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PROTECTED AREAS AND BEYOND

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Contents

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PROTECTED AREAS AND BEYOND

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COVER: Cotton grass in Sarek National Park in Sweden, one of Europe's oldest parks.
Photo: Kitty Terwolbeck, Flickr/Creative commons

ABOVE: Nordvestfjord, near the Daugaard-Jensen glacier, Greenland National Park.

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What is beyond protected areas?

THE OLDEST NATIONAL park in the world is considered to be Bogdkhan Uul in Mongolia, established officially in 1778. Even before that there were "protected areas" of a sort – forests where the nobility liked to hunt, their resources off-limits to commoners. As Tom Barry and Courtney Price point out in this edition, the history of protected areas in the Arctic goes back more than a century, to the establishment of Afognak Island State Park in Alaska. Historically, such parks were considered to be places that would protect natural values, from species to landscapes. However, as several of the contributors note, there are pressures in the Arctic that mean future conservation models must expand from the existing, relatively static park system towards more dynamic and comprehensive concepts.

There are models for a new, expanded conservation approach elsewhere in the world. As Alberto Aroyo Schnell writes, there is an effort taking place across the European Union to identify and protect areas of particular ecological significance that does not rely on excluding human activities, but that focuses on management that is economically and ecologically sustainable. Another model, the PAN Parks idea is outlined by Zoltan Kun, who writes about an approach that stresses adding value to wilderness through non-extractive uses.

Might such approaches work in the Arctic? Cristian Montalvo Mancheno works on an initiative to create an ecological network in the Caucasus – while this isn't the Arctic, it proves that such an approach can work across historically difficult boundaries. The Caucasus initiative covers six countries and 28 ethnic groups, in an area fractured by local enmities for centuries. Within the Arctic, Anna Kuhmonen and Oleg Sutkaitis outline plans for a network of protected areas within the Barents Region in northern Europe, and Bente Christiansen and Tiia Kalske bring us the story of the success of the Pasvik-Inari Trilateral Park that crosses the borders of Norway, Finland and Russia.

A particular challenge to building up protected area networks, or other conservation approaches that stress the need for connectivity, representation, and resilience to change, is the need for research to help inform management choices. The distance of much of the Arctic from research infrastructure, and the costs of research in the Arctic, mean that it is among the least-studied regions of the world. Karen Murphy and Lisa Matlock present one model which seeks to ensure that conservation science needs in Alaska are addressed and shared so the appropriate conservation measures can be developed.

FUTURE CONSERVATION MODELS MUST EXPAND FROM THE EXISTING, RELATIVELY STATIC PARK SYSTEM TOWARDS MORE DYNAMIC AND COMPREHENSIVE CONCEPTS.

CLIVE TESAR, Head of Communications & External Relations, WWF Global Arctic Programme

Collectively, these articles point toward potential conservation approaches, whether that is adapting a successful model from somewhere else in the globe, or growing a local approach in the Arctic. Whatever the conservation methods chosen, it is clear that the Arctic is changing fast, and that policy makers and conservation managers must also move quickly in order to be effective at conserving the locally and globally valued – not to mention valuable - species, landscapes, and ecosystems in the region. ○

To the Last Ice Area and back

AFTER SIX EXCITING WEEKS on board the Arctic Tern this summer, the crew from the *Last Ice Area* exploration arrived back on land with sobering tales from the northwest coast of Greenland and Canada's High Arctic Islands. A week after their return, news emerged that the record for low sea ice extent in the Arctic had already been broken, despite the fact that it was not quite the end of August.

"What this means is that the trend continues – the trend of declining summer sea ice that set us off on our journey", said Clive Tesar, one of the crew members and WWF Global Arctic Programme's Head of Communications and External Relations. "This trend leads us to believe that where summer sea ice stays the longest is likely to become increasingly important to the life, both human and animal, that has evolved over thousands of years, physically and culturally, to live on and around that ice."

This life is also important to the rest of the world. Four of the ten largest world fisheries are in the Arctic, and many migratory species including whales and seabirds rely on the summer bloom of life at the ice edge.

A significant part of the Last Ice Area project consists of consulting with the people in local communities to fill in the knowledge gaps about this remote area. This is their back yard, and what they have to say about it matters. The team also managed to contribute in a small way to the research that needs to be done in the area. Sampling salt marshes and seawater for evidence of what life lives there now will help in assessing how the area changes, and in helping project how it is likely to change. ○

© Petr Shpilenok

Sockeye salmon

Russian salmon gets poaching protection

THANKS TO a WWF-supported anti-poaching patrol, salmon can easily navigate Kamchatka's Bolshaya River. Created to stop illegal fishing in this poaching hot spot, the group includes public inspectors from Kamchatka Public Salmon Council and governmental enforcement services. All summer, water area and river banks have been under control of inspectors 24 hours a day. During the most recent raids inspectors deterred dozens of violations, confiscated 200 meters of nets, and a few poachers' boats. Scientific monitoring proved that this summer the number of sockeye salmon passed to spawning ground significantly increased in comparison with many previous years. ○

WWF-US Arctic Program recognized for outstanding achievement

THE ALASKA Conservation Foundation (ACF), a state-wide foundation supporting environmental work, capacity building and leadership development, has selected the WWF-US Arctic Field Program as the 2012 recipient of the Lowell Thomas, Jr. Award for Outstanding Achievements by a Conservation Organization. The selection was made by long-time Alaskans and the ACF's national board of trustees, making this a particularly great honour. ○

Expedition prepares for tourism in Russia's Arctic

AS RUSSIA'S ARCTIC opens up to tourism, employees of the national park "Russian Arctic" were joined by WWF experts, supporters, and writer Yevgeny Grishkovets on a two-week expedition

BP sees the real cost of offshore oil

THE REAL PRICE of offshore oil development in the Arctic has scared off British-based oil company BP – now it should scare off many others, says a spokesperson for WWF. BP announced this summer that it is indefinitely shelving a plan to drill the 'Liberty' field, four miles from the Alaskan coast in the Beaufort Sea.

"BP's decision shows a rational business approach," says WWF's Mikhail Babenko. "If you add up the real costs, drilling for oil in the Arctic is too expensive and risky. Economic analysis demonstrates that oil and gas development in the arctic offshore is not economically viable if a company is to follow adequate preparedness, prevention and response standards." ○

© National Geographic Stock/ James P. Blair / WWF

in August to research and plan for the area's future. Aboard the ship *Professor Molchanov* the 40 voyagers visited ecologically valuable parts of the "Russian Arctic" park, the archipelago of Novaya Zemlya and Franz-Josef Land.

The voyage was sponsored by Coca Cola and WWF supporters – who in turn became participants, taking part in research and seeing the consequences of arctic climate change first hand. Voyagers encountered giant blue icebergs, colonies of tens of thousands of birds, polar bears and walruses and even a real arctic storm. The researchers aboard conducted surveys of the area's land and sea, mapping and registering historical objects and placing information signs.

Much work lies ahead to prepare the park territory for ecological tourism, including an inventory of the natural and cultural heritage in areas expected to see the most visitor traffic, and preparing trails and observation areas. ○

© Ekaterina Shustkhem / WWF-Russia

Unique stone spherulites found on Champa Island, Russia, during the 2012 Russian Arctic expedition.

WWF speaks out on shipping issues

CANADIAN ARCTIC DIRECTOR Martin von Mirbach represented WWF at public hearings led by the Nunavut Impact Review Board, which is reviewing the Mary River Project, a proposed iron ore mine located on North Baffin Island. The proponent, Baffinland, proposes to mine 18 million tons per year of high grade iron ore from the reserve deposit, transport it by a purpose-built railway to a new port to be constructed at Steensby Inlet, and ship the ore on a year-round basis through Foxe Basin and Hudson Strait to markets in Europe. This is the largest project ever proposed in the Canadian Arctic, and WWF is involved in order to ensure that the shipping meets the best international standards. ○

UNESCO site dam plans scrapped

AUTHORITIES IN KAMCHATKA reversed recently a decision to build a hydropower station in the heart of Kronotsky Nature Reserve following WWF intervention. This territory is a part of UNESCO Heritage; nevertheless the Governor of Kamchatka region announced this plan as a "done deal" through local mass media. To prevent a violation of international legislation and protect a fragile ecosystem WWF shared their concerns with the world community at the 36th Session of World Heritage Committee in St-Petersburg. Soon after, Kamchatka Administration revised the decision and officially informed citizens that the project will not be implemented as it is potentially dangerous for nature. ○

Photo: Visit Greenland, Flickr/Creative commons

Mountains, North East Greenland National Park.

Arctic protected areas: conservation in a time of change

Protected areas have long been viewed as a key element for maintaining and conserving arctic biodiversity and the functioning landscapes upon which resident and migratory species depend. But much like the Arctic itself, there are questions of whether its protected areas will be able to adapt quickly enough to maintain their functions in the face of swift change, say TOM BARRY and COURTNEY PRICE.

THE ENDLESS white horizon of the North East Greenland National Park and UNESCO Biosphere Reserve is punctured with jagged mountain peaks and icebergs, with large expanses of tundra and arctic desert. The landscape plummets to unseen depths, brimming with life in the dark ocean of the area's extensive fjord systems. This extreme landscape is vital for diverse cold-adapted species, from the charismatic mega-fauna (polar bear, musk ox and narwhal) to the less glamorized copepod and ice algae. At 972,000 km² this chunk of the planet is bigger than most countries, and constitutes the world's

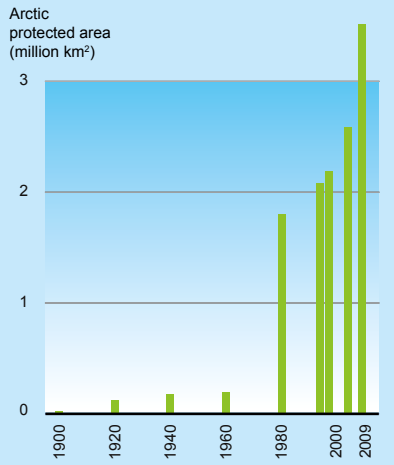
largest and most northerly protected area. It is but one example of the Arctic's growing and changing protected areas.

