Serengeti National Park in Africa. Whatever their characteristics, all protected areas or sites have one thing in common – they have value to society. Just as there is a wide diversity in types of protected areas, there is likewise, a wide diversity in the values they protect and represent.

Furthermore, these values are not static – they change over time. For example, although we know too little about the earliest protected sites, many were valued mainly because of their direct benefits to people. Such sites could have spiritual, religious or political significance (i.e. the great pyramids of Egypt and Mexico, the recently decimated Buddha's of Afghanistan, the totems of North America's west coast, or the great cathedrals of Europe). Others had military, navigation or educational values such as the Great Wall of China, the Lighthouse and the Great Library of Alexandria. Other early sites had important economic or subsistence values. These included, for example, the hunting preserves of medieval aristocracies or ancient dynasties.

Beginning in the 19th century, values other than those directly benefiting humans gained more prominence and societies set aside special areas for other values including as habitats for other species, for geological or scenic uniqueness, for ecological functions or for sheer aesthetic appeal. Collectively, these are termed "natural" values. Indeed, the history of protecting areas in the 19th and well into the 20th centuries demonstrated a clear trend towards protecting sites primarily for these latter values. During that period, there was a marked growth in national park, wildlife reserve and strict nature reserve designations. There was also a trend towards designating larger and larger tracts as "protected". Examples are Krueger National Park, South Africa, established in 1898 and the nearly 1 million km^2 Greenland National Park, the world's largest, established in 1974.

Another trend during that period was a shift in governance away from private or communal ownership towards public, national ownership and stewardship of protected areas, coupled with the establishment of government branches dedicated to their management. Examples are the United States, or Canadian parks services. There was also a rise in international co-operation to protect natural resources seen as dwindling or at risk due to increasing human activity,

transportation and industrial development. International and regional treaties were signed ranging from commitments to protect species from over-exploitation to protecting special ecosystems such as wetlands.

Often areas established to protect their "natural" values entailed prohibiting, regulating or restricting human uses deemed to conflict with the ecological and natural values for which the areas were established. This was not welcomed by those with the viewpoint that human-oriented values should be predominant and over time, this led to the perception that "protected areas" were, in effect, islands set apart from the mainstream of human activity. Inevitably, conflicts ensued between the proponents of the two apparently opposing sets of values: those who considered "natural" values as primary and those who considered "human use" values predominant. Frequently, the differing perceptions were seen as incompatible, in competition, and mutually exclusive.

More recently, there have been efforts to better accommodate the two visions and balance the two sets of interests. The challenge is to prevent the pendulum from swinging too far in any one direction or having any one group of values overly-dominate the other. Methods that are being used can include categorising or classifying different types of protected areas by their predominant values and management objectives. For instance, the IUCN (World Conservation Union) system in wide use globally, classifies protected areas into six categories ranging from strict nature protection with highly restricted human access to areas designated primarily for managed human use.

IUCN Protected Area Categories

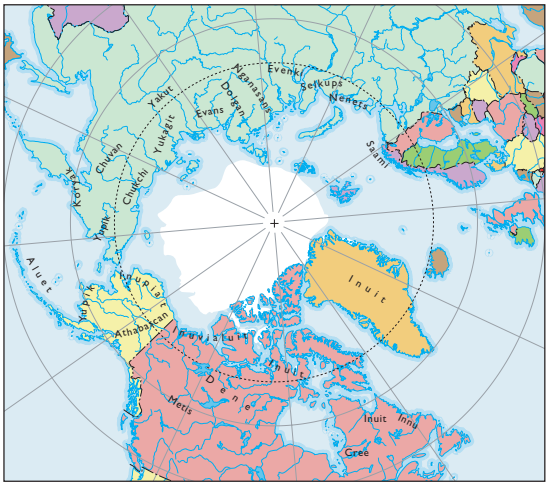
I. Strict Nature Reserve/Wilderness Area
II. National Park
III. Natural Monument
IV. Habitat/Species Management Area
V. Protected Landscape/Seascape
VI. Managed Resource Protected Area

II. THE ARCTIC

The Arctic is a unique region encompassing nearly 30 million km^2. It includes an ocean, multiple seas and a surrounding land mass of over 14 million km^2. The Arctic ranges across eight countries each with its own protected area regime and national and regional protected area agencies. Despite its wealth of natural resources including oil, gas, minerals, freshwater and forests, the Arctic until recently has been relatively immune to some of the major anthropogenic pressures present in more southern countries. It remains sparsely settled and largely unaffected by intensive economic development and human activity, by large-scale industrialisation, by urbanisation and by extensive transportation systems. The main reason for this isolation and limited development has been the harsh climate, low temperatures and lack of technologies suited for Arctic conditions. However, all that is changing. Recent technological advances in transportation, construction and resource extraction have made the Arctic increasingly accessible and attractive for development and people. In fact, in all regions of the Arctic except Russia's north, there is a veritable population boom and increasingly, mines, offshore and onshore oil and gas facilities, forestry operations and roadways dot the landscape.

A Land of the People

The Arctic has high and diverse cultural values and traditions. It is home to many ancient societies including the Inuit of North America, the Saami of northern Europe, Russia and Scandinavia and at least 40 distinct peoples of Northern Russia and the Aleutian Islands. Overall, there are over 50 separate groups of indigenous aboriginal peoples throughout the Arctic, each with its own distinct culture, traditions and lifestyle.



A World of Natural Values

The Arctic has high natural values. For instance, it contains much of the world's remaining pristine wilderness area and unfragmented landscapes. Over forty percent of its area is marine which consists of the Arctic Ocean itself and many coastal seas, bays and fjords. The Arctic contains most of the Northern Hemisphere's supply of fresh water in the form of glacial ice and the great rivers that flow north from Eurasia and North America into Arctic waters. There are abundant mountains, wetlands and marshes, the vast Arctic plain known as the tundra, and great

stretches of forested area. Vegetation ranges from the dense covering of alpine meadows to the occasional solitary plant surviving in the high Arctic desert, to large kelp forests along the coasts. The Arctic hosts a surprisingly wide array of resident insect, bird, mammal and fish life, and includes several of the richest fishing grounds in the world. During the short, intense spring and summer seasons, the Arctic also hosts millions of migratory animals from around the globe.

A Tradition of Protection

The Arctic countries have a long and proud tradition of protecting natural values and were among the earliest to establish protected areas. For example, the United States established Yellowstone National Park, the world's first national park, in 1877 and began the Alaskan park system in 1917. Sweden established nine national parks as early as 1909, the first such parks in Europe. Canada established its first migratory bird sanctuary, Last Mountain Lake, in 1887 and its first northern park, Wood Buffalo National Park,in 1922.

As has been the case with other constituencies of the world, the initial priority for Arctic governmental agencies was to protect the Arctic's natural values including its wildlife resources. An important tool was to legally establish protected areas at sites with high ecological and natural values. Each country has already placed a portion of its terrestrial territory under some form of legal protection for the primary purpose of protecting its ecological and natural values. With respect to the marine environment, however, the level of protection lags far behind.

Terrestrial Sites (greater than 10 km^2) Protected for Natural Values in the Circumpolar Arctic - 2000

Country	Number of Protected Areas	Total Arctic Area Protected (km^2)	Percent Arctic Land Area Protected
Canada	61	500,842	9.5%
Finland	54	24,530	30.8%
Greenland	15	993,070	45.6%
Iceland	24	12,397	12.0%
Norway	39	41,380	25.3%
Russia	110	625,518	09.9%
Sweden	47	21,707	22.8%
USA (Alaska)	55	296,499	50.2%
Total	**405**	**2,515,943**	**17.0%**

Arctic Flora and Fauna: Status and Conservation, Arctic Council, 2001

Note: Separate figures not available for marine protection

Each Arctic country has a national system of protected areas that, for the most part, have been protected for their ecological and natural values. The Arctic component of most of these systems is but a portion of the wider national system. Overall, the Arctic countries employ a combination of protected area approaches. These include land-use restrictions inside protected areas, setting areas aside to preserve their natural state, and focusing on protection of species through restrictions and regulations on users of biological resources (chiefly hunters and fishers), which also extend beyond protected areas *per se*. It is the specific combination of these approaches that differentiates the national systems. While the governance details and criteria for designating protected areas differ

across the Arctic countries, there is an underlying commonality to them in that habitat, species and ecosystem conservation have served as the primary designation criteria while a variety of other criteria have been of secondary importance.[1]

Circumpolar Co-operation

In 1991, the Arctic countries agreed to co-operate for Arctic environmental protection and for the sustainable development of its resources. They re-affirmed this commitment in 1996 with the formal establishment of the intergovernmental Arctic Council. Protected areas were identified as a priority. Also in 1996, the eight countries adopted a Circumpolar Protected Areas Network (CPAN) *Strategy and Action Plan* and a set of *Principles and Guidlines*. As laid out in these documents, the primary objectives of CPAN are to protect critical habitat throughout the Arctic and to ensure representativeness of ecosystems at a circumpolar level. In summary, as a network, CPAN seeks to provide a mechanism and process for international co-operation to protect the full range of natural values found throughout the entire Arctic ecosystem, since each country alone cannot achieve full coverage. CPAN also seeks to protect cultural values and provide for traditional indigenous use of natural resources and to provide for education, recreation, tourist and other human needs as well. CPAN also contributes to the implementation of several international programmes and conventions such as the Conventions on Biological Diversity or Wetlands of International Importance (Ramsar) and the Man and the Biosphere Programme (MAB).

The full range of values intended to be protected through CPAN include:

- the dynamic biodiversity of the Arctic region in perpetuity
- the wide variety of Arctic systems and successional states across their natural range of variation
- viable populations of all Arctic species
- ecological and evolutionary processes
- habitats of migratory species and other wide-ranging species
- relatively undisturbed areas as a natural heritage of global significance
- the diversity of ecosystems, processes, species and genetic varieties
- the dynamic and shared marine environment and its species
- significant biogeographic features
- indigenous cultures of the north
- significant cultural features.

The Arctic countries also agreed that CPAN would:

- seek to minimise negative impacts of world population growth and economic development on the biological diversity and integrity of the Arctic while providing for traditional indigenous use and educational, recreational, tourist and other human needs
- safeguard many of the world's outstanding areas of living richness, natural beauty and cultural significance
- provide core sites and facilities for a wide range of Arctic research and monitoring
- provide a framework and a context for countries contiguous to a sensitive area to collaborate for area protection (e.g. Canada/Greenland, Russia/Norway, Russia/USA)
- provide additional stimulation to countries to protect their Arctic ecosystems, habitats and species
- facilitate ecological, informational and physical linkages among protected areas.

1. Legare G. and Belikov, S., *National Principles and Mechanisms for Establishing Protected Areas in the Circumpolar Arctic*, Conservation of Arctic Flora and Fauna Programme, Ottawa, 1996,

Regional Co-operation

Within the Arctic there are also regional alliances including:

- the *North American Commission on Environmental Co-operation* which is seeking a continental network of marine protected areas extending to the Arctic

- the *Barents Euro-Arctic Co-operation* which is seeking a network of protected areas in the Barents portion of Scandinavia and North-west Russia

- the *European Union*, which includes several Scandinavian countries and is implementing a protected area initiative termed "Natura 2000" which includes an Arctic component

- the *Nordic Council of Ministers* which has developed an Arctic action plan, is reviewing protected areas and related issues in the five Nordic countries and supporting extensive research.

III. VALUES AND BENEFITS OF ARCTIC PROTECTED AREAS

Arctic protected areas provide a greater array of global, national, local and community benefits for nature and for people than is generally realised. Many of these benefits are difficult to quantify and cost. As a result, they are often poorly accounted for in conventional resource evaluations and in land use decisions.

The result is that many analyses of protected areas considerably undervalue their role in providing societal and ecological benefits. The following chart summarises some of the main benefits and values generated by protected areas.

