WWF
MAGAZINE
No. 4
2014

THE CIRCLE

PROTECTING THE ARCTIC GARDEN

PUBLISHED BY THE WWF GLOBAL ARCTIC PROGRAMME

Contents

The Circle is published quarterly by the WWF Global Arctic Programme. Reproduction and quotation with appropriate credit are encouraged. Articles by non-affiliated sources do not necessarily reflect the views or policies of WWF. Send change of address and subscription queries to the address on the right. We reserve the right to edit letters for publication, and assume no responsibility for unsolicited material.

Publisher:
WWF Global Arctic Programme
8th floor, 275 Slater St., Ottawa, ON, Canada K1P 5H9.
Tel: +1 613-232-8706
Fax: +1 613-232-4181

Internet: www.panda.org/arctic

ISSN 2073-980X = The Circle

Date of publication:
Oct., 2014.

Editor in Chief: Clive Tesar, CTesar@WWFCanada.org

Managing Editor: Becky Rynor, brynor@uniserve.com

Design and production:
Film & Form/Ketill Berger, ketill.berger@filmform.no

Printed by St. Joseph Communications

COVER: Sea ice over the Beringian Canyons has delivered shore stones far offshore. These "drop-stones" works as attachment anchors and cover for creatures in the deep canyons.
Photo: Michelle Ridgway.

ABOVE: Young golden king crab.
Photo: Michelle Ridgway.

Thank you for your interest in The Circle. Many of our subscribers have moved to an e-version. To receive an electronic copy in your email instead of a paper copy, please write to us at gap@wwfcanada.org and help us reduce our costs and footprint.

Healthy oceans, healthy peoples

THE ARCTIC OCEAN with its rich resources, diverse seas and extensive coastline is unquestionably one of the most valuable and fragile of the world's marine places. So it is no coincidence that WWF is focusing its collective efforts on playing a very active and constructive role in conserving the natural resources of the Arctic. At the same time, WWF's marine program is squarely focused on protecting and restoring marine ecosystems to support human well-being. The Arctic is clearly one of the most important of these.

As the contributors to this edition of *The Circle* underscore, the Arctic Ocean has so many places and features that require conservation: places where people harvest for their livelihoods; places that birth amazing bursts of productivity and places that are essential for the continued well-being of Arctic species. They are also places that are facing change that is unprecedented in its rate and extent. Some of this change is driven by global climate change. This cannot be effectively altered on a local basis, but there can be effective local responses. However there are challenges in these responses. As Jan Gunnar Winther and Dag Vongraven point out, the marginal ice zone that is the most productive area in the ocean is also a moving target from year to year. As the summer sea ice cover continues to diminish in extent and duration, where and when these important places will be from year to year will vary, so traditional static protection responses will not be effective.

As several contributors note, the legal framework in the Arctic is also a challenge. Lacking regional marine agreements, there is no mechanism to enact conservation measures in parts of the Arctic Ocean beyond national jurisdiction. Kamrul Hossain suggests this is an omission that could be tackled by the Arctic Council.

So where are these areas in the Arctic that require conservation? As noted, some are moving targets, and will require imaginative responses. But others can be tackled with a more traditional approach. Eduard Shirkov writes that the natural resource values of the West Kamchatka shelf require a zoning approach for protection, or those values will be significantly degraded. Parnuna Egede makes the case for conservation of the North water Polynya, a large winter area of open water between Canada and Greenland.

While we do well understand some of the values and places that require conservation measures, there's also value in continuing to invest in understanding and prioritizing parts of the marine environment. The Aleut International Association project outlined in this edition shows one useful approach in mapping traditional use of the marine environment by Indigenous peoples. Dr. Nengye Liu outlines another approach through the Convention on Biological Diversity (CBD) of identifying Ecologically and Biologically Sensitive Areas in the marine environment. Jake Rice provides a useful overview of how this process worked in Arctic Canada.

THE ARCTIC MARINE ENVIRONMENT CURRENTLY COVERED BY FORMS OF PROTECTION IS A TINY FRAGMENT

The Arctic marine environment currently covered by forms of protection is a tiny fragment: a buffer zone around Russia's Wrangel Island and some other small marine extensions of onshore protected areas; a bowhead whale sanctuary in Canada; some areas in Norway and United States that have been temporarily withdrawn from offshore oil and gas exploitation. Most Arctic nations have agreed to protect 10% of coastal and marine areas by 2020. In looking to meet those targets, the Arctic would be a good place to start. ○

JOHN TANZER is the Director of WWF International's Global Marine Programme.