Protected areas have long been viewed as a key element for maintaining and conserving arctic biodiversity and the functioning landscapes upon which resident and migratory species depend. The Arctic's first protected area was established in 1892, with coverage remaining low until the 1970s. But since 1980, the region's protected area coverage has almost doubled to include 1127 areas, encompassing about 3.5 million km², or 11 per cent of the Arctic (as defined by the Arctic Council biodiversity working group, the Conservation of Arctic Flora and Fauna (CAFF)).

The diversity in the scale and composition of arctic protected areas is reflective of the wide variety of the values and nature they protect and represent. On these sites ecological integrity combines with cultural heritage, physical features, species habitat, ecological services and more to create windows where human-caused stress is minimal. Some protected areas are co-managed by Indigenous and local peoples, contributing traditional knowledge to inform management practices. Protected areas are essential benchmarks to provide valuable information on current and projected changes facing the Arctic, and how these changes will affect both wildlife and human populations.

Protected areas in the Arctic are also important for global biodiversity conservation. The majority of arctic species use the region seasonally, with arctic habitats providing vital resources for many migratory bird and mammal species. It is important to look beyond designated protected areas and consider unprotected areas and their role as corridors in facilitating arctic species migration.

TOM BARRY is Executive Secretary of CAFF's International Secretariat based in Iceland and **COURTNEY PRICE** is CAFF's Communication Officer.



Current and projected issues facing arctic protected areas

- Climate change
- Increasing human use
- Development within and surrounding protected areas
- Global and local contaminants
- Non-native invasive species
- Loss of traditional knowledge
- Capacity and coordination

CONCERNS FOR THE FUTURE

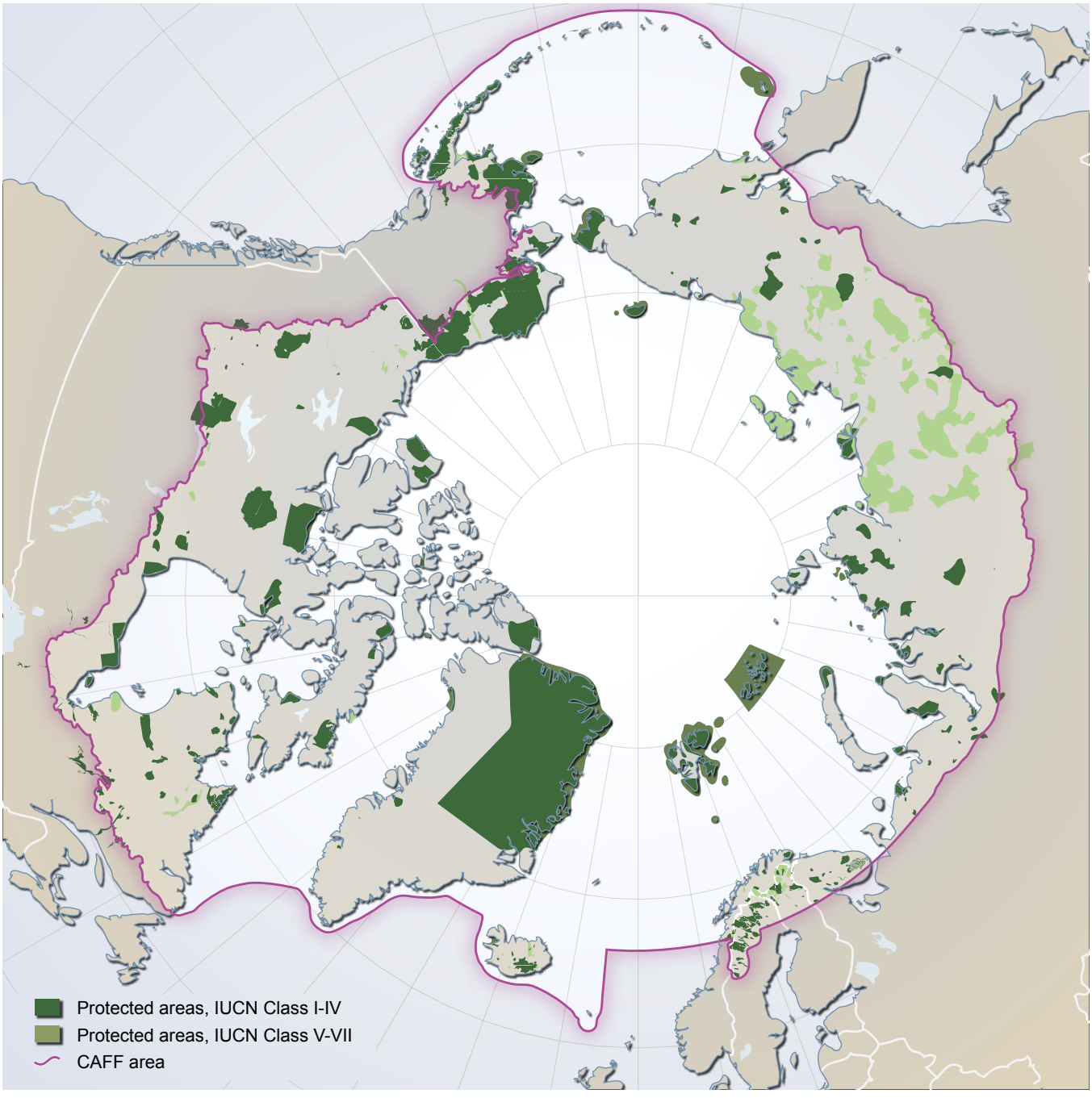
The Arctic and its protected areas are undergoing rapid and dramatic changes, with significant implications for the region's ecosystems, wildlife and peoples. Much like the Arctic itself, there are questions of whether its protected areas will be able to adapt quickly enough to maintain their functions in the face of swift change.

THE DIVERSITY IN THE SCALE AND COMPOSITION OF ARCTIC PROTECTED AREAS IS REFLECTIVE OF THE WIDE VARIETY OF THE VALUES AND NATURE THEY PROTECT AND REPRESENT.

The majority of arctic protected areas have been established in strategically important and representative areas, helping to maintain crucial ecological features and functions. This approach, however, contains an underlying assumption that conditions within these delineated borders remain static and unchanged. But these borders are man-made constructions and do not shift to match changing ecological conditions and species movements. Given the scale and pace of changes affecting the Arctic, scientists and managers may find that these «untouched» areas are more challenging to define, that what requires protection may change and perhaps be lost completely before it can be determined. Strategies in protected

The Circumpolar Biodiversity Monitoring Program (CBMP), is an international network of scientists, government agencies, Indigenous organizations and conservation groups working together to harmonize and integrate efforts to monitor the Arctic's living resources. The CBMP is currently exploring better linkages to how it can help CAFF support the United Nations Convention on Biological Diversity **Strategic Plan for Biodiversity (Aichi) Target 11:**

"By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes."



areas management and conservation must evolve to meet new realities and challenges.

In the complexity and interconnected nature of the challenges facing the Arctic, it is clear that no individual country acting on its own can ensure adequate conservation for the entirety of arctic biodiversity. A coordinated circumpolar approach that responds to rapid change, addresses local concerns and links the Arctic in the wider global context is needed to achieve conservation.

CURRENT EFFORTS

There are a number of international efforts underway that strive to provide practical approaches to create a strong ecologically and culturally significant arctic protected areas network.

CAFF began work in this area soon after its inception in 1991. Starting with the Circumpolar Protected Areas Network (CPAN), whose goal was to promote the development of a protected areas network that would contribute to maintaining and conserving ecosystem health and dynamic biodiversity of the Arctic region, protected areas work has since been incorporated in many aspects of CAFF's work.

CAFF's Circumpolar Biodiversity Monitoring Program (CBMP) has ana-

© naturepl.com / Bryan and Cherry Alexander / WWF-Canon

Narwhal, Greenland

Photo: Visit Greenland, Flickr/Creative common

Musk ox, Greenland

lyzed and integrated various protected areas considerations into their marine, freshwater and terrestrial monitoring plans, and further identified 'changes in protected areas' as a key scientific indicator of arctic change. This indicator was one of a suite that helped formulate the *Arctic Biodiversity Trends 2010: Selected Indicators of Change* report, a first deliverable under the Arctic Biodiversity Assessment and the Arctic Council contribution to the 2010 UN International Year of Biodiversity. The report also updated the indicator, first created in 1994, which now forms the arctic component of the UNEP World Conservation Monitoring Centre's World Protected Areas Database and is accessible from ProtectedPlanet.net. Further, in spring 2013 CAFF will release the full scientific Arctic Biodiversity Assessment, offering vital baseline data against which future changes in arctic biodiversity can be detected and measured, allowing for more efficient and effective policy responses.

Arctic marine ecosystems receive low levels of protection compared to terrestrial ecosystems. There is a critical need for the identification of important and vulnerable arctic marine areas, including sea ice, and recommendations for their management. Responding to a recommendation from the *Arctic Marine Shipping Assessment*, the Arctic Council is working to identify marine areas of heightened ecological and cultural significance. The results of these efforts may contribute to the work of global instruments such as the International Maritime Organisation and the United Nations Convention on Biological Diversity (CBD). The CBD's Subsidiary Body on Scientific, Technical and Technological Advice has recently adopted a package of recommendations on marine and coastal biodiversity, including on the topic of ecologically or biologically significant marine areas (EBSAs), which are up for consideration at the October 2012 CBD Conference of the Parties.

A COORDINATED CIRCUMPOLAR APPROACH THAT RESPONDS TO RAPID CHANGE, ADDRESSES LOCAL CONCERNS AND LINKS THE ARCTIC IN THE WIDER GLOBAL CONTEXT IS NEEDED TO ACHIEVE CONSERVATION.

CHANGING NEEDS

WWF's own Rapid Assessment of Circum-Arctic Ecosystem Resilience (RACER) is another such ecosystem-

Photo: Henrik Hansen/Visit Greenland, Flickr/Creative common

Polar bear, Greenland

based method that emphasizes the changing needs of protected areas management, and offers responses in light of anticipated changes, rather than reacting to change. The RACER project provides a tool to focus on regional biodiversity, productivity and ecosystem resilience and helps shape an approach to creating protected areas that maintain those systems. This new approach is intended to ensure that a protected area is better positioned and has the capacity to serve the needs of the ecosystem in a rapidly changing environment. The Arctic Council is using a similar approach in the ongoing work on the Arctic Resilience Report and has also established an Ecosystem-Based Management expert group to identify best practices and advance a common understanding of ecosystem-based management in the Arctic.