Values of Protected Areas[2]

Natural physical values can encompass functions and relative importance of a protected area for sequestering carbon, as a watershed, for pollution filtration.

Natural ecological values can encompass functions and relative importance of a protected area as species habitat including for sustenance, breeding, migration, natural evolution, adaptations.

Economic values can include direct or indirect monetary, commercial and employment benefits to a community/ country derived from tourism, cottage industries, agricultural grazing and others.

Cultural and **Heritage** values can include the importance of protected areas in representing the characteristics that formed a society's distinct character and the historical importance of a site in shaping a society or people; spiritual values attributed to a site are also included.

Recreation values can include the worth of a site for consumptive (i.e. sport hunting) or non-consumptive (hiking, camping, photography, etc.) activities.

Subsistence use values can include the worth of a site as human habitation or providing human nourishment prior to western economic development or uses.

Societal values can include the importance of a protected area to a society at large often reflected in the funding or political priority attached to the site.

Landscape values can include the visual characteristics and their relative importance to local communities, nations or internationally.

Educational values can include the use of a site to train or teach people and make them aware of their physical and natural surroundings and its biodiversity.

Scientific and research values can include the importance of a site in contributing to an overall understanding of the natural environment and the consequences of natural vs human-caused, or anthropogenic, changes.

2. Arctic Protected Areas: A Question of Values, unpublished paper, J. Pagnan, 2002

As the case studies in this document demonstrate, even though a protected area may be established for one overriding conservation objective, it will generally generate and protect a variety of other values and provide opportunity for uses which are sustainable and complementary to its main natural values. Maintaining these multiple values is, of course, a matter of having clear conservation and sustainability priorities and effective, rational governance.

Water in Abundance

In recent decades, parts of the world have experienced catastrophic droughts and shortages of freshwater have become a major global issue. In comparison to many parts of the globe, the Arctic is blessed with an abundance of freshwater and holds a high proportion of the world's freshwater resources. For example, eight of the world's largest rivers are in the Arctic and pour 4,200 km^3 of freshwater into the Arctic basin and seas annually. Where Arctic rivers drain into the seas, they form some of the world's most important deltas. A number of these have been protected. For example, Russia has established protected areas at the deltas of the Ob,Yenisey, Lena, Pechora and Kolyma Rivers; the USA, Norway and Canada have established protected areas at the deltas of the Yukon, Altaelva and Nelson Rivers, respectively.

The watercourses of Arctic rivers drain more than half of the land area of North America and the Russian federation and form two of the largest watershed mosaics in the world. The importance of protecting these watersheds in order to maintain freshwater quality is increasingly recognised by the global community. Although the Arctic states have established protected areas at some of the strategic watershed sites and regulate point-source pollution along important waterways, watershed protection has not generally been a major priority in designating protected areas to date. Finland, however, has legislation to protect entire hydrological entities and complete watershed areas.

The Arctic landscape is dotted with lakes and some of the world's largest lakes occur there, for example, Great Bear and Great Slave lakes in Canada and Lakes Taimyr, Ladoga and Onega in Russia. Lakes cover 8.5% of Sweden and 10% of Finland. Some Arctic lakes, for example Lake Myvatn in Iceland, are protected. In some countries, such as Finland, legislation is in place to protect the water quality of lakes by prohibiting most lakeshore development and by regulating inputs and water withdrawals. During the ice-covered period, which can extend throughout much of the year, parts of the Arctic such as Yakutia and Greenland, still carry on the practice of harvesting blocks of ice for domestic use.

The largest permanent freshwater deposit in the Arctic is glacial ice. Areas of the Arctic with significant glacial ice coverage include the large Arctic islands of Russia (i.e., Novaya Zemlya and Severnaya Zemlya), south-western Alaska, south-east Iceland and the Greenland ice cap which at 1.7 million km^2, holds 10% of the world's freshwater supply. To date, Arctic countries have given high protection to glaciers and their important water supplies and many national parks or other protected areas have been established in their vicinity. Examples are Glacier Bay National Park (USA), Quttinirpaaq (Ellesmere Island) National

Park (Canada), Greenland National Park (Greenland), Skaftafell (Iceland), North West Spitsbergen National Park (Norway), and the Severnaya Zemlya Sanctuary (Russia). In addition to protecting valuable water resources, these glacier-based protected areas are also prime tourist destinations because of their spectacular vistas and thus generate important economic benefits.

Protecting Global Biodiversity

Arctic countries are signatories to the 1992 Convention on Biological Diversity: through this and other legal instruments they have committed to protecting wildlife and their important habitats as a contribution to the global effort. The Convention on Biological Diversity calls for global and regional systems of protected areas and the Circumpolar Protected Area Network is being implemented partially in response to this commitment.

Wildlife species in the Arctic are either permanent residents or migratory. Among the more important permanent residents are polar bears, musk-ox, caribou and reindeer, Arctic wolf and fox, lemmings, wolverines, ptarmigans, Snowy owls, snow-buntings, walrus, sea otters, many varieties of seal, and cetaceans such as the orca, or Killer, bowhead, narwhal and beluga whales. Admittedly, the number of permanent resident wildlife species in the Arctic is lower than in more temperate or tropical regions. Nonetheless, these species are globally unique and each has great value within the short Arctic food-chain. Many have been relied on for millennia and continue to be important to Arctic indigenous peoples and their ways of life.

An additional and indispensable global role played by the Arctic is as the summer home and breeding ground to millions of migratory wildlife from all over the globe, including Antarctica. Over 250 species of birds including geese, shorebirds, seabirds, and many others flock to the Arctic each spring to enjoy the rich breeding grounds and abundant nutrient supplies. Arctic waters also receive several species of marine mammal such as the humpback and grey whales and various seals. For over a century, the northern countries have been setting aside sanctuaries and reserves to protect both resident and migratory wildlife. Examples are: national wildlife areas and migratory bird sanctuaries and regional ecological reserves in Canada; national wildlife refuges, state game sanctuaries, game refuges and critical habitat areas in the USA (Alaska); nature reserves in Greenland; strict nature reserves and wilderness areas in Finland, and in Russia, national zakazniks, (wildlife sanctuaries) and regional reserves. Other types of protected area designations such as national parks usually have wildlife protection in their mandates and countries have also adopted stringent hunting regulations to protect species from over-exploitation.

Arctic protected areas also contribute to global efforts to stem species extinctions. All eight countries are signatories to the Convention on International Trade in Endangered Species (CITES). Fortunately to date the majority of Arctic species are not listed as “endangered” or “threatened” although there are notable exceptions. Some examples are the Peary caribou, Lesser white-fronted goose, Steller’s eider, Steller’s sea lion, Siberian crane, Whooping crane, some populations of polar bear, Bowhead whale, and the walrus. Arctic countries have been particularly vigilant in setting aside areas to protect these and other Arctic species threatened with decline. For

example, Norway strictly protects polar bears on Svalbard. Sweden has set up a protected area for the Lesser white-fronted goose. Russia has established several protected areas on the Taimyr Peninsula and along the Laptev coast to protect the walrus. The Arctic countries also set aside areas to protect migratory species from harm during their stay in the Arctic. For example, Russia protects the Grey whale and the Snow goose at the Wrangel Island Zapovednik and surrounding waters.

Svalbard, Norway: Protecting the Polar Bear – Symbol of the Arctic

The Svalbard Archipelago covers 62, 700 km^2 in the middle of the Barents Sea, north of mainland Norway. Since the Svalbard Treaty of 1920 it has been under Norwegian sovereignty as part of the Kingdom of Norway and there are today three small settlements and research stations of Norwegians, one of Russians and a Polish research station. In addition, there are small meteorological stations on two remote islands: Hopen and Bjrrnrya (Bear Island). For over 400 years it has been intermittently inhabited by Europeans, chiefly whalers in the early days, but since 1906, also by coal miners. The archipelago is 60% covered by glaciers but has a relatively mild climate relative to other areas that far north due to the moderating influence of the Arctic Seas and the North Atlantic current. Svalbard is the site of Norway's efforts to protect the polar bear.

Sixty percent of Svalbard's land area is protected and the islands contain three national parks (all on the largest island, Spitzbergen), three nature reserves, a plant preservation territory and 15 minor bird reserves. In addition the remote and isolated Bear Island – located between the Svalbarfd Archipelago and mainland Norway – discovered and named by Wilhelm Barents when killing a polar bear there in 1596, was designated as a 177 km^2 nature reserve in August 2002. A new protected areas plan has been worked out, and if the proposed six new areas are established the level of terrestrial protection may reach 64%. One of these areas is the island Hopen which is one of the most important and best polar bear breeding sites in Svalbard. Governance of these protected areas rests with the Governor of Svalbard under the guidance and supervision of the Directorate for Nature Management.

The Svalbard Archipelago has a very rich concentration of biodiversity. While dwarf birches are the only trees, there are 165 plant species in the 6-7% of the archipelago which has plant cover. There are 41 species of birds, and although ptarmigans are year-round residents, migrant fulmars, petrels, auks and kittiwakes flock to its cliffs yearly to nest and geese, waders and eiders migrate to other areas in the archipelago. The principal mammals are the Svalbard reindeer, Arctic fox, short-tailed vole and, of course, the polar bear. In the waters and ice around Svalbard are six common species of seals and four common species of whales. Cod, capelin, Norwegian haddock, Greenland halibut and shrimp are commercial fish stocks harvested primarily by Norway and Russia

One of the most significant wildlife populations in Svalbard is the polar bear. Kong Karls Land, a nature reserve, is the best polar bear breeding site on Svalbard. The bears are protected throughout Svalbard and hunting them was banned in 1973. Since that date, they have been protected under the circumpolar International Polar Bear Agreement as well as under Svalbard law and regulations. The bears concentrate on the pack ice east and north of the islands moving south in the winter with the ice, where they will often come ashore. Human-bear encounters are rather common in Svalbard and anyone going outside of the main settlements is advised to carry a large calibre rifle for defence. Bears can be killed only in self-defence and all kills are examined for harassment, chasing or other provocations. In fact, harvesting and environmental regulations are very strict and comprehensive on Svalbard and most wildlife is protected throughout the archipelago with limited hunting seasons for some few species outside the protected areas. The Svalbard Environmental Protection Act that entered into force July 1, 2002 is quite unique since for the first time all environmental regulations for one area have been collected in one act. The act introduces a general principle that all flora and fauna are basically protected. Only controlled and limited harvesting is allowed so that the species' natural productivity, diversity and habitats are preserves.

Svalbard is becoming a more popular tourist destination, especially for cruise ships, and tourist regulations are strict. More than 40,000 tourists visit Svalbard every year, three-quarters of them arriving by cruise ships (2001). Statistics for the 1996-2001 period shows an increase of 130% in the number of landing sites indicating that an increasing number of visitors are landing at often very remote places, including significant polar bear habitats. Disposing of wastes, hunting and fishing (out of season), disturbing birds and mammals, removing fossils and plants, the use of all-terrain vehicles, putting up buildings and landing aircraft are all prohibited. All tour operators and any individual tourists must clear any visits to the protected areas with the Governor's office.

Overall, habitat and wildlife on Svalbard are probably among the most protected in the Arctic which is in line with the objectives of the Norwegian government. Threats to the ecological values protected on Svalbard, in addition to new Norwegian and Russian mining projects underway, come from offshore and are chiefly the threat of ocean-bound pollution from Europe and Russia, spills from oil and gas development in the Barents Sea, potential marine disasters as shipping increases, and the growing influx of tourists.