Illegal fishing threatens Russian Crab stocks

CRAB STOCKS in the Russian Far East are at risk of collapse due to overharvest from rampant illegal fishing, a new WWF report shows. An analysis of more than 10 years of trade and customs data reveals major discrepancies between the reported amount of crab caught in Russian waters and the amount imported into receiving countries, including the US.

"There's a good chance that the king or snow crab Americans are dining on is from Russia, and it could be illegal," says Michele Kuruc, WWF-US vice president of marine policy.

The study shows that during that period, between two to four times the legal harvest limit has entered the global marketplace.

"The magnitude of illegal crab fishing threatens the long-term sustainability of the fishery and puts the western Bering Sea marine ecosystem at risk," Kuruc says. "The US is likely importing large quantities of crab and other seafood which may have been illegally caught. The problem is the US is unable to say how much is illegal. Without the ability to verify, the US is unwittingly helping to perpetuate these illegal activities."

The report, *Illegal Russian Crab: An investigation of trade flow* provides a comprehensive look at illegal Russian crab entering the global market, including the US. The report also describes how overharvesting affects the North Pacific region, which supplies around half of the annual seafood catch for the US and Russia.

According to Russia's domestic trade data, the crab fishery stays within its legal harvest limits and does not export more than is caught. But this new report indicates that the illegal crab harvest amount has been at least double, in some years quadruple, the legal harvest amount in the last decade.

"Russia cannot solve this problem without cooperation from buyers of Russian seafood," said Konstantin Zgurovsky, the head of the WWF-Russia marine programme. "We need better port control and a transparent, international monitoring system of fishing activity and seafood trade. Otherwise, we may lose stocks of our most valuable species like crabs." The report can be downloaded at: http://wwf.panda.org/what_we_do/where_we_work/arctic/?231010/Illegal-Russian-crab-entering-US-market

Photo: Hector Abouid, Flickr.com

The king crab on your plate may be illegally caught.

Expedition pioneers technique for polar bear research

A TEAM OF FRENCH scientists working with WWF has for the first time isolated polar bear DNA from a track left in the snow. The scientists from DNA specialist firm SPYGEN looked at two samples from polar bear tracks collected earlier this year during the WWF-Canon and Norwegian Polar Institute expedition to Svalbard.

"The results are really exciting," says SPYGEN project lead Eva Bellemain. "This is the first time we have been able to extract DNA from a track left by a polar bear – we found not only the bear's DNA, but also that of a seal and a seagull. We know from observations by the WWF team that the bear in ques-

tion had just killed a seal, and that seagull had been seen at the kill site too. This one footprint tells the whole story."

WWF's Arnaud Lyet says in a rapidly changing environment like the Arctic, maintaining current information on polar bear populations is a costly challenge.

"This method would be an invaluable tool for conservation biology," he says. "At present, researchers use expensive, invasive techniques to track the population size and health of wildlife such as polar bears. Using footprint DNA, we could dramatically cut the investment required, so monitoring populations could be done more easily."

The team now hopes to refine its analysis of the bear DNA, so it can tell more about the animal. It also intends to see if the method can be applied to other rare or difficult to access wildlife.

Acknowledgement

THE ARTICLE by Olav Schram Stokke in the previous edition of The Circle, *Asia in the Arctic*, (#3, 2014) was an abridged, updated version of his article 'The Promise of Involvement: Asia in the Arctic', *Strategic Analysis,* 37 (2013), pp. 474–479. That article is available at www.tandfonline.com/doi/abs/10.1080/09700161.2013.802520

Photo: Bemep, Flickr.com

Queen angelfish heading for the Arctic.

Fish moving poleward

A STUDY by the University of British Columbia, Canada, predicts large numbers of fish will disappear from the tropics by 2050. The study examined the impact of climate change on fish stocks, identifying ocean hotspots for local fish extinction. But it also found that changing temperatures will drive more fish into Arctic and Antarctic waters.

Using the same climate change scenarios as the Intergovernmental Panel on Climate Change, researchers projected a large-scale shift of marine fish and invertebrates. In the worst-case scenario, where the Earth's oceans warm by three degrees Celsius by 2100, fish could move away from their current habitats at a rate of 26 kilometres per decade. Under the best-case scenario, where the Earth warms by one degree Celsius, fish would move 15 kilometres every decade. This is consistent with changes in the last few decades.

"The tropics will be the overall losers," says William Cheung, associate professor at the UBC Fisheries Centre and co-author of the study published in *ICES Journal of Marine Science*. "This area has a high dependence on fish for food, diet and nutrition. We'll see a loss of fish populations that are important to the fisheries and communities in these regions."

Cheung and his colleague used modeling to predict how 802 commercially important species of fish and invertebrates react to warming water temperatures, other changing ocean properties, and new habitats opening up at the poles.