A forward-thinking protected areas management approach that addresses local concerns and links the Arctic in the wider global context must evolve alongside the changes already occurring in the Arctic, and include mechanisms to determine and respond to future change. Various coordinated circumpolar activities already underway are providing the framework that will ensure that arctic protected areas remain key conservation tools for biodiversity. ○

STRATEGIES IN PROTECTED AREAS MANAGEMENT AND CONSERVATION MUST EVOLVE TO MEET NEW REALITIES AND CHALLENGES.

Arctic protected areas status and trends

- First arctic protected areas: Afognak Island State Park, Alaska, USA (1892)
- Largest protected area: North East Greenland National Park, 972,000 km^2
- Smallest protected area: Kattarauga, Iceland 0.0008 km^2
- Protection level 1980: 1.8 million km^2; 5.6 per cent
- Current protection level: 3.5 million km^2; 11 per cent
- Marine coverage: less than terrestrial, and an urgent need to identify and protect biologically important areas
- 40 per cent of arctic sites have a coastal component

EBSAs in the arctic marine environment

In 2008, the ninth Conference of the Parties to the Convention on Biological Diversity (CBD) adopted seven criteria for identifying marine areas in need of protection. A number of different efforts to identify ecologically or biologically significant marine areas (EBSAs) using these criteria in the Arctic have been conducted. These efforts now need to be combined and linked, say LISA SPEER and TOM LAUGHLIN.

LISA SPEER directs the International Oceans Program at the Natural Resources Defense Council (NRDC) in New York.

TOM LAUGHLIN was NOAA's (National Oceanic and Atmospheric Administration) former Deputy Director of International Affairs, and currently serves as Senior Arctic Advisor to the International Union for Conservation of Nature (IUCN).

ARCTIC MARINE ECOSYSTEMS face an uncertain future as summer sea ice – headed for record lows as of this writing – continues to retreat. The unprecedented loss of ice threatens marine food webs exquisitely adapted to the seasonal ebb and flow of sea ice, and ice dependent animals such as walrus, narwhal, polar bears, ice seals and some arctic birds and fish. These changes have major implications for the arctic marine environment and the people who depend on it for sustenance and cultural survival.

The loss of ice also means that, for the first time, much of the Arctic is opening up to new human activity, including offshore oil and gas development, shipping and commercial fishing. Accidents, oil spills, pollution, invasive species, underwater noise, and a host of other impacts of new and expanded development pose major additional threats to the region.

Reducing CO_2 emissions is the single most important thing we can do for the Arctic. But even if we stopped carbon emissions tomorrow, the loss of summer sea ice will continue. It is therefore critically important to do what we can to ensure that new human industrial activity is managed in a way that avoids to the maximum extent possible further damage to very vulnerable arctic marine ecosystems.

Our record of managing human activities in other oceans is grim. Depleted fisheries, massive dead zones, huge gyres of floating plastic waste, widespread sewage and chemical pollution and degradation of habitat now afflict virtually all of the world's oceans.

The Arctic presents us with the chance to get out in front of industrial development and get oceans management right. But we need to act quickly. Once poorly regulated development becomes entrenched, proactive management becomes extremely difficult.

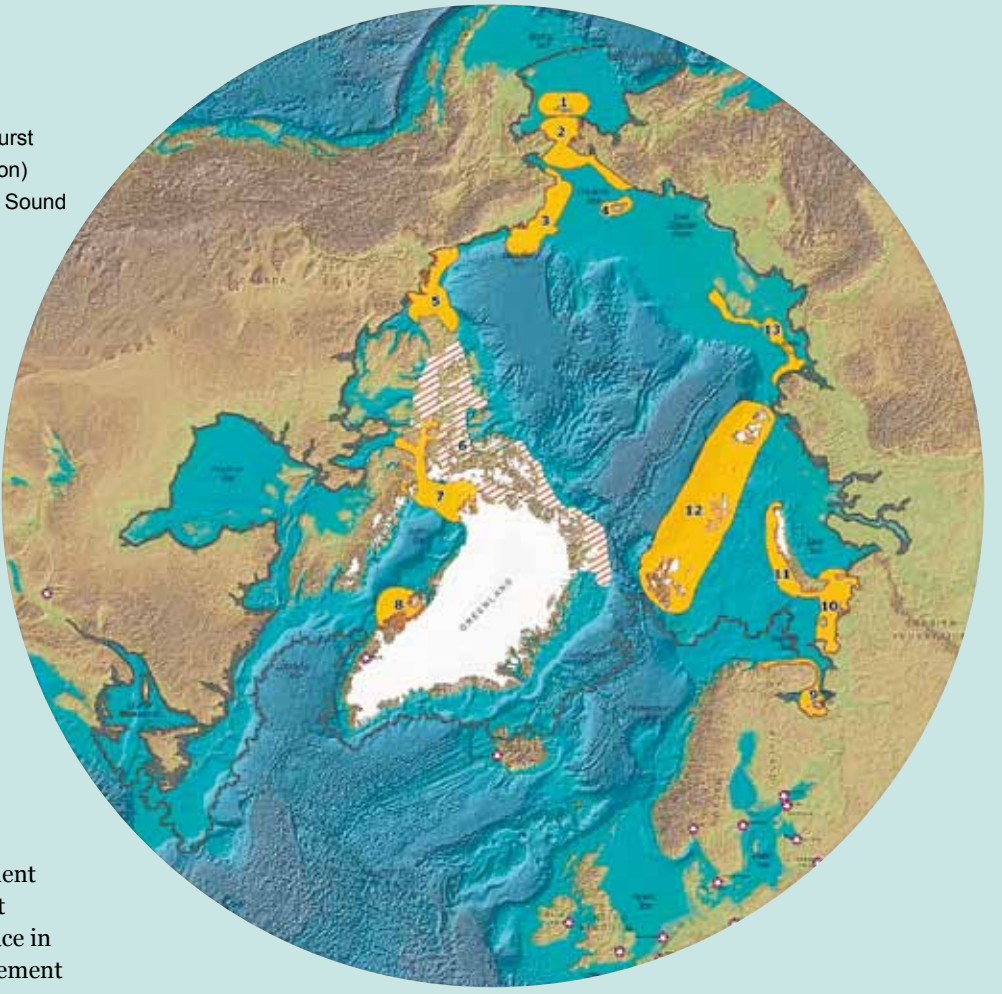
Integrated, ecosystem-based management (EBM) has the potential to

Photo Wikimedia Commons

Much of the Arctic is opening up to new human activity, including offshore oil and gas development. Here Northstar Island, an oil and gas drilling site built up as an artificial island in the Beaufort Sea north of Alaska.

Figure 1. EBSA overview

1. St. Lawrence Island
2. Bering Strait
3. Chuckchi Beaufort coast
4. Wrangel Island
5. Beaufort Sea coast/Cape Bathurst
6. Polar pack (Sept 2040 projection)
7. North water polynya/Lancaster Sound
8. White Sea/Barents Sea coast
10. Pechora Sea/Kara gate
11. Novaya Zemlya
12. High arctic islands and shelf
13. Great Siberian polynya



provide an organizing framework for managing human activity in a manner that can maximize resilience and preserve essential ecosystem functions. Such an approach includes defining portions of ocean space for management purposes based on ecological and oceanographic criteria, and the development of management arrangements that address all human uses of that space in an integrated fashion. A central element of integrated, ecosystem based management is the identification of ecologically significant or vulnerable areas that should be considered for protection due to their role in maintaining valued ecosystem functions and resilience.

The seven scientific criteria adopted by the ninth Conference of the Parties to the CBD relate to the areas uniqueness or rarity; special importance for life-history stages of species; importance for threatened, endangered or declining species and/or habitats; vulnerability, fragility, sensitivity, or slow recovery; biological productivity; biological diversity; and naturalness. Any area which meets one or more of these scientific criteria can be defined as an EBSA.

A number of different efforts to identify EBSAs in the arctic marine environment have been conducted, including a workshop the International Union for Conservation of Nature (IUCN) and the Natural Resources Defense Council (NRDC) held in 2010 involving representatives of government agencies, academia and Indigenous organizations (see figure 1). A key next step is to combine these efforts in order to define and create a linked information system on ecologically and culturally important areas throughout the Arctic. This would allow arctic coastal nations – both individually and collectively – to develop management arrangements to ensure that key ecological and cultural areas and functions are protected and preserved. This could be one of the recommendations to the upcoming Arctic Council Ministerial Meeting in 2013 by the EBM expert group tasked with examining ways in which arctic countries could collaborate on ecosystem-based management. ○

THE ARCTIC PRESENTS US WITH THE CHANCE TO GET OUT IN FRONT OF INDUSTRIAL DEVELOPMENT AND GET OCEANS MANAGEMENT RIGHT. BUT WE NEED TO ACT QUICKLY.

Protected areas and management of

Protected areas are a cornerstone of global conservation efforts. In the Arctic, climate change now provides opportunities to think about how to address the immediate and long term protection needs, says NIK LOPOUKHINE.

PROTECTED AREAS are institutional mechanisms for maintaining natural ecosystems which provide important values for human societies. Protected areas are amongst the most successful, and in some cases – like the Egmont National Park in New Zealand – are said to be the only successful way of maintaining natural ecosystems, both from habitat conversion and degradation. The growing awareness of the planet's vulnerability to human driven changes, in particular in the Arctic where climate change effects are magnified, provides an opportunity to consider the role of protected areas in conserving the multiple values of natural ecosystems and the services that they provide.

In 2008, after exhaustive consultation, the International Union for

the Arctic

Photo: upsidedownNZL. Flickr/Creative commons

Egmont National Park, New Zeland.

Conservation of Nature (IUCN) agreed to a new definition of a protected area, which made subtle but significant changes to the union's understanding of the objective of protection through a protected area (see PA glossary).

This definition makes clear that the fundamental purpose of protected areas is the conservation of nature. This priority holds throughout different management objectives as categorized by IUCN, ranging from wilderness to sustainable use.