Preserving Plant Life and the Gene Pool

Arctic vegetation has aesthetic, ecological, educational, recreational, subsistence and scientific values to the people of the Arctic and, increasingly, to the global community. One of the recurring myths about the Arctic is that it is practically barren of vegetation. While it is true that its glacial and desert regions have sparse vegetation, in fact much of the Arctic has a rich vegetation cover. At least 6,000 species of flowering plants, lichens and mosses occur in the tundra zone alone. The Arctic landmass includes representatives of all major plant types from the tiniest lichens and mosses to over a dozen species of trees. During the short spring and summer seasons the Arctic tundra, a massive treeless plain circling the northern part of the globe, springs to life and becomes a carpet of flowering plants, lichens and grasses. Of the flowering plants, many are endemic and found only in the Arctic and some ninety-six species are classified as rare. Unfortunately, countries have been slow to protect much of this rare plant life in its own right. For example 61% of rare endemic taxa occur outside protected areas. Of the more common plant types, 47% lack formal protection, 30% are fully protected and the remaining 23% are partially protected.

In addition to supporting migratory wildlife during their short breeding season, Arctic vegetation supports resident herbivore species of the Arctic such as the caribou, reindeer and musk ox. However, Arctic plant-life grows slowly and can only support a limited amount of grazing. Therefore, the ranges of

these species are necessarily large. Countries have taken steps to protect important tracts of the tundra critical for these herbivores. Examples are the Arctic National Wildlife Refuge in Alaska which protects the Porcupine caribou herd, North-west Spitsbergen National Park that protects the Svalbard reindeer, and the Great Arctic Nature Reserve of Russia which helps protect the Tundra reindeer. Greenland's National Park protects the grazing grounds of the largest herd of musk oxen in the Arctic.

Arctic countries are co-operating to conserve the genetic heritage of their plant life as a unique contribution to the global initiative to preserve the genetic diversity and vegetation heritage of the earth. Arctic scientists regularly collect representative samples of Arctic plant life and have set up a special repository on Spitsbergen to conserve the samples and gene pool.

A Wealth of Wetlands

Underlying much of the Arctic is a layer of frozen soil termed "permafrost" the upper portion of which, along with the snowcover, melts in the spring to form a rich blanket of marshes and wetlands in low-lying areas, providing ideal breeding habitat for a wide range of species. The Arctic is also blessed with an extensive network of permanent wetlands.

Migratory waterbirds visiting the Arctic depend on wetlands and all eight Arctic countries are signatories to the Ramsar Convention on Wetlands of International Importance. Together, as of 2000 the countries had designated 44 International Ramsar sites in the Arctic, with more proposed. Some 136 species of migratory birds breeding in the Arctic depend on wetlands as well as on wetlands in the countries where they over-winter. Of the nearly 1200 Ramsar sites designated globally, over 800 are used as important wintering sites for Arctic birds.

Forests in the Arctic - A Multitude of Values

Lying between the great northern boreal forest and the Arctic tundra lies the forest-tundra transition zone. Here, forest cover is interspersed with tundra-like vegetation and areas of sparse tree growth. Arctic forests have important physical and biological values. For example, they stabilise and protect fragile northern soils and nutrients, prevent erosion, conserve water resources and watershed capabilities, act as carbon storage and filter pollutants through their soils and wetland areas. The shifts in distribution of Arctic forest areas and in the occurrence of wildfires are also an important indicator of climate change. Biologically, the forest-tundra transition zone contains 15 known tree species and plays a vital role as habitat for many Arctic species such as moose, crane, lynx, snow-shoe hare, some populations of caribou and reindeer during winter periods, as well as many smaller creatures, migratory birds and a host of insect and lower-order plant life. These areas have been critical for many

Taavavuoma, Sweden: Conserving Valuable Wetlands

Situated in Northern Lapland near Kiruna, Taavavuoma is a 287 km^2 mire complex which is extremely rich in birdlife. It is designated as an International Wetland under the Ramsar Convention and is a Specially Protected Area under the Natura 2000 Program of the European Union. There are also proposals to designate the area as a national park. The area is government owned and managed by Statens Fastighetsverk. Taavavuoma is a large wetland situated in a low-lying part of the tundra landscape and is surrounded by plateaux and the Tsaktso Mountains. It contains the densest concentration of "palsas" in Sweden. Palsas are mounds or raised areas in peat bogs containing permafrost. They are formed by frost raising the land surface. These eventually disintegrate leaving behind pools of water, which are favoured habitat for ducks and wading birds. Long-tailed skuas and other birds of prey often use palsas as vantage points. The area is drained by a small mountain stream which forms part of the largest river system in Sweden not tapped to produce hydro-electricity. The climate is Arctic-like with cold winters and short summers. The vegetation is chiefly sedges and mosses. Tall, thick willow thickets line the streams and lakes and there are significant birch woods.

Over 80 species of birds, particularly ducks and waders, have been recorded at Taavavuoma, almost half or them nesting birds. Density is very high with over 70 duck pairs and 300 passerines per square kilometre. Among the common species are red-necked phalaropes, ruffs, teals and pintails. Rare bird species include red-throated pipits, bar-tailed godwits, great snipe and spotted redshank. Birds of prey include rough-legged buzzards, hen harriers, golden and white-tailed eagles, gyrfalcons and occasionally peregrines, short eared, and snowy owls. The Arctic fox has become extinct in the area but other mammals include red fox, wolverines, brown bears and elk. Stunted char, grayling and some salmon inhabit the streams and perch and pike live in the lakes.

The area is wild and remote and at present, there are no outdoor or recreation facilities site although the site does receive some visitors from outside (mainly fishermen and some berry gatherers) who come in by foot, snowmobile or by seaplane. The area supports traditional reindeer herding and there is a traditional route for migrating reindeer along the river. Overall the area is still subject to minimal disturbance and other than climate change, immediate threats are minimal.

indigenous societies who have used them extensively as centres of subsistence for centuries. To date, industrial timber operations in this critical region have been minimal due to the cost of exploitation and the relatively poor quality of the stands. However, as technology improves and world pressure for resources increases, this could change. Unfortunately, one of the least protected systems in the Arctic are its forested zones although there are some notable exceptions. For example, Greenland has fully protected its Qingua Valley, its only forested area, under special legislation since 1962, and Sweden has two acts in place under which it has established over 600 crown forest reserves throughout Sweden. Several national parks and zapovedniks also contain forest resources but were not specifically established for that purpose.

Urho Kekkonen National Park, Finland: Protecting Forest Values

Located in north-east portion of Finland known as Lapland, the park is 2530 km^2 in size and was established in 1983 by an Act of the Finnish Parliament. State owned, it is managed by Metsähallitus, the Forest and Park Service and is Finland's second largest national park. It contains a multi-faceted mixture of high rocky fells, gently sloping uplands, Scots pine and Norway spruce forest stands, bogs and river valleys. In the forested area, the ground is blanketed with moss and lichens. There are extensive aapa bogs in open areas. The park is also close by a large wilderness area on the Russian side of the border, forming a large, combined pristine area in north-east Europe.

The park was established primarily to protect the forest, along with the peatland and fell ecosystems of Lapland and also to preserve conditions for traditional reindeer herding which was established in the region toward the end of the 19^{th} century. Hole trap remains endure from Saami hunts of wild reindeer and old reindeer fences and herders' huts reflect Saami reindeer husbandry. This remains the most important occupation in the park and it enjoys special status here. The park is also one of Finland's most popular wilderness hiking locales. Gold panning by traditional methods is still permitted but the taking of pearly freshwater mussels, which occurred formerly, is now banned.

Other than protecting the northern forest and traditional pursuits, the main value generated by the park is providing tourism and recreation space. It receives between 150,000-200,000 visits a year and has tourist facilities and a tourist resort with capacity for 10,000 campers on the park's border (Saariselka). Saariselka is one of the largest tourist destinations in Lapland and provides over 200 fulltime jobs and over 25 million Euros in revenue. Hence, it is very important to local communities and the region as a whole. Local people also use it for hunting, fishing and, of course, reindeer herding. The main tourist attractions are the park's natural landscape, its quiet and its wilderness quality.

While there are few immediate threats to the park, its forest area may be threatened by global climate change as it is very near the treeline. Also, as reindeer pasture outside the park has become scarcer, the pasture inside the park has become correspondingly more valuable. Nature based tourism continues to grow in Northern Finland, further enhancing the park's value as a major site for sustainable tourism.

Securing Marine Values

The Arctic's marine environment is crucial for global climate and for regulating the world's ocean currents. It provides year-round habitat for a multitude of marine mammals and seabirds and supports hundreds of thousands of migratory whales, seals and birds. Its seas such as the Bering and Barents contain some of the richest fisheries in the world. Marine wildlife tends to congregate in a few critical areas throughout the Arctic. One favoured area, and a feature unique to the icy marine environment are the "polynyas" - patches of open water that can recur in the same location year after year as ice forms seasonally around them. Examples are the Northwater Polynya between Greenland and Canada, and the Great Siberian Polynya in the Laptev Sea.

In addition to its value as wildlife habitat, the marine environment has sustained Arctic peoples since earliest times. In fact, many Arctic societies such as the Inuit and coastal Saami, depended almost exclusively on marine resources. Europeans were also extensive users of the Arctic's marine resources and, in fact, almost drove many of its species to extinction due to excessive exploitation and unsustainable hunting practices.

Eight marine areas of the Arctic have been internationally recognised for their values as Large Marine Ecosystems (LMEs), areas of ocean characterised by their high productivity, distinct marine features, and by their species interactions. Globally, LMEs produce 90% of the world's fish catch. LMEs in the Arctic include the West and East Greenland Shelves, the Iceland Shelf, the Faroe Plateau, the Norwegian Shelf, the Barents Sea, and the East and the West Bering Sea which produces 50% of the USA annual catch. LME status for a marine area does not give it formal legal protection but is an acknowledgement of the very high ecological and economic values the area holds for the global community.

Fisheries are of high economic and cultural value to the Arctic countries and many Arctic communities depend on them. Consequently, and in addition to establishing formal marine protected areas, countries also conserve marine values and productivity of their valuable fish stocks by declaring no-catch zones as the need arises. This renders an area off-limits to commercial fishing interests on a temporary basis in order to protect fish resources during sensitive breeding seasons or from over-exploitation or other disturbance. Countries also routinely set quotas for fish catches and close important rivers to fishing operations and other types of development during fish migrations and the spawning season.

Despite the enormous values of the marine environment to people and to other species, countries have traditionally shied away from formally protecting it. Some early exceptions are Greenland's Melville Bay and the 3-mile coastal zone of the Greenland National Park, the Alaska Maritime and the Izembek National Wildlife Refuges in the USA (Alaska), Canada's Cape Dorset, East Bay, Prince Leopold Island migratory bird sanctuaries and a portion of Auyuittuq National Park, and Norway's Bliksbaer, Karl Soyvaer and Nord-Fugloy nature reserves. Despite these and other initial efforts, protection has remained low at less than 2%. However, that trend may be changing. For example, in the 1990's, both Iceland and Russia formally protected large marine areas. Iceland established the Breidafjordur Marine Conservation Area in 1995 to conserve the biota, land and seascapes and geological formations and cultural heritage, and to accommodate sustainable resource exploitation and retain traditional uses. In 1993, Russia declared the 42,000 km^2 Great Arctic Reserve which includes several offshore islands and extensive stretches of the Kara Sea. Russia also protected the whole of Franz-Joseph Land and its marine component, a large island complex within Russia's 200-mile economic zone. In 1999, Russia also extended the marine protection of the Wrangel Island Zapovednik out to the 12-mile limit.

Countries are also engaged in planning for systems of marine protected areas. For example, Canada has identified 10 natural marine regions in the Arctic and is in the process of identifying outstanding marine areas to represent each of these regions. When established as marine conservation areas, these areas will be managed for sustainable use and will also include zones of high protection. Norway has identified a series of marine areas for additional protection and the USA is currently assessing which of its marine zones need further protection. In addition, under the Circumpolar Protected Area Network project, the eight countries are collaborating to identify sensitive Arctic marine areas of high natural value.