SIGNIFICANT CONTRIBUTIONS

How well protected areas deliver ecosystem services depends on how effectively they are managed, how they are integrated with surrounding landscapes and land use strategies and whether they are supported by local communities. Consolidating, expanding, and improving the global protected area system requires the engagement of multiple partners, from communities to NGOs, government agencies and the private sector. This is a necessary and logical response to both climate change and the crisis of biodiversity loss.

In addition to conserving biodiversity, protected areas with intact natural habitats make significant contributions on many fronts. They mitigate effects of climate change by storing and sequestering carbon in vegetation and soils, and help communities to adapt by maintaining essential ecosystem services and thus help to cope with, climate change and other environmental challenges.

GOVERNANCE COMPLEXITIES

The signatory parties to the Convention on Biological Diversity (CBD) promote further investment in existing protected areas and their expansion under a range of governance and management regimes.

One major consideration in the establishment and management of protected areas is the question of who governs or has the authority over a protected area. There are four forms of governance. The traditional approach is where governments are responsible for establishing and managing protected areas. Usually a legislative framework specifies the responsibility and accountability. A second approach is where the governance is shared. The governing framework is set up so that decisions affecting the protected area are not unilaterally but collaboratively decided upon. The third

PA glossary

Aquatic Protected Area: A marine protected area consisting of freshwater resources.

Ecologically or Biologically Significant Marine Area (EBSA): Under the Convention on Biological Diversity (CBD), EBSAs are marine areas in need of protection that are identified using seven scientific criteria adopted at the ninth Conference of the Parties to the Convention in 2008. EBSAs could be used in a variety of management systems, not all of them exclusively area-based. While many EBSAs likely require enhanced protection, the management of these marine areas remains in the hands of the competent authorities. Therefore, EBSAs could be turned into marine protected areas for management purposes.

Marine Protected Area (MPA): Like any protected area, marine protected areas are regions in which human activity has been placed under some restrictions in the interest of conserving the natural environment, its surrounding waters and the occupant ecosystems, and any cultural or historical resources that may require preservation or management. Marine protected areas' boundaries will include some area of ocean, even if it is only a small fraction of the total area of the territory.

Network of PAs or MPAs: A set of discrete PAs or MPAs within a region or ecosystem that are connected through complementary purposes and synergistic protections. Such a network could focus on ecosystem processes, certain individual species, or cultural resources.

No-Take or No-Go Zones: Areas in which extractive activities are prohibited.

Protected Area (PA): According to IUCN's definition, a protected area is *"a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values"* and is thus used as a tool for management purposes. Through its World Commission on Protected Areas (WCPA), IUCN have developed six Protected Areas Management Categories that define protected areas according to their management objectives which are internationally recognised by various national governments and the United Nations: strict nature reserve; wilderness area; national park; natural monument or feature; habitat/species management area; protected landscape/seascape; and protected area with sustainable use of natural resources.

(Sources: www.gobi.org/faqs, wikipedia.org, mpa.gov/resources/glossary)

approach, private governance, is whereby individual or family, non-government organizations or corporate ownership have authority. Objectives for these protected areas vary but to be recognized as a protected area they – like other forms of governance – must have a primary objective of conservation. And fourthly, is an Indigenous Peoples or Local Community form of governance where the management authority and responsibility rest with Indigenous peoples and/or local communities through various forms of formal or informal institutions and rules. Approaches vary around the world. Overlapping interests may add to the complexity of discerning responsibility.

NIKITA (NIK) LOPOUKHINE is the former Chair of the International Union for Conservation of Nature (IUCN) World Commission on Protected Areas.

OASIS FOR THE FUTURE

In the Arctic, climate change is imposing dramatic changes which provide an opportunity to think about possible options for the use of protected areas to address immediate and long term protection needs. As the intact natural world shrinks in the face of development, a well-managed protected area stands as a bulwark to losses in biodiversity which are often irreplaceable and as such priceless. Moreover, protected areas act as an oasis where learning, serving and giving joy is realized. To assure their long term viability and to continue to provide all of the above services, protected areas need to be connected by undertaking a holistic land/seascape approach. Initiatives such as the large scale corridors planned in the North American Rocky Mountains and in eastern Australia, among others, are excellent examples of such an approach. A protected area is an investment in nature's future, our future and that of our children and their children. ○

Economic values of protected areas and other natural landscapes in the Arctic

Low human populations and large natural ecosystems have made it relatively easy to persuade arctic governments and communities to establish protected areas. But even large protected areas are ineffective if isolated from other ecosystems, and in some parts of the Arctic the existence of protected areas has served as an excuse for bad management elsewhere, says NIGEL DUDLEY.

THE ARCTIC has huge national parks and wilderness areas, including Northeast Greenland National Park, the largest in the world. As resources grow scarcer, pressures to "open up" protected areas to uses such as mining and logging will increase.

Many of the pressures on natural ecosystems are grounded in economic forces. For people in industries reliant on use of natural resources, protected areas and other ecosystems set aside from commercial use are often literally viewed as wasted lands. Showing that such areas have a significant economic value *as an intact natural ecosystem* can serve as an important counterweight to arguments for exploitation. At the same time improving management in the rest of the landscape is also critically important; initiatives such as The Forest Stewardship Council, Marine Stewardship Council or mining restoration programmes can help responsible companies to carry out their business without undermining the environment.

HOW TO MEASURE?

Valuation studies range from estimates of the value of a particular "service", such as tourism, carbon sequestration or fish catch, to Total Economic Valuation (TEV) studies, which attempt to measure *all* the values derived from a particular ecosystem. Narrow, single issues studies are sometimes able to generate highly detailed results but inevitably paint a limited picture. TEV is more useful but more complicated: some values will be unknown; using one ecosystem benefit may cancel out another and sustainably and unsustainably consumptive and non-consumptive uses of natural resources are often mixed up together. Relatively few TEV studies have been successfully completed for

Photo: Mickael Brangeon, Flickr/Creative commons

Peat bog has a huge capacity for storing carbon.

natural ecosystems. The Economics of Ecosystems and Biodiversity (TEEB) study which was launched by Germany and the European Commission in 2007 is the most comprehensive attempt yet to compile information on global ecosystem service values, with a string of reports aimed at stakeholders ranging from policy-makers to industry. Although TEEB did not itself produce hard figures for ecosystem service values on a global level, it raised the issue of ecosystem valuation to an altogether higher level than previously.

TEEB, along with most other overview studies, focused primarily on tropical and temperate ecosystems, with little attention paid to polar landscapes. (This situation looks set to change with a TEEB Nordic study in progress.) Nor can information from other parts of the world be easily transferred: the Arctic has relatively low genetic diversity, few people requiring buffering against floods and tidal surges, no desertification problems, and so on. But at least some of the ecosystem services that do occur play a critical ecosystem role at a global level, so their valuation is of major geopolitical importance. And the lack of a global overview doesn't mean that no information exists; individuals and institutions within the Arctic have carried out important studies that start to build a picture of what is important and what it is worth.

CRUCIAL CARBON

One of the most important values is also one of the most recently recognised, namely the role of the Arctic in storing carbon. Parks Canada calculated that its 39 national parks, covering only 2.25 per cent of the country, store carbon mainly in peat and soil with a proxy value of Can$72-78 billion at 2000 prices, based on costs of replacing this carbon through reforestation. Yet the peat that stores most of the carbon remains in a dangerously fragile state and the Arctic could, without careful management, change from an absorber to an emitter of carbon: most scenarios for runaway climate change centre on the risk of a sudden pulse of carbon released from the arctic tundra. Keeping carbon stores intact is a major economic incentive for reconsidering plans to clear-cut boreal forests or otherwise disrupt peat deposits.

SHOWING THAT SUCH AREAS HAVE A SIGNIFICANT ECONOMIC VALUE AS AN INTACT NATURAL ECOSYSTEM CAN SERVE AS AN IMPORTANT COUNTERWEIGHT TO ARGUMENTS FOR EXPLOITATION.

IMPORTANT JOBS

Although human populations are generally very low in the region, a relatively high proportion of people rely on wild or semi-domesticated animals living in natural ecosystems. The revenue from moose hunting in Norway was estimated at US$70-90 million a year in 2000, with far greater values if the meat hunted for domestic consumption was included. At the turn of the century, fish were generating pre-processing value of US$1.2 billion a year in Alaska. Indeed, within Alaska as a whole, industries reliant on natural resources (commercial and sport fishing, tourism and recreation and resource management) generated 55,000 full time jobs, over a quarter of the state's total jobs and more than twice as much as the petroleum, mining and construction industries combined, worth $4.2 billion a year in income alone.

Not everything is capable of generating an easy economic figure. Spiritual values of sacred natural sites and other non-material value are hard to give a meaningful dollar sign. But building on the information that already exists and compiling an arctic-wide understanding of the economic values of ecosystem services is an important next step in attempting to conserve the Arctic. ○

NIGEL DUDLEY is a consultant who has worked with WWF and many other NGOs, several United Nations agencies and selected governments in over 50 countries around the world, mainly on issues related to protected areas and landscape approaches to conservation.

Environmental protection in the Pasv

Pasvik-Inari Trilateral Park crosses three national borders and consists of five protected areas, and is a good example of long-term and constructive cross-border cooperation, say BENTE CHRISTIANSEN and TIIA KALSKE.

BENTE CHRISTIANSEN and **TIIA KALSKE** work at The Office of the County Governor of Finnmark (Norway).

PASVIK-INARI Trilateral Park and its surrounding wilderness are located on the north-western edge of the taiga, in the area where Finland, Norway and Russia converge. Environmental authorities and relevant stakeholders in the three countries have co-operated since early 1990s in the areas of nature protection and management, environmental monitoring and research activities.

The lush valley of the Pasvik River stretches from Lake Inari in the south towards the Barents Sea in the north, appearing as a vital nerve in the forested landscape. The region comprises a unique nature system where the European, Asian and arctic species meet. Here, some of the species reach the ultimate limits of their distribution. The area is also an important nesting and resting place for a large number of migratory birds.

CULTURAL MEETING POINT

The Pasvik–Inari region is a meeting point for different cultures. Different Sámi groups live in the area: the Northern, Inari and Skolt Sámi. Since the Early Middle Ages, Finns, Norwegians and Russians also have settled in the region. Although different cultures coexist in the area and have learned a lot from each other, they have each retained their distinctive traditions.