Breidafjordur Marine Conservation Area, Iceland: Conserving Natural History in a Multiple Use Context

Breidafjordur is a large, shallow bay 50 km wide by 125 km long with an area of 2,874 km^2, of which about half is included in the conservation area. To the south it is flanked by the Snaefellsnes peninsula, the Western Fjords peninsula to the north, and the Snaefellsjokull glacier which is now included in the Snaefellsnes National Park. A narrow coastal strip along the bay contains farms and small urban areas. The land/seascape consists of shallow seas, small fjords and bays and a rich intertidal area with 3000 islands, islets and skerries. The bay contains one-half of Iceland's intertidal area and about one third of its coastline.

Unlike many of the case studies presented, Breidafjordur was established in an inhabited area with a long history of resource use. It is a multiple use marine conservation area in West Iceland established in 1995 by a special law. The primary goal of the area is conservation of the natural environment, including fisheries and the better management of commercial stocks. Strict protection and exclusion was not possible except in limited areas or for temporary periods of time. Overall, the area is classified as a Habitat/Species Management Conservation Area (IUCN Category IV) but within it are zones which are Strict Nature Reserves (IUCN IB) and Managed Resource Protected Areas (IUCN VI). The site allows traditional use of the area's resources and permits extraction activity and fisheries. There are management interventions to protect the common eider and certain areas to conserve important cultural features. Access to some parts is restricted to scientific purposes while others allow tourism and outdoor recreation. Governance is by a multi-stakeholder committee comprising the local communities, the National Museum (responsible for cultural heritage) and the Institute of Natural History (responsible for natural history research). A conservation, or management, plan has been completed by the committee and has been signed by the Minister for the Environment. During the process, extensive consultation took place with the Nature Conservation Agency, which is responsible for protected area management and has the authority for planning. The conservation plan for the area takes into account research, monitoring, fisheries, recreation, sustainable tourism and environmental education.

The islands in the conservation area have a long history of human use and habitation. Eiderdown, algae and fish have all been harvested here for a long time. The area is also a growing tourist area. The bay is an important spawning ground for commercial marine species including lumpsucker, scallops, Atlantic cod and pink shrimp. Other long-standing human uses are sealing, egging and catching puffins. Whale watching has now become an important tourist attraction.

The area supports diverse flora and fauna, substantial portions of the populations of a number of bird and mammal species and has a high productivity marine zone rich in algal 'forests' and other important fish and invertebrate habitat, which is key to the marine food chain. The islands include 230 species of vascular plants and 50 of the 70 breeding bird species in Iceland, among them shag, great cormorant, glaucous gull, white-tailed eagle, common eider, black guillemot and grey phalarope. The area is an important staging area for Brent goose and Knot on their way to the High Arctic. Marine mammals include common and grey seal, common porpoise, white beaked dolphin, orca and Minke whales.

The Breidafjordur Marine Conservation Area is a likely candidate for Ramsar designation as well as for a mixed natural-cultural World Heritage Site. It offers valuable lessons on how protection of natural values can interact with established human uses in an area inhabited since the settlement of Iceland 1100 years ago.

Aesthetic Values and Scenic Beauty

The Arctic is blessed with some of the most spectacular natural scenery in the world ranging from the magnificent fjords of Greenland and Norway to the majesty of the mountains of Alaska and Yukon to the stark beauty of the Russian Arctic islands. The Arctic countries have formally protected many of these sites and strictly regulate any activities which could disrupt their high aesthetic values. Besides having high visual values, these sites represent truly pristine, unfragmented wilderness areas which are a rapidly dwindling and valuable commodity on this planet. Another benefit of these protected areas is their remoteness which has thus far protected them from some of the key impacts, sometimes termed "plagues" of industrialisation – excessive noise, light and air pollution.

Geological Wonders in the Arctic

The Arctic has a fascinating array of geological features of local, national and global value. One of its most striking features are its mountains which include several important chains such as the coastal chain in Alaska, the Verkhoyansk, Cherskiy, Kolyma, Anadyr and Koryak Mountains of Yakutia and Russia's Far East, the northern portion of the Ural Mountain chain, and the Scandes Range forming the spine of Scandinavia. These mountains have a multitude of values. They influence the weather patterns of the north, store water as ice and snow, contain important alpine habitat and species and for people of the Arctic, often have special cultural and spiritual meaning. They offer magnificent scenery and are prime candidates for legal protection. It is significant that as the world celebrated the UN Year of the Mountain in 2002, several important mountains are fully protected within parks or nature reserves. For example, Mount McKinley in Alaska's Denali National Park and Mount Logan in the Yukon, the highest peaks in the USA and Canada respectively, are within national parks. The Scandes Range forms the heart of the Norwegian and Swedish skiing and outdoor recreation industry and several important areas are protected as nature reserves or landmarks. Annually, the Arctic's mountainous areas draw hundreds of thousands of tourists. Consequently, their contribution to local economies and employment, to the tourism industry and to the development of facilities within their regions is enormous.

Denali National Park, USA: Protecting Arctic Mountain and Spiritual Values

The Denali National Park and National Preserve is one of the United States' older parks, established in 1917 at 18,228 km^2 and expanded in 1980 to 54,864 km^2 to span more of the Alaska Range. The park's centrepiece is Mount McKinley, the highest peak in North America. The park is federal land managed by the US National Park Service of the Department of the Interior. The park also contains a biosphere reserve within it.

The park encompasses the Mt. McKinley massif and parts of three other ecoregions. To the south are mountain glaciers sweeping off the 6000 m Alaska range. North of the range, alpine slopes descend into shrub tundra which gives way to continental boreal forest and permafrost areas laced with rivers. The park is important habitat for caribou herds, grizzly and black bears, grey wolves, Dall sheep, moose, many furbearing mammals and migratory and resident birdlife. Together with the adjacent Denali State Park (2,980 km^2) and with other national parks and wildlife refuges, a large portion of the Alaska Range extends into Canada's Kluane National Park.

Given its alpine nature, the park has not attracted traditional human settlement but aboriginal peoples used it for seasonal hunting and fishing. A century ago there was intensive gold mining in its northwest but the Park Service has bought out most claims and those remaining have largely converted to tourist lodges. The rugged and immense scale of the mountains and beauty of the alpine valleys and streams provide a unique and for some, an increasingly rare spiritual reward. Park visitation has gone from 1200 in 1940 to 250,000 in the 1980s and is now upwards of 400,000. Mountain climbing is one appeal but general sightseeing, wildlife viewing, hiking and camping, nature photography, skiing, and dog sledging all attract large numbers of visitors. Large-scale tourist operations are based on hotels and lodges just outside the park. They are fed by so-called "package tours", bus and large cruise ship tours that draw tourists from around the world. There is also a thriving locally-based independent tourist industry in the summer.

Denali is one of the few federal protected areas in Alaska accessible by highway and there is pressure for new access roads through the park. Another challenge to the Park Service is regulating the noise and terrain effects made by heavy snowmobile use. There are major pressures to ease access and allow for even more visitors. Another ongoing challenge is conflict over development within the park (fought out in courts and legislatures). There is also concern about the possible effects of climate change on the permafrost, glaciers and the vegetation.

Although political support for the park is strong in some quarters, there are complaints from some that they are being denied access to its resources by virtue of its protection and that this protected status blocks lucrative business opportunities. The major management challenge for this park remains its vulnerability to the large numbers of visitors annually. These and other challenges are being addressed through management planning and consultation.

Geologically, the Arctic is a region of contrasts. It contains both the earth's oldest rock, Greenland's Precambrian holdings included in its protected areas, and the earth's youngest rock, Iceland's extensive lava fields and Surtsey Island, a recently formed island declared a protected nature reserve in 1965. The Arctic also contains unusual geological formations such as the Canadian Shield, which underlies many of Canada's northern protected areas, and Finland's Bothnia area bordering on the Arctic, which is undergoing continual geological uplifting and creating additional land-mass yearly. Both are incorporated in several protected areas.

The Arctic contains an important fossil and paleontological record including a fossilized forest recently discovered in the heart of Canada's Arctic and the extensive holdings in Russia's north including Wrangel Island, home of the last mammoths and now fully protected as a zapovednik. Much of the paleontological record of the Arctic is only now coming to light and most of it falls outside legally protected areas. However, countries have put interim regulations in place to safeguard this heritage and prevent looting and desecration of these sites while they investigate the issue of additional site protection.

The Arctic is a repository for a wide array of metals and mineral deposits many of which have been exploited for over a century. Others have served to support rapid modern-day economic development in, for example, Arctic Russia. Many of the sites and structures are now abandoned and have been protected as important historical and cultural heritage in North America and Scandinavia. Some sites have rare mineral formations such as the unique columns of ikaite found in the waters of Ikkafjord in south-west Greenland and these have been protected in their own right.

Volcanic and related geological activity occur in two main regions in the Arctic. The first is Iceland

which sits atop a volcanic submarine ridge and is replete with geysers, hot springs, boiling mud and active volcanoes that reflect its volcanic origins. Iceland has established several protected areas to conserve its unique geological heritage and values. Examples among the many are: Alftaversgigar, Askja i Dyngjufjollum and Lakagigar National Monuments, and the Myvatn-Laxa and Fjallabak Nature Reserves. The second centre of volcanic activity is the Kamchatka Peninsula of Russia's Far East which forms part of the Pacific "Ring of Fire". There are over three hundred volcanoes stretching across the peninsula with about 30 currently active. The Kamchatka Volcanoes which range in height up to the 4,850 m Kliuchevskoi Volcano and in total cover over 330,000 km^2, are legally protected in a series of federal and regional protected areas. These geological "hot spots" of the Arctic also perform an invaluable function as part of the global chain of pressure valves in the earth's crust.

The geological features found in these and other protected sites in the Arctic also have important values for science and research. For example they offer rare and unique opportunities to study the behaviour of the earth's crust, the formation of its land-mass, and the mechanisms of species colonisation, thus adding important knowledge and data to the global geological and geographical information base.

Kamchatka, Russia: Protecting Arctic Volcanoes and Geysers as a Global Heritage

The Kamchatka peninsula, along the Pacific-Arctic "Ring of Fire" has over 300 volcanoes, 29 of them active. Five protected areas in the south-east peninsula have together been designated as a natural World Heritage Site in recognition of their universal value. The protected areas are the Kronotsky Zapovednik, Bystrinksy and Nalychevo Nature Parks and the South Kamchatka State Nature Reserve.

In Russia, the Kronotsky Zapovednik is an IUCN Category Ib which, like all Russian Zapovedniks, is a strict nature reserve affording it the highest level of protection and prohibiting development. Access is highly restricted and is chiefly for scientific purposes. The other four sites are IUCN Categories II and IV with less strict protection and freer public access. These allow hunting, fishing, berry and mushroom gathering. There is also some trapping and reindeer herding. The Kronotsky Zapovednik and the South Kamchatka areas are managed by the federal Ministry of Natural Resources and the Russian Forestry Service. The Regional Administration of Kamchatka manages the others.

The Kronotsky Zapovednik (11,400 km^2) dates from 1934 when it was founded to protect sable from overhunting. It has been a Man and the Biosphere Reserve since 1984. The South Kamchatka area (8000 km^2) became a state nature reserve in 1973 as a result of a bilateral agreement with Japan to protect migratory bird habitat. The other sites are of more recent vintage. The Bystrinsky Reserve is 12,500 km^2 and Nalychevo, 2500 km^2. The Kronotsky Zapovednik has a small marine area but its main feature is 16 volcanoes, the highest at 3,500 metres. The mountains and volcanoes in the zapovednik support mountain glaciers as well as a "valley of geysers" containing hundreds of geysers, volcanic hot springs and other active volcanic features. Hence for its geologic features alone it is a rare site. The zapovednik has over 800 plant species, some rare trees and a high density of brown bear (grizzly) and its rare fauna include sea beaver, Steller's sea eagle, fish hawk, and Arctic falcon. Over 50% of the world population of the Aleutian tern can be found here. The rivers in the reserves are also significant spawning grounds for salmon.

Although there is a modest history of human exploitation here the area is largely pristine but the remains of a Paleolithic settlement 21,000 years old have been unearthed. In 1995 the region had 15,000 tourists of which 2000 came for the valley of the geysers. Thus there is some potential for expanded tourism but access has to be largely by helicopter so it is expensive. The South Kamchatka site contains areas of traditional nature use by the Even people.

Threats to the reserves are largely concentrated outside of the zapovednik and in the other portions of area where there is a problem with illegal and excessive fishing. There is also some logging in the nature parks which poses a threat to wild salmon and their habitat by contaminating the rivers with runoff and erosion. Mining for gold is also a threat if it has inadequate controls and enforcement.

Adding to Global Knowledge

A common view of the Arctic is that it is an exceedingly vulnerable and fragile ecosystem. In fact, the Arctic and its species have superbly adapted to their naturally inhospitable climate and to its long periods of nutrient deprivation. How they have accomplished this may help us understand whether or how species and ecosystems in other regions of the world can adapt to the current pressures of global warming and extreme weather events, including drought. This is one of the many areas of research being conducted in protected area systems of the Arctic that may be useful in other regions of the world. The Arctic itself is a bellwether for both global climate change and the long-range impact of airborne and marine pollution, and Arctic protected areas make ideal settings for ecological and biological research and monitoring activities. Such areas can provide an excellent baseline for the study of human impacts on the natural environment and for climatic change. To capitalise on these features, the Arctic countries are establishing an ecological monitoring network using protected areas as core sites.

Arctic protected areas have long served the needs of the scientific research community. For example, Russian Zapovedniks are heavily oriented toward scientific research and non-scientific human access to them is often highly restricted as a result. Research is underway on increasing exposure to ultraviolet radiation, melting and ice variability, plant adaptations, wildlife population studies, the impact of wildlife on ecological regeneration and a host of other scientific questions. Research is also underway on human impacts and pressures on natural variability. Another example of the use of protected areas for intensive research is the Greenland National Park which regularly accommodates teams of internationally-renowned scientists for in-depth studies on a range of scientific disciplines.

Landscape – Seascape Values

The concept of "landscape" or "seascape" values is relatively new and means an "area of land with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural values and often with high biological diversity." The Arctic contains several areas with nationally significant landscapes in which human interaction figures prominently. These sites recognise and protect the ongoing relationship between people and the natural environmental values which have sustained them. However, because of the low overall human population in the Arctic, they are not as numerous as in other regions. Some of these special landscape values are conserved in Russia's protected areas such as Taimyr and in national parks such as Ivvavik/Vuntut in Canada. Both Iceland and Norway have set aside several sites specifically as landscape protected areas. For example, Norway has protected several traditional reindeer herding areas used by the Saami. Sweden has also protected several sites that have traditional agricultural landscape values including natural hay and grazing areas.

Greenland National Park: Fostering Research Values and Increasing Global Knowledge

The spectacular Greenland National Park, established in 1974 as a "generous contribution from Greenland and the Danish Realm to the preservation of original and virginal environments", is the world's largest protected area at just under 1 million km^2. It constitutes a large portion of the land area protected in the Arctic and extends out to the three-nautical mile territorial sea zone. The park is a high Arctic landscape dominated by the Greenland icecap with glaciers descending from it through mountain valleys. An added benefit of the national park is that it protects a large percentage of the Greenland icecap which contains 10% of the world's freshwater supply. Within the park are a wildlife sanctuary, a Man and the Biosphere Reserve, a biological bank, and four scientific and monitoring stations. Since there is no private ownership of land in Greenland, the park is "owned" communally by the nation but access to it requires permission of the Greenland HomeRule Government, the park's management authority. Hunting is generally prohibited within the park but residents of two municipalities retain traditional hunting rights for ocean resources within the park's marine boundary.

The Greenland National Park has long been a unique place for research in the fields of biology, geology, glaciology, geophysics and climate research. Permanent research stations are set up on the icecap. The Danish Polar Centre runs the Zackenberg Research Station, conducting ecosystem research of the High Arctic and pursuing studies in multiple basic quantitative features. These include ecosystem structure and processes, baseline studies of short and long term variations in ecosystem functions, historical analyses of organic and inorganic materials to trace past ecosystem changes and experimental studies of ecosystem response to climate change.

Although dominated by the icecap, there are areas of grassy hills with dwarf bush vegetation. The coast is characterised by islands, peninsulas and deep fjords. Most of the year these are blocked by sea ice but in summer months they are one of the world's great iceberg "factories". Although located in the most arid zone in the Northern Hemisphere, there are regions of relatively lush tundra and high mountain vegetation which form important natural habitats. The park is a breeding ground for a separate Greenlandic population of polar bear distinct from the Eastern Canada or Svalbard populations. There is a large musk ox population in the park forming about 40% of the world's population. Other prominent wildlife includes Arctic fox and hare, wolf, collared lemmings and ermine. The marine zone is important for a variety of marine mammals and fish. The park contains the only two haul-out sites still used by walrus in Greenland; the other sites have been abandoned due to hunting pressures and other disturbances.

Currently the Greenland authorities are revising the management framework for the park to better exercise its role in protecting natural values and to create the best possible framework for ongoing research. It will also focus on increasing local participation and developing ecotourism in the park. Since the park is one of the most remote areas of the world and it has a relative absence of direct anthropogenic disturbances, threats to it come from long term global processes such as climate change, changes in the surrounding seas or long-range marine and aerial transportation of pollutants. All of these topics are objects of research at the park.

Conserving Heritage Values

Increasingly, protected areas play a valuable role in conserving the Arctic's heritage values. For example, one convention that is receiving increased attention is the convention concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention – WHC). Under this convention, countries nominate sites or properties with high cultural and/or natural values. Once these are placed on the World Heritage List they are recognised as being of universal value and constituting the common heritage of mankind. Once listed, countries are obligated to implement various follow-up measures. As of 2002, only a handful of WHC Natural Heritage sites were in the Arctic and included three in Canada, two in the USA (Alaska), two in Sweden and one in Russia. However, several other Arctic sites are being nominated. For example, Illulissat, Greenland is being nominated for, among other values, its unique role as the major calving ground of icebergs in the northern hemisphere.

In terms of securing international recognition for the Arctic traditional and cultural heritage, the Arctic countries have only recently begun to take advantage of the World Heritage Convention designations for their Arctic cultural heritage. For example, within the five Nordic countries, as of 1996 there were 15 cultural heritage sites but only one site - the rock carvings in northern Norway - was considered to be in the Arctic.

Most Arctic countries view cultural and natural heritage values in a joint context and new proposals put forward by, for example, the Nordic countries, include both outstanding natural and cultural values.

In addition to providing an additional layer of protection for the values for which a World Heritage site is nominated, conferring World Heritage status on a site enhances its marketability value for tourism and, depending on the country, in applying for certain types of funding.

Another international designation occasionally applied to sites in the Arctic is the "Man and the Biosphere Reserve" (MAB) designation. MAB is a programme under UNESCO and through it, Arctic countries can establish biosphere reserves in which the goals are to accommodate development, traditional indigenous interests and conservation. MAB sites have a range of objectives including research, monitoring, training and demonstrating sustainable development. As of 2002, there were six biosphere reserves in the Arctic a number which has remained stable for many years.

Protecting Traditional Cultures and Values

The Arctic has been inhabited for millennia and until the past one or two hundred years, its people have depended exclusively on the living resources of the Arctic for their subsistence. Since wildlife in the Arctic tends to congregate in discrete centres of abundance and follow regular migration patterns, people generally congregated in these areas and established their settlements there. Their life-styles were intertwined with those of the other living resources on which they subsisted.

Initially when governments began establishing protected areas in the Arctic, they often selected these same sites because of their high biodiversity values and classified them as strict nature reserves or wildlife sanctuaries intended to curtail almost all human activity. However, Arctic countries have recognised the important historical, cultural and subsistence values of these sites to the traditional peoples of the Arctic and permit traditional uses to be carried out in these protected areas, regardless of the classification or management objective of the site.

The Taimyr Peninsula and Great Arctic Reserve: A Cluster to Protect Traditional Values and Wildlife

The Taimyr Peninsula in Russia is one of the Arctic's richest areas of biodiversity. It is also relatively heavily populated in its southern parts. It is a traditional homeland of 5 groups of Russian indigenous peoples, the Dolgan, Nganssan, Nenets, Evenk and Ents. Traditionally their lifestyle and culture were based on hunting wild reindeer and later on grazing domesticated reindeer. The peninsula has the largest population of wild reindeer in the world estimated to range between 300,000 and 700,000. Taimyr is also now one of Russia's most intensely protected areas by means of a cluster approach of three zapovedniks combined with other types of protected areas. These protect key sites and features without restricting traditional nature use by the indigenous peoples.

The Taimyrski zapovednik was established in 1979 and is a 17,819 km^2 strict nature reserve on the right bank of the Verknyaya Taimyra River and the south west shore of Lake Taimyr, the largest freshwater lake in the Russian Arctic. One other zapovednik is slightly to the south and the larger one is on the east coast of the peninsula. Like all zapovedniks, they have scientific staff on site. The reserve is also a MAB site and is partnered with Schleswig-Holstein Wadden Sea National Park in the Federal Republic of Germany since the two areas share the same population of migratory birds at different times of the year. The zapovedniks contain widespread tundra plants including small stands of willow and dwarf birch. There are also two isolated larch forests. The principal wildlife here, other than large numbers of reindeer, are wolf, Arctic fox and blue hare. King eider, white-billed and Arctic loon and bean goose nest here. There are also large numbers of musk ox in the reserve's buffer zone.

Despite the progress made in Taimyr, challenges and threats remain. Recently the poor state of the Russian economy has led to an intensification of reindeer hunting both locally but more by outsiders, and the reindeer population appears to be falling markedly, possibly by 50%. This poses a serious threat to the indigenous communities of the peninsula. To attempt to counter this, a new reindeer management plan is being developed.

To the north, on the Arctic Ocean coast lies the Great Arctic Reserve established in 1993 comprising together 41,692 km^2. This cluster of zapovedniks is centred around the East Atlantic Flyway and is linked in a network to protected sites in Europe and Africa. Together they protect crucial areas for the migration of millions of migratory birds between Southwest Africa into the Russian Arctic, a protection scheme of almost hemispheric proportions that is based on protecting key areas of concentration rather than the whole territory. The Great Arctic Reserve also includes many offshore islands and protects key habitat for a wide variety of marine and coastal wildlife other than migratory birds.

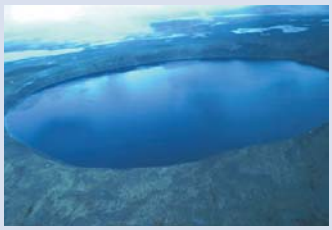
Indigenous peoples themselves also recognise the need to protect certain areas. For example northern groups of aboriginal peoples in Canada have entered into negotiations for transfer of land ownership and have reached many land claim settlement agreements. These agreements contain provisions for protected areas which are co-operatively managed by aboriginal peoples and government authorities. This enables Canada's northern aboriginal peoples to share in protecting the multiple values of the sites and to reap their benefits, including monetary benefits. In Scandinavia, reindeer herding and coastal fisheries are long-standing traditional activities of the Saami people. Many important reindeer summer pastures and winter grazing sites are in protected areas and the values of these areas for traditional use is enshrined in legislation.

In recent years there has been a growing interest in protecting the Arctic's unique indigenous cultural heritage and traditional values, a phenomenon paralleled in many indigenous communities globally. One Arctic example is in Russia where the Russian Association of Indigenous Peoples of the North (RAIPON) is engaged in a long-term project to identify and protect sites with important spiritual values for Russia's Arctic indigenous peoples.