In earlier times the river was an important channel to the Barents Sea along which trade commodities was transported. The battle for nickel in Pechenga brought changes to the area, as the rapids of the Pasvik River were used to produce energy for mining and smelting.

Despite the changes, the Lake Inari area and the Pasvik River valley have preserved their natural values and species diversity. The specific features of the area make it an attractive nature and culture destination.

Nature, animals and plants, and also pollution, do not recognise man-made borders. The cross-border cooperation between environmental authorities in Finland, Norway and Russia was initiated in the early 1990s. The first protected area crossing the border was the Norwegian-Russian Pasvik Zapovednik/

Pasvik-Inari Trilateral Park

Map design: Ketill Berger, Film & Form

vik-Inari area

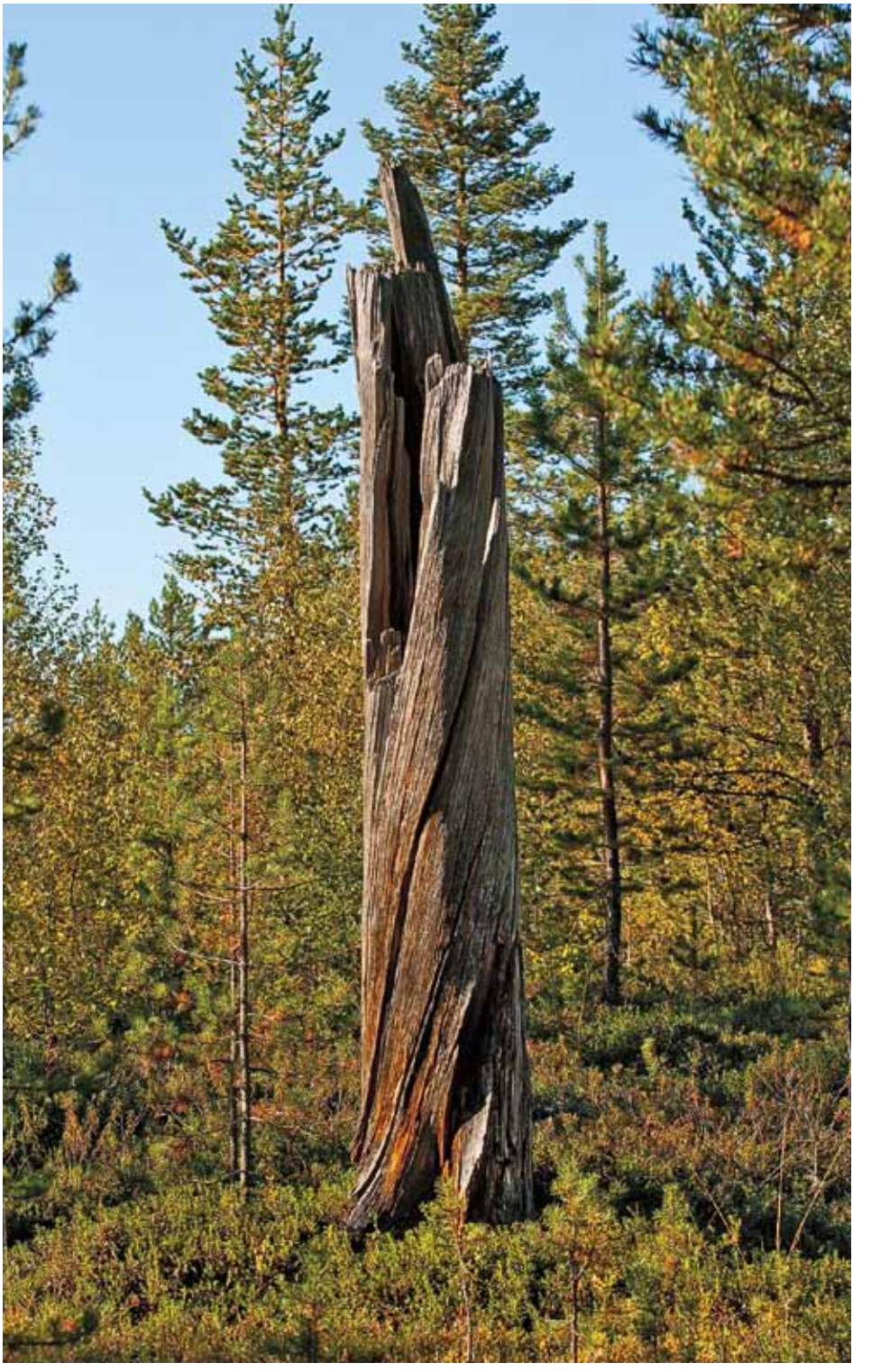
Pasvik Nature Reserve which was established 20 years ago. From then annual meetings, exchange of information, and joint mappings, field expeditions, and projects have been conducted. Over the years the knowledge of the protected areas and challenges connected to management and monitoring issues on common species have grown.

REGIONAL FRIENDSHIPS

So has the friendship between the people involved in the daily work with the protected areas. In the early 2000 the idea of a joint 'Friendship park' was introduced. The Interreg project "Promotion of nature protection and sustainable nature tourism in the Inari-Pasvik area" which took place in 2006-2008 intensified and structured the cooperation towards what it is today. The main objectives were to unite the protected areas under a common name, and to establish a formal framework for the management of the common area despite the national borders. In the course of the project, joint monitoring and harmonisation of methodologies on chosen border-crossing species were implemented (brown bear, waterbirds and golden eagle), a joint action plan and a joint vision were created, and activities to promote local tourism were initiated. In 2008 Pasvik-Inari Trilateral Park was awarded the European certification for EUROPARC's "Transboundary Park – following nature's design". This certification provides managers of protected areas with tools for maintaining a long-term, workable cooperation for nature management.

There are numerous challenges for the cooperation to address, including different legislation, different levels of protection, many languages, different terminology and methodologies, funding issues, border restrictions and formalities, effects of water regulation and pollution issues. But based on the experience so far, almost all these challenges can be solved through an open and transparent communication, and mutual understanding of the different cultures in the three countries. The human resources involved in the cooperation are also of crucial importance; both short-term and long-term joint benefits have to be recognised by all the parties in order to see the day-to-day advantage of cooperation. ○

Photo: Dan Nordal, Flickr/Creative commons



Twisted trunks, Pasvik, Norway.

Representative network of protected areas to conserve northern nature

The Barents Region, situated in the northern part of Europe and Northwest Russia, boasts one of the largest intact ecosystems remaining on Earth. The Barents Protected Area Network (BPAN) project promotes the establishment of a representative cross-border protected area network with a special focus on forests and mires in the region, say ANNA KUHMONEN and OLEG SUTKAITIS.

ANNA KUHMONEN is Senior Coordinator at the Natural Environment Centre of the Finnish Environment Institute and leader of the BPAN project.

OLEG SUTKAITIS is Head of WWF Russia's Barents Office and BPAN coordinator in Northwest Russia.

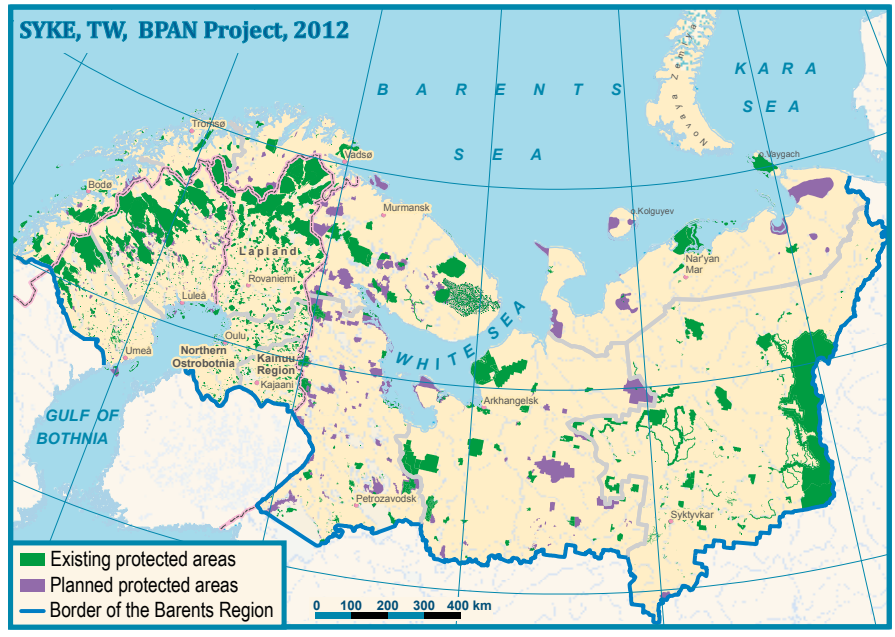
THE FOUR BARENTS COUNTRIES – Finland, Norway, Russia and Sweden – share similar challenges with respect to conservation of ecosystems. Due to increasing and often unsustainable use of natural resources – gas, oil, minerals, forests, peatlands and water resources – threats to the remaining wilderness areas continue to grow.

The biggest threats to the vulnerable boreal and arctic nature of the Barents Region are climate change and loss of biodiversity. The large forests and mires of the region have a significant impact on climate through the carbon cycle, and unique natural ecosystems represent a natural heritage of global significance.

Protected areas are important tools for biodiversity conservation as well as climate change adaptation and mitigation. A representative network of protected areas consists of diverse and well connected natural areas that safeguard biodiversity, support natural ecosystems and maintain ecosystem services.

By facilitating the establishment of such a network in the Barents Region, the project contributes to the Convention on Biological Diversity (CBD) target to significantly reduce the rate of biodiversity loss by 2020.

Barents Projected Area Network - BPAN



(c) The Norwegian Directorate for Nature Management (c) Finnish Environment institute, SYKE (c) ELY Centres (c) Lantmäteriet (c) Metsähallitus (c) Transparent World (c) Kola Biodiversity Conservation Center (c) The Karelian Regional Nature Conservancy (c) Arkhangelsk office WWF (c) Ministry of the Natural Resources and Environment

The project is running from 2011 to 2013, and focuses on implementing geographical information system (GIS) analyses and regional evaluations of a transboundary protected area network.

Five regional pilot projects are currently implemented in high conservation value areas threatened by human activities in Northwest Russia. These include Europe's largest old-growth spruce

Planned Khibiny National Park in Murmansk Region, Russia, has unique nature and is home to rare and endemic species.

forest "Dvisky" in Arkhangelsk Region and the old-growth pine forest "Jonn-Njygojaiv" in Murmansk Region (both of which are leased to forestry companies); the most important habitat of endangered wild reindeer in the Tsilma River basin in the Republic of Komi; valuable natural and cultural landscapes of the Zaonezhskye Peninsula in the Republic of Karelia; and developing biodiversity monitoring in the Niznepechorsky *zakaznik* in Nenets Autonomous Okrug. The overall aim of the pilot projects is to support the conservation of biodiversity in internationally significant sites of the Barents Region.

BPAN is coordinated by the Finnish Environment Institute in cooperation with WWF's Barents Sea Office. It is implemented by national and regional authorities, scientific institutions and NGOs in the Barents region, and funded by the Nordic Council of Ministers, the Ministries of the Environment of Finland, Norway and Sweden, and WWF-Russia's Barents Sea Office.

FOR BIODIVERSITY CONSERVATION, IT IS OF OUTMOST IMPORTANCE THAT THE CONNECTIVITY AND REPRESENTATIVENESS OF PROTECTED AREAS ARE PRESERVED.

WWF supports the BPAN project to ensure an international exchange of experience around common areas, common rare species, migration routes and conservation problems. This kind of cooperation will help avoid mistakes and create effective tools for management and development of protected areas for Finnish, Norwegian, Russian and Swedish decision makers.

For biodiversity conservation, it is of outmost importance that the connectivity and representativeness of protected areas are preserved. More analyses are needed to ensure this happens. BPAN recommendations will be published at the Barents Ministerial meeting in the autumn of 2013, and the results of this meeting will form the basis for the future work of the BPAN project. ○

Improving Alaska's wildlife conse

A National Landscape Conservation Cooperative (LCC) network has been developed in North America to promote landscapes capable of sustaining natural and cultural resources for current and future generations. The LCCs are helping to ensure that conservation science needs are addressed and shared. Better knowledge is an important key to developing appropriate conservation measures to threats posed to wildlife by climate change, especially in western Alaska where there is limited baseline information, say KAREN MURPHY and LISA MATLOCK.

THE LCC NETWORK was launched in 2010 by the US Department of the Interior Secretary Ken Salazar in recognition that climate change and other large landscape-scale stressors demand a greater level of coordination and collaboration across agencies, organizations and other partners interested in conservation and resource management. No one entity can provide the level of conservation that is needed in today's rapidly changing world. This is especially relevant in Alaska where unprecedented changes are taking place as the climate warms.

The LCCs were established as a national network of regionally applied conservation science partnerships and today consist of 22 self-directed partnerships that each address regionally relevant issues and needs. The network promotes collaboration among partners in defining and addressing shared science needs to inform broad-scale conservation. Partners retain their own mandates and decision making authorities, but the LCCs create an environment for collaboration and cooperation. The LCC system also seeks to improve the efficiency and effectiveness of applied science activities among partners to advance landscape level conservation efforts across Alaska.

The science needs for agencies and organizations in the huge and remote ecosystems of Alaska are great, and often overlap across organizations. Five LCCs cross the Alaskan landscape (and into Canada) from the Arctic to the north Pacific. While islands in the Bristol Bay area are included within the Aleutian and Bering Sea Islands LCC, the Western Alaska LCC encompasses the

Emperor geese.

Arctic tern.

Photos: FWS stock photos

ervation through applied science

mainland portion of the Bristol Bay region and extends north to Kotzebue and south along the Alaska Peninsula and Kodiak. This LCC focuses on climate change effects on terrestrial systems and terrestrial-marine associations. Since beginning almost two years ago, the Western Alaska LCC has formed a broad partnership for applied science through identifying and addressing science needs shared by federal, state, and tribal agencies and non-governmental organizations. The LCC is helping fill in the linkages from oceanographic system drivers to landscape processes to ecological and human systems.

COASTAL PILOT

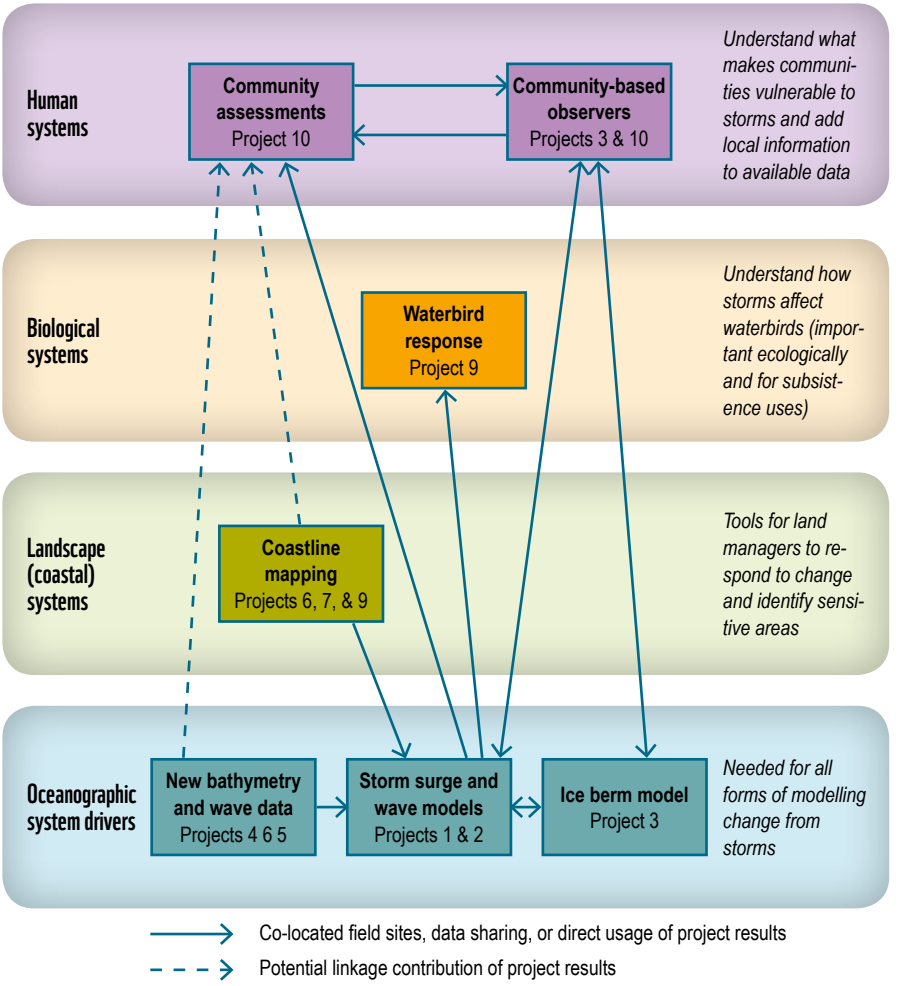
In 2012-2013, the Western Alaska LCC partnership is focusing on a pilot program theme of "Changes in Coastal Storms and Their Impacts". A second mini-pilot program has also begun on "Stream and Lake Temperature Monitoring". The suite of ten projects funded in 2012 address important shared science needs relating to coastal storms and their impacts, leverage existing efforts, and are coordinated to benefit a variety of partners (Figure 1).

Togiak coast.

Half of the recent Western Alaska LCC projects study 'system level' stressors. These projects provide a vital foundation for addressing important fish and wildlife management decisions, such as the impacts of storm surge inundation on the habitat of breeding waterfowl. Simultaneously, they address science needs of agencies less-focused on wildlife, such as the National Oceanic and Atmospheric Administration's interest in improving real-time storm

Figure 1

Relationships among 10 coastal pilot program projects funded by the Western Alaska LCC in 2012. Each box represents major topics and includes the corresponding project number(s). See www.arcus.org/western-alaska-lcc



LISA MATLOCK is the Outreach Specialist for the US Fish and Wildlife Service's Alaska Region Science Applications program based in Anchorage.

KAREN MURPHY is the LCC (Landscape Conservation Cooperative) Coordinator for the Western Alaska LCC; her position is funded through the US Fish and Wildlife Service on behalf of the partnership.

forecasting for western Alaska's communities.

The coastal projects cascade from basic oceanographic modeling to effects on wildlife and villages. One project is assessing the impact of reduced sea ice on storm surges and coastal flooding. This project incorporates the effects of sea ice, tide, wind-driven waves, and currents along western Alaska's coast and will eventually lead to more precise real-time predictions of storm surges. Moving to biological systems, a connected effort studies the relationships between flooding and progressive changes in waterbird abundance and nesting locations on the Yukon-Kuskokwim Delta. Human systems are also included in these projects. A network of western Alaska community members are being trained to collect coastal storm data through a project that builds on the climate change vulnerability assessments in Bristol Bay communities sponsored by the LCC in 2011. No one knows better how storms directly affect the western Alaska coast, and all of its inhabitants, than the people who live there.