Indigenous Sacred Sites in the Arctic-An International Pilot Project in Russia

With financial support from the Danish Environmental Protection Agency, a pilot project to map and identify the conservation value of sacred sites of indigenous peoples is being implemented. The project has been underway since 2001 and is being carried out as a collaborative effort between the Russian Association of Indigenous Peoples of the North (RAIPON), the Arctic Council's Conservation of Arctic Flora and Fauna Programme (CAFF) and the Arctic Council Indigenous Peoples Secretariat. The first project phase involved developing case studies through extensive interviews with northern aboriginal people in two model areas and was completed with participation solely of indigenous experts. In the case study (2001-2002) in the Tazovsky district (area of 174,000 sq. km, total population of 16,300) of the Yamal-Nenets autonomous region (Northwest of Siberia) 66 elders, reindeer herders and fishermen of nomad Nenets people were interviewed and 263 sacred sites were documented and mapped. Simultaneously, in the Olyutorsky district (301,500 sq. km, total population about 29,300 people) of the Koryak autonomous region (Kamchatka peninsula of the Russian Far East), 30 of the Koryak, Chukchi and Itelmen peoples were interviewed and 84 sacred sites were mapped and documented. A standardised methodology with photo documentation, audio and video recording has been applied to the description of the sacred sites and a preliminary classification of each model area has been developed on the basis of existing publications, archives and research.

The initial project results have been presented by the project co-ordinator Mikhail Todyshev, a RAIPON Vice-President, at the ninth meeting of CAFF in Abisko, Sweden, 28-31 August 2002. The final report in Russian (150 pp., with executive summary in English) is available upon request from the RAIPON (www.raipon.org). This work has already had a positive impact on legislation work in the model areas in Yamal-Nenets and Kamchatka/Koryak autonomous regions. Other northern regions in Russia have expressed interest in conducting similar research. The second phase of the project foresees the organisation of a circumpolar workshop and presentation of a CAFF Technical Report with an analysis of the project results and recommendations. The background information to the final report in Russian contains substantial research materials, references and facts.



Kativik, Canada: Indigenous Peoples Parks for Tourism and Traditional Use

In 2002, the provincial government of Quebec, Canada, formed a partnership agreement with the Kativik regional government and the Makivik Corporation (an indigenous organisation) for economic and community development in the Nunavik, or Ungava, region and its predominantly indigenous population. Under the agreement, three new provincial parks are to be established and will promote tourism over the period 2002 – 2007. The Kativik regional government will carry out the capital and development work for the new parks and will manage services and operations. Staffing, administration and park maintenance will all draw on the local Kangiqsujuaq community for personnel.

One of the parks, Pingualuit, was proposed by the Inuit in association with a lands claim settlement and will be the province's first northern park. It will protect an upraised, perfectly circular meteor crater whose bottom is a freshwater lake. As well, there are several Inuit sacred sites near the crater which will also be researched and protected. The Puvirnituq River canyon within the boundaries has unusual endemic plant life and is another of the proposed park's major features. Wildlife includes the snowy owl and twenty-four other bird species, caribou, Arctic char and lake trout. Relatively little is known about the wildlife and its behaviour here and the park is seen as an opportunity for detailed research and study. The park is expected to be a significant site for ecotourism and recreational activities will focus on building natural and cultural heritage awareness. Prohibitions on hunting and trapping will apply to park visitors. However, traditional hunting and fishing rights are preserved.

In addition to the work at the proposed Pingualuit Park, the state of ecological knowledge at the two other proposed park sites will be assessed and the Kativik regional government will also be responsible for undertaking these studies. Altogether, these proposed and existing protected areas will comprise over 20,000 km^2 within the provincial park system.

Benefits for People

Protected areas have long been a means for people to protect their natural and cultural heritage and their traditional ways of life against undesirable incursions. This is because protected area status is intended to provide an elevated level of security through various means of governance whether they be managed by governments, communities or private interests. Protected area status secures a territory against unwanted or unplanned incursions and safeguards the values for which the area is protected. Without protected area status for these sites, communities may find their traditions and values compromised by outside forces or, indeed, by opposing forces within their own communities. Protection provides opportunities to conserve these values. In some cases, however, local communities or interests may not fully appreciate – and may even resent - the values for which an area is being protected: they may even consider the "protected status" as an infringement on their rights and interests or a threat to their autonomy. This creates a classic conflict between the interests and values of one group and those of another, in which a balance between interests must be determined.

To maximise the benefits to Arctic people, it is important to have a governance system in place that meaningfully engages local communities in the management of the protected areas to give them a true voice in the protection of values important to them. One method used in the Arctic is Canada's system of co-operative management applied in its north.

Vuntut and Ivvavik National Parks, Canada: Protecting the Cultures of the Caribou

Vuntut National Park, established in 1995, is a 4,345 km^2 area adjacent to the Arctic National Wildlife Refuge (Alaska). Directly to the north is Ivvavik National Park, a 9,750 km^2 area on the Beaufort Sea established in 1984. Both parks are federal land managed by Parks Canada. Both parks have co-operative management regimes with the indigenous peoples, the Vuntut Gwitchin for Vuntut and the Inuvialuit for Ivvavik.

Ivvavik National Park is situated on the Arctic Ocean coastal plain and to the south, abuts Vuntut National Park which includes portions of the Old Crow Flats wetlands and lakes. Both parks are part of Beringia, a continuous physiogeographic region stretching across Alaska and into north-east Russia. Beringia was not subject to glaciation during the last ice age and acted as a refuge for flora and fauna. Its features thus differ from surrounding areas which were ice-covered for millennia. Ivvavik National Park has three vegetation types: tundra, alpine tundra and taiga. Open stands of white spruce and balsam poplar grow here to within 50 kms of the Beaufort Sea. The Old Crow Flats in Vuntut National Park are polygonal peat bogs containing the Yukon's most important wetlands and are a Ramsar site. Both parks provide essential bird habitat for both migratory and year round residents. Over half a million birds use the Old Crow Ramsar site to breed, moult or stage before they migrate south in the autumn. Characteristic wildlife of the parks include grizzly bear, wolverine, wolf, mink, moose, muskrat, gyrfalcon, peregrine, golden eagle and rock and willow ptarmigan. Chum and Chinook salmon spawn in the Porcupine River and its tributaries.

However, the outstanding wildlife feature of both parks is the Porcupine Caribou herd, 123,000 strong. The herd migrates annually from the forested valleys of the North Central Yukon to its calving grounds on the Beaufort Coast, protected by the Arctic National Wildlife Refuge (Alaska) to the west. The herd is managed throughout its range under the provisions of the Canada-USA Agreement on the Conservation of the Porcupine Caribou Herd. Given the herd's importance for the indigenous peoples on both sides of the border, they participate in herd management and provisions are in place for customary and traditional use of caribou by Canadian and Alaskan aboriginals and rural residents. In fact these two parks form a core part of a chain of protected areas extending from the Yukon coast clear across Alaska to the Bering Sea providing unfragmented habitat and migratory routes for caribou and other wildlife.

Vuntut National Park is within the traditional territory of the Vuntut Gwitchin people. Their land claim agreement mandates that the park recognise their history, culture and historic harvesting rights and that it protect traditional nature use. It also requires the park to provide them with economic and employment opportunities, to establish heritage sites and manage moveable heritage resources in the park on the basis of traditional knowledge. Within the park, there are over 100 significant indigenous archaeological sites. Hence, the park is both a national and cultural treasure to the Vuntut Gwitchin people. The Inuvialuit Final Land Claim Agreement provides for an equal or preferential role for Inuvialuit in employment, economic opportunities and strong involvement in the management of Ivvavik National Park. Both parks enjoy local support.

The most immediate threat is to the Porcupine Caribou herd, should oil and gas development in the US Arctic National Wildlife Refuge take place. The herd and Ivvavik, as a coastal park, could also be threatened by oil and gas development in the Beaufort Sea. Other threats are the impact of climate change on the permafrost and on the Old Crow Flats wetlands.

Feeding the Economy and Benefiting Local Communities

Around the world, protected areas help generate money and jobs. For example, they attract tourists and the tourism industry, scientists and academicians, the business sector and a host of others. They also provide employment for members of local communities either within the protected area itself or in peripheral enterprises. An argument frequently made is that some protected areas might be put to better use and generate more revenue if they were converted to other uses. To many, including some Arctic residents themselves, this is persuasive and compelling particularly if the financial rewards are high. Protected areas as such do not generally offer the same sort of lucrative short-term monetary benefits as, for example, mining or the oil and gas industry or even game hunting. However, the benefits offered by protected areas are, instead, long-term, potentially more sustainable in the long run and may be better suited to the interests and aspirations of many northern residents.

Another argument made is that protected areas can be a drain on the economy because they are not usually financially self-sustaining but must often rely on external funding. In the Arctic this is particularly true due to remoteness, the harsh seasonable conditions and the high costs of maintenance and infrastructure development. An ongoing dilemma is for governments and local residents alike to weigh and decide on which values to protect for future generations and whether to make the needed investment.

Nevertheless, protected areas are not without their economic benefits. In fact, many regional governments and local communities are capitalising on the multiple values of the protected areas in their midst, and are using them to bolster local economies and preserve communities. One example is Auyuittuq National Park in Nunavut, Canada.

Tourism – a Potential Boon to People and Protected Areas

Protected areas are a magnet for tourism. The very title of "National Park" or "Preserve" or "Sanctuary" carries with it a certain mystique and perceived guarantee for the visitor. The tourism industry and the visitors it brings can contribute considerably to local communities and to the Arctic region as a whole. First, they bring in needed cash. Second, they offer employment and business opportunities in transportation, accommodation, concessions, guided tours and guiding, sledging, and local arts and crafts. Third, the alternative offered by tourism to other forms of income can, in the long run, be the most potent force to protect the values of Arctic communities and protected areas.

Over the past few decades, tourism to Arctic protected areas, including cruise ship tourism, has grown significantly. Bearing in mind that with the exception of some industrial centres in northern Russia, the total population of the Arctic is less than one million people, the following figures give some idea of the importance of tourism for some protected areas:

Protected Area	Visitors Annually
Urho Kekkonen NP (Finland)	~200,000
Denali National Park (USA)	400,000
Arctic National Parks (Canada)	70,000
Svalbard (Norway)	40,000
Glacier Bay (USA)	250,000

Tourism carries with it some pitfalls and does not always meet expectations in terms of benefits. For example, a complaint of some communities and protected area advocates is that tourism companies target protected areas as prime destinations but do not financially contribute to their upkeep or to the

Auyuittuq National Park, Canada: Generating Community Benefits

This park, established in 1976, is 19,700 km^2 and is located adjacent to the Cumberland peninsula on Baffin Island in Canada's Nunavut Territory. As with all Canada's national parks it is Crown (federal) land managed by Parks Canada, under the Canada National Parks Act. Auyuittuq has a co-operative governance system whereby a joint management committee composed of equal numbers of Inuit and government appointees makes recommendations on all aspects of park management.

One-fourth of the park area is dominated by the Penny Icecap, one of the largest ice features in the Northern hemisphere and the most southerly remnant of the Laurentide Ice Sheet. Outlet glaciers, including the Coronation Glacier and small cirque glaciers radiate out from the icecap. Where glaciers have melted, long, narrow U-shaped valleys remain. On the coast a network of deep, narrow, but high-cliffed fjords up to 50 km long penetrate from the Davis Strait. The park is treeless but supports dwarf willows, lichens, mosses and abundant wildflowers in sheltered places. Land mammals include lemmings, Arctic hare and fox, polar bear and caribou. Auyuittuq also has a marine component supporting beluga, narwhal and orca or Killer whales and several varieties of seals. Some 40 bird species also nest in the park. It is a rugged wilderness park representing the landscapes and ecoregion of Baffin Island/Davis Strait.