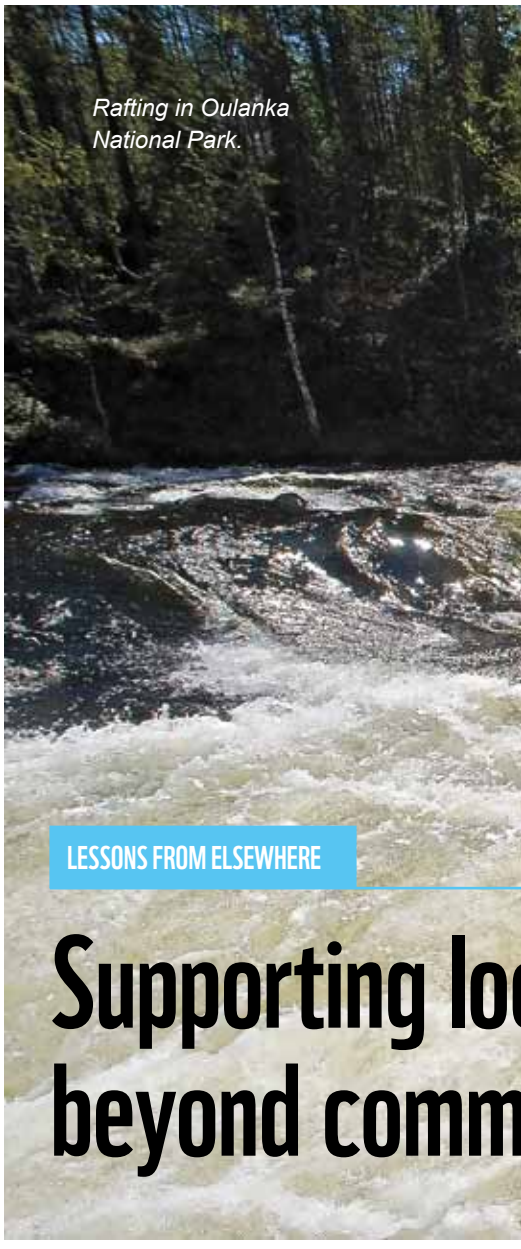
BETTER UNDERSTANDING

The tools and knowledge developed through these projects will help wildlife managers better understand how climate change may impact coastal wildlife populations. Identifying the potential changes now can enable managers to develop innovative methods to help manage wildlife populations as their habitats change. Some of the tools, like the three coastal mapping projects, will also help managers identify the most important coastal habitats so they can focus their protection efforts during oil spills or other disasters. Other projects will help to create and improve predictive models to assess the vulnerability of both wildlife and human communities to future storm surges. The coastal pilot program will continue through 2013 while the Western Alaska LCC completes its long-term strategic science plan. The mini-pilot program is being initiated with a workshop on stream and lake monitoring to identify key steps in understanding how climate is changing these important systems. Western Alaska LCC's long-term strategic science plan will begin to address future applied science needs for the region next year.

Managing wildlife, and its habitat and users, through the changes ahead requires better understanding of basic systems and their relationships in order to learn how we can adapt to future changes. The Western Alaska LCC seeks to fill at least some of these needs while connecting partners together for, ultimately, the most effective conservation we can deliver. ○

ABOUT 88 PER CENT of Alaska is in public ownership and many areas are set aside to protect their natural features including a wide variety of fish and wildlife habitats. These protected areas vary in their specific purposes and include 32 state wildlife refuges, sanctuaries, and critical habitat areas, and waters important to anadromous fish; as well as other areas such as state parks; and National Wildlife Refuges, National Parks, and Preserves. (Source: www.adfg.alaska.gov)

Photo: Paavo Hamunen.psd



Rafting in Oulanka National Park.

LESSONS FROM ELSEWHERE

Supporting lo beyond comm

Oulanka National Park in Finland joined the PAN Parks network 10 years ago. Since then the park has contributed to sustainable tourism and more job opportunities in the area, says ZOLTAN KUN.

CLOSE TO the Arctic Circle at the Russian border, where Taiga forests alternate with vast moors, lies what the Sami people call "the flooded land": Oulanka National Park. Oulanka is a climatic

cal development
odities

crossroads, where the Arctic and the southern climate collide and vegetation grows, untypically lush for the North. Rare species like the golden eagle and capercaillie, the bear and the lynx roam in the park. And in June the calypso orchid blooms, the emblem of Oulanka National Park.

In order to meet the target under the Convention on Biological Diversity to increase marine and terrestrial protection by 2020, most European countries have to take measures to establish new or enlarge existing protected areas. They will face real challenges in implementing this target unless further public support is gained, including from local communities.

WILD VALUES

PAN Parks, a European wilderness protection organisation which was established in 1999, offers an interesting opportunity to increase the number of protected areas while supporting the local economies. The foundation manages a network of protected areas that remains among the most undisturbed in Europe. While protecting essential wilderness attributes this network also offers opportunities for local entrepreneurs to benefit, aiming to add values to wilderness through non-extractive usages such as tourism. The PAN Parks network currently covers over 0.5 million hectares of existing wilderness in Europe.

Oulanka National Park joined the PAN Parks network in 2002. Although the area had already been protected before, the management authority wanted a tool to improve the local tourism potential. The international recognition by PAN Parks helped provide additional benefits and marketing for some of the local businesses, with convincing results.

Today more than 170,000 tourists visit Oulanka every year and the total annual income in 2010 was €14.7 million. This income is brought back into the communities in different ways, for instance through local salaries. 190 jobs have been created in this process, meas-

Photo: Paavo Hamunen.psd

Autumn wilderness in Oulanka National Park.

ured in full time positions per year.

PAN Parks is of course not the ultimate solution in itself. The concept of combining strict wilderness management principles with sustainable tourism only works if there is strong local consensus to work together. In the case of Oulanka National Park, the Finnish state-owned enterprise Metsahallitus managed to pull local municipalities and businesses together to form a local PAN Parks group, which agreed on a regional Sustainable Tourism Development Strategy. This strategy was crucial in establishing the first transboundary PAN Park, Oulanka / Paanajarvi, created in August 2012. Furthermore, there is now political will to strengthen wilderness conservation within the two management authorities, and enlarge the territory on the Russian side.

ZOLTAN KUN is Executive Director of PAN Parks, where he has overall responsibility for the operation of the foundation. He joined the PAN Parks initiative in 1997 and was appointed Executive Director in 2002 after working with PAN Parks for five years as Conservation Manager.

INCREASING THREATS

However there are also growing threats to this success story. Due to the increasing commodity prices, there is a current proposal to open a gold mine just at the border of Oulanka National Park. Mining activities consume large amounts of water and consequently cause large volumes of polluted wastewater. The mining company promises to create a few dozen jobs, which compared to the employment effect of tourism is minor. Conservation organisations, including PAN Parks, and local entrepreneurs are against the gold mining plan. The gold mining plans are currently undergoing an Environmental Impact Assessment, and there is hope that the plan will be withdrawn.

THE CONCEPT OF COMBINING STRICT WILDERNESS MANAGEMENT PRINCIPLES WITH SUSTAINABLE TOURISM ONLY WORKS IF THERE IS STRONG LOCAL CONSENSUS TO WORK TOGETHER.

We believe that PAN Parks can serve as an example and can encourage other countries and organisations to improve protection measures. Biodiversity continues to decline rapidly in Europe, even if a few species and ecosystems are recovering. Although European states have achieved substantial progress in the conservation of biodiversity, we believe that increasing the size of wilderness and wild lands is crucial to halting biodiversity loss in Europe. ○

The Natura 2000 network: where ecology and economy meet

Natura 2000 is a European Union success story. It is the biggest network of protected areas in the world, with more than 26,000 sites covering close to one million square kilometres of the European Union, says ALBERTO ARROYO SCHNELL.

TODAY, THE NATURA 2000 terrestrial areas cover around 18 per cent of the EU territory, exceeding the UN Convention on Biological Diversity's (CBD) goal of 17 per cent. The designation of marine sites is currently ongoing, with some good results. Germany has for example proposed to include 30 per cent of their marine Economic Exclusive Zone as a Natura 2000 area.

Moreover, Natura 2000 is also an NGO success. Over the past 15-20 years key European environmental NGOs, including WWF, have invested a lot of time and effort to make this project a reality, and are still working intensively to ensure its implementation.

So what lessons could be learnt from these experiences?

Natura 2000 is a legal obligation for all the members of the European Union - all EU nations have to follow the same approach to ensure the long-term survival of Europe's most valuable and threatened species and habitats. This means that it has become a truly international network of protected areas, a unique common continental conservation effort in 27 countries.

SCIENTIFIC SELECTION, FLEXIBLE MANAGEMENT

A particular characteristic of this network is that the selection of the sites is strictly based on science. No politics or socio-economic interests are included in the discussions. The creation of the network is therefore not just a recognition and acknowledgment of the natural values of Europe, but it also serves as an inventory of its most important areas for habitats and species.

At the same time, Natura 2000 is not a system of nature reserves, in which all human activities are excluded. The emphasis is on ensuring a future where land management is sustainable both ecologically and economically. In practice, economic activities with potentially negative effects on the sites will follow an evaluation process. This determines if such an activity can be carried out. When there are no alternatives, compensatory measures should be put in place, otherwise the evaluation process will conclude that the activity should not take place as it was planned. For instance, the Polish "Via Baltica" highway was re-routed as the route chosen did not consider the Natura 2000 network adequately.

FINANCIAL CHALLENGE

The cost of the management of Natura 2000 has been estimated by the European Commission and EU member states to be minimum €5,8 billion per year. This is a very small figure compared to the benefits which flow from the network, estimated by the European Commission to €200-300 billion per year. This includes estimates of carbon sequestration and storage, water provision and purification, national hazards prevention, tourism and recreation. Currently there isn't a specific fund for financing Natura 2000, but all the relevant EU funding sources (including the European Agriculture and Rural Development Fund, the European regional Development Funds, the European Fisheries Fund and the European Environmental Fund) can be drawn upon. However, to ensure that all financing needs of Natura 2000 are covered is the biggest challenge ahead and EU member states are at the moment developing national planning documents to define how to cover these costs from EU and national funds.

Despite the financial challenges, to which innovative solutions currently are being applied – including the development of national and regional planning tools – the Natura 2000 network is a success story on many levels. The factors referred to above related to scientific selection, flexible management and the compulsory legal nature of the protection regime could be elements to take into account for related developments in other regions in the world. ○

ALBERTO ARROYO SCHNELL works as Biodiversity Policy Advisor for WWF's European Policy Office where he has been since 2011, previously working as WWF's Natura 2000 Coordinator since 2005. He is responsible for the European biodiversity policy portfolio, and coordinates WWF's European network on biodiversity related issues. He is a forestry engineer, specialized in protected areas management and implementation.

Development of an ecological network approach in the Caucasus

Strategic planning, broad and multidisciplinary expert involvement, and transboundary collaboration are among the ingredients behind the success of the ecological network approach in the Caucasus, explains CRISTIAN MONTALVO MANCHENO.

THE CAUCASUS ECOREGION spans over the entire territories of Armenia, Azerbaijan and Georgia, the north Caucasus part of the Russian Federation, the northeastern territory of Turkey and part of northwestern Iran. It is one of the most biologically rich regions within the temperate zone in the northern hemisphere: the Caucasus Ecoregion is one of WWF's 35 Priority Places and Conservation International's 34 Biodiversity Hotspots. Furthermore, the Caucasus Ecoregion is an important centre of cultural diversity, including 28 ethnic groups with different languages and religions.