Auyuittuq contributes substantially to the local economy. It receives around 500 visitors annually with local visitor expenditures of around $175,000 CAD/yr. Much of the spending occurs in the adjacent communities of Qikitarjuaq and Pangnirtung. The park has had local spin-offs in the community by supporting an Inuit ecotourism and crafts "cottage industry" which results in direct economic benefit to community residents. Visitors to Canada's High Arctic and remote parks are generally highly educated, environmentally aware and spend a high amount per visitor, including the high cost of transportation to get there and for provisions. Auyuittuq is an important component of the tourism marketing strategy of the Territory of Nunavut and efforts are now being made to increase visitation and community benefits. At present, tourist activity appears to be on a sustainable scale although management of garbage and human waste are ongoing issues. Other pressures on the park are likely to come from long-range transport of pollutants or global climate change impacting the ice pack.

There is community support for Auyuittuq National Park locally, due in large part to the co-operative management committee structure and because of the direct and indirect economic benefits, including employment. For instance, in 2001 the park employed 5 full time staff, all but one of which were Inuit, and 7 seasonal/student staff, 6 of which were Inuit.

local communities. Tourism can be disruptive to local communities and overwhelm them with numbers of visitors. Tourism development if not properly planned and regulated can also degrade and spoil the environment and damage valued cultural resources. These disadvantages can be overcome if communities and regulators are vigilant and if appropriate governance systems with community input, along with sets of regulations, guidelines and financial support agreements are put in place to ensure that the tourism industry supports the protected area and the local communities.

Increasingly, the Arctic countries are attempting to capitalise on the multiple values of their protected areas, including their natural aesthetic appeal, for ecotourism. However, growth in this sector will need to be carefully managed to avoid adverse impacts on the very values for which each protected area was designated.

Quantifying the Values

When deciding whether to establish a protected area or to open one up to a wider array of uses or to close one down, it is now customary to examine the financial implications and to attempt to quantify the values. This is not easy in the case of protected areas because many of the values which they protect are non-material or intangible. Nevertheless, efforts are being made in the Arctic countries and elsewhere, to quantify the values of protected areas since this can be a powerful argument for decision-makers and communities alike. One such initiative undertaken in Canada is described below.

Estimating Quantitative Values of Protected Areas: A Canadian Study

A study was recently undertaken to quantify the values Canadians attach to four proposed national parks to be created in northern Canada. The study surveyed a sample of Canadians, termed respondents, and was aimed at estimating the "existence" values of a park. These are benefits that accrue to individuals because a park exists even if the person will likely never have the opportunity or occasion to visit it. Nevertheless, the individual will attach a value to the park based on the respondent's perception of whether the world would be a better place by virtue of the park's existence or, alternatively, that without it the respondent's well-being would be diminished. The respondent could view the site as a place of rare or irreplaceable natural wonder or as a fragile ecosystem over which humans should exercise stewardship.

The study which used contingent valuation methods, provided respondents with information about the parks to be valued and asked them how much they would be willing to pay as a one-time tax to have the new parks established or maintained. It also asked how much compensation respondents would want if an existing park ceased to exist.

The study found that respondents were willing to pay 244.35CAD per household to establish four additional northern parks. Generalized across the Canadian population, this yields a value of 2.8 billion CAD. This provides a quantitative value which can be used in cost-benefit decision-making and financial resource allocation. It can also be used to evaluate opportunity cost for alternative land and resource use decisions.

These are significant findings obtained through a rigorous and statistically valid survey and demonstrate the high value that Canadians place on establishing new arctic national parks.

IV. CHALLENGES FACING ARCTIC PROTECTED AREAS

With over 17% of the Arctic land mass under formal protection, some mistakenly assume that the level of protection of in Arctic is adequate. However, this statistic is deceptive. For example, it disguises the very low level of protection of the marine environment and discounts the fact that if the nearly one million km^2 Greenland National Park is removed, the percentage drops dramatically by over 40%. Statistics tell only part of the story. There are many other considerations to take into account when determining if protection is adequate and sustainable in the long run.

In order to sustain protected areas, the values they preserve and their long-term benefits, it is necessary to have adequate funding, trained staff, good governance systems, functioning enforcement and political and local support. In parts of the Arctic, funding for protected areas is not keeping pace with rising costs or has been reduced; governance systems are outdated and may no longer to be adequate to deal with today's realities and pressures while still effectively conserving the values for which the protected areas were established in the first place.

Attitudes towards protected areas have changed. In the past, it was commonplace for governments to set aside large tracts of land in very remote areas solely to protect natural values. Opposition tended to be very localised. One reason is that the Arctic did not attract much serious attention from industrial interests including the oil, gas, mining, forestry and transportation sectors. That is quickly changing and the Arctic is experiencing unparalleled human growth in both its population and its economy. As a consequence, there is often pressure to convert existing protected areas to alternate uses that appear to offer greater monetary and job opportunities. Governments and local peoples alike are faced with a difficult decision on whether to support existing or proposed protected areas or to support industrial development. The debate can fracture communities and split governments with various sections favouring the resource industry and the income it brings, and others favouring environmental and cultural protection and the income they can bring over the long term. The groups hold different sets of values and the challenge is to accommodate both without compromising either. For example, on a regular basis, decision-makers are often forced to weigh employment potential offered by an extraction industry in a sensitive natural area versus the very real threat to a wildlife species, including extinction, if its critical habitat is destroyed in the process of securing those jobs. Decision-makers, including local communities, must also ascertain if proposed development activities will curtail their ability to set aside protected areas in the future. The ongoing challenge is to secure jobs and sustainable livelihoods while maintaining or even enhancing the environment.

Other challenges facing current and potential protected areas in the Arctic are the legacies of past decisions and both past and contemporary attitudes. For example, there are significant gaps in protection of forested areas and the marine environment which undoubtedly need additional protection. However, there remains a lingering perception that protected areas are islands set apart from the people they serve, a perception often reinforced by past protected area governance regimes. There are also recent pressures to open up protected areas to activities that are not compatible with the protection of the natural and cultural values that the areas were designed to safeguard. All this leads to questions about whether protecting the natural and cultural values in the Arctic is a high priority and whether they are important enough to successfully compete with alternative uses. Another question is whether the reservation of lands and waters via special legal action remains the preferred means of conserving these values.

V. AN OPTIMISTIC FUTURE IN AN UNCERTAIN WORLD

Despite growing pressures, there is much reason for optimism for the future of protection in the Arctic. In most of the Arctic, protected area systems and legislation are evolving to better accommodate the legitimate concerns and aspirations of local people, indigenous communities and the business sector. There are many multi-stakeholder forums in place. Management responsibilities and decision-making are being shared more frequently with local governments, with indigenous peoples in co-operative management settings, and with the private sector. There is ample evidence to show that protected areas have worked effectively to conserve nature and our natural resources and that where critical habitat is protected and suitable regulations and voluntary mechanisms are in place, wildlife responds well. There is a better appreciation among all segments of society of the need to protect not only the natural but the cultural dimension as well. There is a growing recognition and understanding of the very wide array of values that protected areas conserve and the benefits that Arctic protected areas provide locally, nationally and internationally - truly benefits beyond boundaries!

Canada's Protected Area System

Canada's system is a mosaic of types and jurisdictions. At the federal level, Canada's 39 existing national parks are crown (federal) land under the authority of the Minister of Canadian Heritage and managed by Parks Canada. Each park represents one of Canada's 39 terrestrial ecosystems (16 in the Arctic). In addition, there are 29 marine ecozones (1 Arctic), which will be represented by marine conservation areas. Three out of 10 Canadian World Heritage sites are within Arctic national parks and 6 of 32 Canadian Ramsar sites are within federally protected areas in the north. Parks Canada also manages 144 of Canada's 849 National Historic Sites. The existing national park system covers 2.5% of total land area, but is home to 71% of native land and freshwater vascular plants and 81% of its vertebrate animal species. All parks correspond to IUCN Category II. National parks are established and managed for the benefit, education and enjoyment of Canadians and are to be maintained and used in a way that leaves them unimpaired for future generations. In 2000 there were 16 million visitors to the parks (70,000 in Arctic) who spent $1.5 billion CAD. The parks generate about 27,000 full time jobs.

There are 48 national wildlife areas (4 Arctic) and 90 migratory bird sanctuaries (15 Arctic) also on crown land. These are under the statutory authority of the Minister of Environment and managed by the Canadian Wildlife Service. Their mandate is to protect and conserve critical wildlife habitat and they are home to a wide variety of animal and bird populations. Migratory bird sanctuaries, in particular, protect habitat for the millions of migratory birds that come annually to Canada's north from all parts of the globe.

Canada establishes its protected areas in consultation with stakeholders and local communities. Most northern parks have management committees comprised of indigenous and government members who advise and make recommendations on park management and planning. This system, along with provisions for indigenous harvesting rights and traditional nature use aims to sustain indigenous culture and heritage.

Canada's provinces and northern territories also have systems of protected areas consisting of territorial or provincial parks and ecological reserves which often give priority to outdoor recreation and tourism while preserving important natural and ecological values as well. At the municipality/county level there are also conservation areas primarily devoted to outdoor recreation.

Finland's Protected Area System

Finland has protected 3257 sites for a total of 30,587 km^2 or 9% of its total surface area. Of that, 100 sites or 24,725 km^2 lie within Finland's Arctic territory. Protected areas are categorised as: national parks (33), strict nature reserves (19), mire reserves (173), protected herb-rich forests (53), protected old-growth forest areas (92), grey seal protection areas (7), other protected areas on state-owned land (65), protected areas on private land (2803) and wilderness areas (12). Those sites on public land larger than 10 km^2 are managed by Metsähallitus, the Finnish Forest and Park Service and the Finnish Forest Research Institute. Finland's protected areas support traditional usage in order to safeguard Saami culture and their traditional livelihood insofar as it is based on the use of living resources. Finland's nature protection areas have been established under the Nature Conservation Act and its wilderness areas are established under the Wilderness Act. Finnish protected areas encourage multiple uses of nature by providing conditions and areas for this. Twelve of the 14 Arctic Important Bird Areas (BirdLife International designation) are within protected areas, one is partly within and one is outside the protected area system. Finland has 11 Ramsar sites with 1 in the Arctic area. An important driver of the Finnish protected area system is Natura 2000, a long-term habitat protection plan of the European Union based on the EU Habitat Directive.

The treeless mountain area is over 90% protected. The boreal conifer and mountain birch forest is approximately 10–20% protected and of the mires and wetlands, about 20-30% are protected. In 1996, the state council made a decision to protect old-growth forests in Northern Finland. However, they have not yet been legally protected. Biodiversity conservation is the main value supported by the Finnish protected area system. Other important values are for ecotourism and recreation which are important sources of income in the north, particularly associated with parks and protected areas. Protected areas also support reindeer herding which is very important for the Saami culture. Other than the strict nature reserves, recreational hunting for local residents is allowed. Some of the sites support licensed hunting, and fishing is allowed in most areas.

Challenges to the system come mainly from south of the Arctic where protection levels are much lower, especially of forested areas. Meadows and grazing lands are underrepresented everywhere within the protected area system. Other threats are the concentration of large numbers of tourists in a few locations which presents management difficulties. Overgrazing and mining are also potential threats to some specific sites.

Greenland's Protected Area System

Nearly 1 million km^2 of Greenland is protected area. The centrepiece and jewel of Greenland's protected area system is the Greenland National Park. The national park is also a Man and the Biosphere Reserve (MAB) and contains two Ramsar sites. In addition there are four strict nature reserves, a protected hot spring and nine other Ramsar sites in Greenland. A World Heritage site is also proposed.

Greenland's protected areas are managed under the Nature Conservation Act except for the Qingua Valley Forest which was protected under a Greenland Council Resolution. All land is public land in Greenland but withdrawal of land from common use requires the approval of municipal authorities near towns and the Home Rule Government in rural areas.