Since the beginning 12 years ago, the conservation of the Caucasus Ecoregion was thought of as a strategic planning process driven by species and supported by experts' knowledge – represented by governmental organizations, NGOs and scientific institutions. It started by identifying large-scale valuable areas for conservation, and it has moved on to more detailed analyses to set aside new protected areas (PAs) and identify paths that will ensure persistence of Caucasus' biodiversity. In general, this process can be divided into three stages.

Caucasus Ecoregion

Priority conservation areas and corridors.

ROADMAP FOR CONSERVATION

The first stage was to identify important taxon areas, using 70 model species from all major taxa selected by experts from the six countries of the Caucasus Ecoregion. As a result, 260 important taxon areas were identified, which included 60 for plants, 29 for mammals, 121 for birds, 28 for amphibians and reptiles, and 22 for fish. They constituted the basis for the second stage, on which valuable conservation areas were selected.

Experts identified and selected 56 priority conservation areas (PCAs) where

Photo: WWF-Caucasus Programme Office

Baghdadi, Georgia, at the northwest corner of Borjomi Kharagauli National Park.

urgent conservation measures were needed, and 60 corridors that sought to guarantee the connectivity between PCAs. As a result of this work, a road map for the conservation of the Caucasus' biodiversity, called the Ecological Conservation Plan (ECP), was born in 2006. Recently, an updated version has been released in light of the 2020 targets under the Convention on Biological Diversity (CBD).

CROSS-BORDER COOPERATION

A multitude of activities has been carried out in the region as part of the implementation of the ECP, ranging from habitat restoration to development of sustainable activities within and outside PAs across the region. These activities aim to contribute to the maintenance of ecosystem integrity and the sustainable use of natural resources, which are important elements of ecological networks.

The development of Caucasus' ecological networks has focused on both improving the management of existing PAs and increasing the area under legal protection. Most of the new PAs have been created within PCAs that cross country borders, as a way not just to ensure the conservation of biodiversity but also to promote transboundary collaboration in a part of the world where territorial issues still exist. Lake Arpi National Park in Armenia and Javakheti National Park in Georgia are a good example of a transboundary PA, where the Armenian and Georgian governments have agreed to coordinate their management with the purpose of creating a common vision and objectives, and implementing joint programmes. Clear plans for transboundary cooperation also exist along the borders of Turkey-Georgia, Azerbaijan-Georgia, and Armenia-Iran.

PILOT STUDY

As conservation activities have reached a tipping point where more detailed planning information is needed, WWF has initiated the third stage of conservation efforts. A pilot study that started two years ago is being carried out in the transboundary (Georgia-Turkey) priority conservation landscape of the Western Lesser Caucasus. The study seeks to generate necessary background information and will help gain insight into the local planning processes so when initiated in other parts of the Caucasus, the process has been adapted and improved according to the reality of region.

This pilot study is being developed using GIS tools for biodiversity at a finer planning scale. Another crucial and even more important piece of this work, which will start in the upcoming year, covers generating information on socio-economic issues, developing effective means for sharing information across the stakeholder spectrum, and creating incentive mechanisms that will help engage local populations into the process of corridor establishment. Due to this finer planning scale and multidisciplinary work, this challenging approach requires not just reliable information and coordination of efforts between all stakeholders, but also substantial donor support during longer periods of time than traditional programmes do. ○

ACTIVITIES AIM TO CONTRIBUTE TO THE MAINTENANCE OF ECOSYSTEM INTEGRITY AND THE SUSTAINABLE USE OF NATURAL RESOURCES.

CRISTIAN MONTALVO MANCHENO is from Ecuador and did his Master of Science at the University of Idaho, USA, focusing on ecotourism as a mechanism for financing PAs. He has been in Georgia for the last three years where he is doing a PhD on natural resource management at Ilia State University, focusing on GIS design of ecological corridors in the Georgian part of the West Lesser Caucasus Mountains. He also works as a freelance consultant for the WWF-Caucasus Programme Office in projects related to biodiversity and sustainable development.

A Pan-Arctic Ecological Network: the concept and reality

Protected areas represent the most common, traditional and familiar approach to in-situ conservation. But the traditional approach will not be sufficient for a rapidly changing Arctic, says ALEXANDER SHESTAKOV, who argues that a representative, resilient and effective Pan-Arctic Ecological Network now needs to be developed.

PROTECTED AREAS (PAs) can be an efficient conservation tool, and are an essential element of spatial planning and territorial management. They will no doubt remain critical elements of conservation all over the world's landscapes and seascapes.

ALEXANDER SHESTAKOV is Director of WWF's Global Arctic Programme. He has a law degree and a PhD focused on environmental management and conservation and has previously worked for academia, NGOs, government and industry. He has been an expert to the Russian Parliament on environmental law, and member of official Russian delegations to the Convention on Biodiversity and the Convention on International Trade in Endangered Species.

At the same time, many traditional PAs continue to be "conservation islands" in an ocean of increasing human development and no or insufficient – or inappropriate – management regimes. Separated or isolated individual PAs are more vulnerable to various threats, including climate change, and are therefore often less effective in delivering conservation results.

ECONET

To address some of these issues the concept of *ecological networks* (econet) was developed 30 years ago and has subsequently been successfully promoted and implemented in different parts of the world (such as Europe, South America, Central Asia). The Pan-European Ecological Network, including Natura 2000 which is described elsewhere in this edition is a classical example. However, similar to what is the case for PAs, econets are still predominantly terrestrial phenomena.

Ecological networks are designed to strengthen ecological stability and resilience of large ecosystems and allow for sustainable provisioning of a wide range of ecosystem services. Properly designed, implemented and managed, econets may become strong effective conservation backbones of the landscape/seascape.

MANY TRADITIONAL PAS CONTINUE TO BE "CONSERVATION ISLANDS" IN AN OCEAN OF INCREASING HUMAN DEVELOPMENT AND NO OR INSUFFICIENT – OR INAPPROPRIATE – MANAGEMENT REGIMES.

An important feature of an ecological network – which makes it different from a protected area – is the combination of classical protected areas (as core zones) together with areas under other management regimes. In this way, an econet is open for some economic activities, and does not preclude sustainable activities or exclude people.

ARCTIC CHALLENGES

In the Arctic up to 14 per cent of the territory belong to PAs of various categories, including very few marine areas. Despite a request in 2004 by the Convention on Biological Diversity programme of work on protected areas to ensure protected area system gap analyses at national and regional levels, there is still no comprehensive picture for the entire Arctic. Existing PAs were established by arctic nations without an overall analysis of pan-arctic conservation needs and representativeness on a pan-arctic scale, and do not fully address resilience needs and current rapid changes in the region.

The last decades have brought new threats and challenges to arctic ecosystems. Current network of PAs and similar conservation areas are unlikely to be able to adequately address these challenges.

An arctic econet would combine clus-

ters of different management regimes, linking areas with classical protected area status to areas that are managed to ensure overall ecosystem resilience and provisioning of ecosystem services to communities. Such a combination of stricter protection for the most valuable elements with management regimes for supporting zones will provide for ecological stability of the wider landscapes/seascapes by ensuring:

- Additional benefits for conservation through linking essential areas together (for example calving and feeding areas and migration routes for reindeer), guaranteeing full representativeness at ecosystem and species level;
- Stronger resilience towards various external threats (including processes related to human infrastructure and socio-economic systems);
- Long term benefits to local communities and the global community through ecosystem services and sustaining essential living resources;
- Opportunities to continue traditional land use practices;
- Opportunities for co-management between local communities.

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An econet does not preclude sustainable activities or exclude people. Here Inuit kids in front of their house, Scoresbysund, Ittoqottormiit, NE Greenland National Park.

CRITICAL STEPS

An arctic econet – a Pan-Arctic Ecological Network – needs to be properly designed in order to be representative, resilient and effective. This will require several critical steps:

- Full gap analysis of existing systems of protected areas and other conservation areas, as well as areas with special management regimes in the Arctic for terrestrial and marine realms. This analysis should fully incorporate ecosystem resilience assessments, ecosystem services analyses and adaptation measures to climate change;
- Full analysis of legal instruments available in the Arctic at local, national and international levels for various management forms related to econet functional elements (core zones, buffers, corridors);
- Consultations with Indigenous communities and stakeholders to agree on specific management/conservation regimes for every identified element;
- Consideration of econet scheme proposals by appropriate authorities;
- Full incorporation of econet elements into territorial plans/schemes;
- Effective management, monitoring and control of econet elements.

The two first steps could be developed in partnership between arctic experts and governments under the umbrella of the Arctic Council CAFF working group, using its expertise and significant data collated during previous years with contribution from other working groups (in particular PAME on marine areas of heightened ecological and cultural importance). This will be a good practical implementation of important data collected through CAFF projects and activities. The subsequent steps should then be taken by arctic governments in consultation and cooperation within the Arctic Council processes.

PROPERLY DESIGNED, IMPLEMENTED AND MANAGED, ECONETS MAY BECOME STRONG EFFECTIVE CONSERVATION BACKBONES OF THE LANDSCAPE/SEASCAPE.

Fundamentally a Pan-Arctic Ecological Network is not about creating hundreds of new parks and other PAs. It is rather about addressing the new challenges and threats to ecosystems, through ensuring further scientific knowledge about the Arctic, identifying proper management regimes that can support sustainable and long term socio-economic development and prosperity of local communities, and linking together and strengthening existing PAs and other territorial conservation measures. Only by doing this can we guarantee the long term provisioning of essential ecosystem services locally and globally, and build resilience in the rapidly changing Arctic. ○

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THE PICTURE

The largest national park in the world

Photo: Rita Willaert. Flickr/Creative commons

NORTHEAST GREENLAND NATIONAL PARK is the largest national park in the world, with an area of 972,000 km^2. This makes the park larger than most countries and would place it 31st if it were a country, just behind Egypt. It is the only national park in Greenland and is also the most northerly national park in the world.

The park encompasses the entire northeastern coastline and interior sections of Greenland. It was originally created in 1974 and expanded to its present size in 1988. The park has no permanent human population. An estimated 5,000 to 15,000 musk oxen, as well as numerous polar bears and walrus, can be found near the coastal regions of the park. Other mammals include arctic fox, stoat, collared lemming and arctic hare, in addition to various seals, narwhal and Beluga whale.

(Source: Wikipedia)

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Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

www.panda.org/arctic