Other than the national park, several discrete ecosystems are protected. Melville Bay Nature Reserve is a marine protected area and a scenic landscape with cultural and scientific values is protected at Paradise Valley. Akilia Island is a special geologic formation where the oldest trace of life in Greenland was discovered. Lyngmarken is a small area protecting hot, thermal springs and the Qingua Valley contains Greenland's only birch forest. Ikkafjord in south-west Greenland contains ikaite, a mineral that crystallises into unique column formations where fresh water from a meltwater river seeps out of the sea floor and meets cold, salt water.

Greenland is overwhelmingly an Inuit society based largely on hunting, fishing and sheep herding for its livelihood and its cultural and social traditions are based on these pursuits. The strength of its protected area system is that by effectively protecting natural habitats and species according to principles of sustainable use, it is also able to effectively protect and conserve that tradition and way of life.

The main challenge to the system comes from the prospect of the mining industry developing in the near future. Greenland welcomes about 35,000 tourists a year, a number which is growing. Tourism is one of the government's targeted pillars around which to develop the economy. Tourist influx is leading to a demand for greater access to the national park, but so far operators and protection authorities have shared a common interest in nature protection.

Iceland's Protected Area System

Iceland's protected area system consists of national parks, nature reserves and natural monuments all managed by the Nature Conservation Agency, and county parks which are under municipal management and largely dedicated to outdoor recreation. In addition, there is a marine conservation area on the West Island at Breidafjordur Bay and special laws conserving the Lake Myvatn and River Laxa area. Approximately 27,000 km^2 is under formal protection. Iceland has approximately 60 important bird areas and three Ramsar sites. Overall, protected areas are governed by the recently revised Nature Conservation Act. Other relevant laws are the Forestry Act, the Soil Conservation Act, the Planning Act and the Act on Protection, Conservation and Hunting of Wild Birds and Animals. Management authority for protected areas resides with the Nature Conservation Agency, advised by the Icelandic Institute of Natural History. Each municipality in Iceland has an elected local conservation committee which has an advisory role with the national government and an educational role with the public. Several environmental non-government organisations play an important role in nature protection, as well.

Iceland derives most of its living from the sea and its resources. The Breidafjordur Marine Conservation Area is a new departure for marine management and conservation. There is a major study of benthic invertebrates in the Iceland Exclusive Economic Zone (200 nautical miles out) underway which may form the basis for further efforts in marine protection. The system places a high value on the protection of seabirds and other wildlife. In physical terms, it protects landscapes, seascapes, geologic formations and areas of special natural or historic-cultural value. Protected areas are also chosen for their potential for tourism and recreation although this is a secondary criterion. Most Icelandic protected areas are multiple use, allowing for long standing and sustainable uses of nature, which are centuries old, and public access to protected areas is widespread

An ecozone analysis and classification is underway which will be followed up by an assessment of protected area coverage. Currently, there appears to be a gap in the protection of volcanoes and many other geological features including the need for wider buffering of hot springs and waterfalls.

Norway's Protected Area System

Norway has jurisdiction for the mainland, for the Svalbard Archipelego in the Barents Sea and for Jan Mayen and Bear Islands. Mainland Norway has 1,786 protected areas: 19 national parks, 1485 nature reserves, 101 natural monuments, 106 landscape protected areas and 75 other types of protected area. In total, 26,298 km^2, or 8.12% of Norway's mainland territory is in protected areas. Svalbard has a total of 22 protected areas: three national parks, 18 nature reserves and one other area. In total, 35,029 km^2 or 55.87% of Svalbard is in protected area. Norway also has 37 Ramsar sites, 4 World Heritage Sites (all cultural) and 11 biogenetic reserves under the Council of Europe and the Berne Convention. Norway is also very active in protected area work within the Nordic Council of Ministers and the Barents Euro-Arctic region.

The Nature Conservation Act, to be revised by 2004, the Wildlife Act and the new Svalbard Environmental Protection Act (2002) govern Norway's protected area policy. The main agencies are the Ministry of Environment, Directorate for Nature Management, county governors, including Svalbard, and local municipal authorities. The Svalbard Environmental Protection Act governs the protected areas in the Svalbard Archipelago, including Bear Island and there is a separate act concerning Jan Mayen island where the need for protected areas is under consideration. The Wildlife Act protects flora and fauna outside the protected area system and the Nature Conservation Act governs protected areas on the mainland. All protected areas are designated by royal decrees. All Norwegian protected areas have individual, site-specific regulations. Pilot projects are carried out giving the local, municipal levels of governance responsibility for management of selected protected areas.

Gap analyses in the protected area system have been conducted for Svalbard and a supplementary protected areas plan has been worked out to fill the gaps. Also, on mainland Norway, more detailed gap assessments are underway on, for example, on forest protection. Through the new Svalbard Environmental Protection Act and the protected areas plan, Norway aims to make Svalbard a model for nature protection and wilderness management, and is also considering marine protected areas in the archipelago. Forty national parks and other large protected areas are proposed in the national park plan on mainland Norway, while 10 of the existing parks will be extended. A list of 47 candidate sites for marine protection has also recently been worked out by a multi-sectoral advisory group. Norway is also planning for additional transboundary protected areas with its adjacent neighbours, Finland, Sweden and Russia.

Russia's Protected Area System

Throughout the 1990s, Russia's protected area system underwent a marked expansion. Ten strict nature reserves (zapovedniks) and eight national parks were added. This brought the system to 99 zapovedniks (8 in Arctic) and 33 national parks (1 in the Arctic). The plan is to have 14 Arctic zapovedniks and 4 Arctic national parks. Russia also has federal zakazniks (Habitat/species management areas – IUCN Category IV), state sanctuaries and natural monuments (IUCN Category III). Russia has one Arctic World Heritage sites, several Arctic Ramsar sites and MAB sites. In addition, at the republic/regional level, there are a large number of protected areas mainly corresponding to the zakaznik designation. Lastly there are local, municipal protected areas.

Federal protected areas are under the management authority of the Ministry of Natural Resources, also responsible for resource regulation on federal land. The Law on Specially Protected Areas governs protected areas and the Law on the Animal Kingdom protects and regulates the use of wildlife. The Russian system has been the beneficiary of a number of international partnerships with the Global Environmental Facility of the World Bank, and neighbouring states as well as Germany, the Netherlands and the UK, World Wildlife Fund (International) and environmental grant-making foundations have also provided it major support.

The Russian protected area system, and especially the zapovedniks, is designed to preserve Russia's natural heritage. Access is strictly controlled and is mainly for scientific research and for limited tourism. More recently, zapovedniks have taken on an educational and outreach function. All zapovedniks have on-site scientific staff which research and monitor nature. They are all classified as IUCN Category 1B. Several zapovedniks exhibit a cluster pattern, that is having several discrete sites under one administration rather than having one very large protected area. National parks date only from 1983 and are more accessible for visitors. Their role is to protect scenic landscapes and wildlife, and to provide sites for nature tourism, education and outreach. Russia's protected area system covers all geographic/ecozones of Russia and the primary values it protects are flora and fauna biodiversity, representative and unique ecosystems, historical and cultural monuments (often in national parks) and aesthetic natural values. Many sites have zones where Russia's indigenous peoples can pursue their traditional lifestyles and nature use.

The Russian system faces several challenges. There is a lack of state resources needed for its maintenance and expansion to fill identified gaps in protected area coverage. Many sites now have to raise their own funds to meet their operating requirements. There are often 'tugs of war' between agencies and levels of government and jurisdictions with some republics resisting the application and enforcement of federal environmental regulations in their jurisdiction. Many sites are in need of wider buffer zones. However, management of non-core zones is in the hands of regional authorities and land use conflicts are rising. In the Arctic, major oil, gas and mineral processing facilities near protected areas pose a threat to them. There is also a problem of ensuring that indigenous rights are secured and honoured throughout the system so indigenous peoples are able to preserve their traditional ways of life.

Sweden's Protected Area System

Sweden has 4701 protected areas in IUCN Categories 1 – IV. Covering over 40,000 km^2, the protected areas are classified as: national parks (27 – IUCN I), nature reserves (2,192 – IUCN I, IV), wildlife sanctuaries (1,049 – IUCN I), and natural monuments (1,433 – IUCN III). Sweden also has over 1,500 biotope protection areas as well as 140 nature conservation areas and one cultural reserve.

Sweden's protected area system has been established over the past century with the last one, Lapland Heritage Site, in 1996. As a rule, Sweden's protected areas are under full state ownership and are managed by regional administrative boards which may use their own personnel or contract out management functions. Local and indigenous people also participate in the establishment and management of protected areas. Funding for protected areas, especially the national parks, is given highest priority in environmental protection work.

Sweden's protected areas are established primarily to conserve biodiversity, the natural and cultural environments and to satisfy the needs for outdoor recreation. Specifically, Sweden protects its mountains and other outdoor recreational sites, its wetlands, its forest areas including its primeval forest above and below the economic forestry operations line, selected broad-leaf forests, common alder and other broad-leaf wetland forests, deciduous forest succession sites on burned land and miscellaneous broad-leaf forests. Mosaics of mire/forest mix and mires *per se*, lakes and watercourses and some marine areas, endangered species, and several agricultural landscapes with natural hay and grazing areas, are also protected.

A strength of Sweden's protected area system is that it is based on firm legislation. Currently, most areas are under public ownership. However, future efforts may examine private or voluntary protection. Although Sweden is not planning any new protected areas in the near future, there is a need to strengthen protection outside mountain areas where the percentage of protected area is small and to better protect, and fill gaps in the protection of lakes, waterways and marine areas.

USA (Alaska) Protected Area System

Because of the individuality of the 50 states, the US protected area system is highly complex. Also, in 1980, a special federal law, the Alaska National Interest Land Conservation Act, designated a large potion of federal lands in the State of Alaska for protection. This summary, then, will confine itself to Alaska.

At present, approximately 46% of the Arctic land area of the USA has protected status corresponding to IUCN Category IV or higher and at least 20% of each Arctic terrestrial region has some level of protection. All told, 549,000 km^2 of Alaska is protected. At the federal level there are eight national parks, ten national preserves, two national monuments (managed by United States National Park Service), and sixteen national wildlife refuges (managed by United States Fish and Wildlife Service) under the authority of the Secretary of the Interior. At the state level, the Alaska Department of Fish and Game and the Alaska State Parks and Outdoor Recreation Division manage three state wildlife sanctuaries, five state recreation areas and 42 state parks. There are two World Heritage sites (one shared with Canada), three MAB sites and several Ramsar sites. Portions of rivers and estuaries are also protected under special programmes.

The primary values protected by this huge matrix are wilderness areas, wildlife and their habitats. Tourism and recreation are also a key value. 25% of all jobs in Alaska are directly or indirectly tied to tourism, outdoor recreation or the management of public lands. Income from this is estimated at 1.4 billion USD. This runs the gamut for protected area personnel salaries to lodges, tour companies, guides and outfitters, plane and boat charters, hotels, restaurants, artists and craftsmen.

The protected area system in Alaska is relatively well funded and, despite some conflicts, political support and popularity for the system is quite strong in Alaska and in the lower 48 states among environmental NGOs.

Alaska is accessible by highway through British Columbia and the Yukon, Canada, from the rest of the mainland USA. Also a growing source of out-of-state visitors are boat cruises up the Pacific coast. A lot of out-of-state Americans have visited and experienced the beauty of Alaska. This, in fact, presents the system with one of its greatest challenges. Protected areas with relatively easy access (e.g. Denali, Glacier Bay) are experiencing very large numbers of seasonal visitors and it is a challenge to manage the intensive seasonal influx of visitors and, at the same time, to protect the values they come to see. The number of visitors and the demand for greater access is growing which, in turn is creating demand for more visitor services and development near Denali Park, and other protected areas. Multi-sectoral consultations are ongoing to reach a balance that will not compromise the natural values for which the protected areas have been established.

IBC