"As fish move to cooler waters, this generates new opportunities for fisheries in the Arctic," says Miranda Jones, lead author of this study. "On the other hand it means it could disrupt the species that live there now and increase competition for resources."

Dr. **JAN-GUNNAR WINTHER** is a hydrologist and director of the Norwegian Polar Institute.

DAG VONGRAVEN is a biologist and senior adviser at the Environmental and Mapping Department of the Norwegian Polar Institute. He also chairs the IUCN/SSC Polar Bear Specialist Group.

Foto: Chase Dekker, Flikr.com

THE SEA ICE ZONE:

Where the ocean blooms

The ice edge is rarely a neat line. Rather, it comprises a dynamic zone of varying degrees of ice cover between open water and 100 per cent ice cover. Dependent on current and wind conditions, it can change from being a fairly narrow, well-defined edge, to a swath of ice floes tens of kilometres broad. It is in constant motion, moving north- or southwards during the seasons. Dr. JAN-GUNNAR WINTHER and DAG VONGRAVEN say this zone of high biological production, here called the Sea Ice Zone*, is particularly vulnerable to human impact. In addition to its role in moderating regional and global climate, sea ice needs to be taken into consideration when assigning new licenses for oil and gas prospecting in the Barents Sea. ➤

* The Sea Ice Zone is the entire dynamic zone between open water and 100% ice cover, where there is an increased ecological vulnerability.
The Marginal Ice Zone (MIZ) refers to the outer part of the greater Sea Ice Zone, and is the part that is affected by the physical processes in open water

Polar bear on melting ice.

Pod of Beluga whales.

Photo: Ansgar Walk, Wikimedia Commons

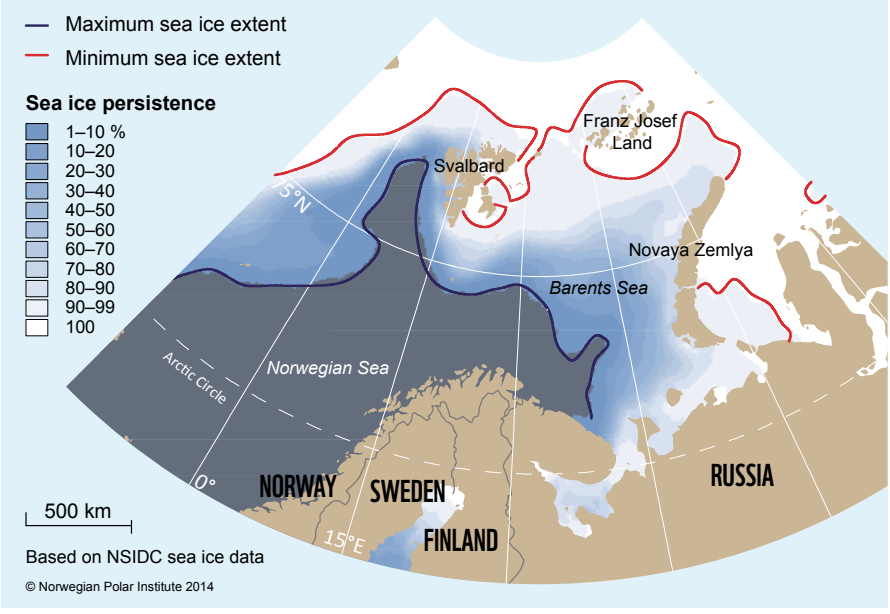
AN IMPORTANT AND VULNERABLE GARDEN

For a few weeks in spring, the Sea Ice Zone becomes a hotbed of primary production, a blooming garden of plant plankton and ice algae. Zooplankton feed on these, and they in turn are prey for larger animals. From its outer edge and throughout the area where the light penetrates the ice cover, the Sea Ice Zone is more ecologically vulnerable than other parts of the ocean.

Primary production takes place across the world's oceans, but nowhere is it as concentrated in time and space as in the Sea Ice Zone. A more predictable and denser patch of food than the open ocean, the Sea Ice Zone is an important feeding ground for a variety of animals, including ivory gulls, ringed seals, polar bears, narwhals, beluga and bowhead whales. Some of these are nationally or internationally protected and/or endangered species. The area provides crucial habitats and foraging areas for other key species in the Arctic ecosystem, such as capelin and polar cod, which are prey for other species of marine birds and mammals. It is also an important resting place for migrating species of marine birds and mammals – a biological hot spot.

Sea ice persistence, April 1984-2013

Map showing maximum and minimum sea ice extent in the month of April in the years from 1984 to 2013, as well as ice persistence in 10% increments. Ice persistence is the frequency of April days with ice concentration greater than 15% in any given pixel/area in the material the maps are based on.

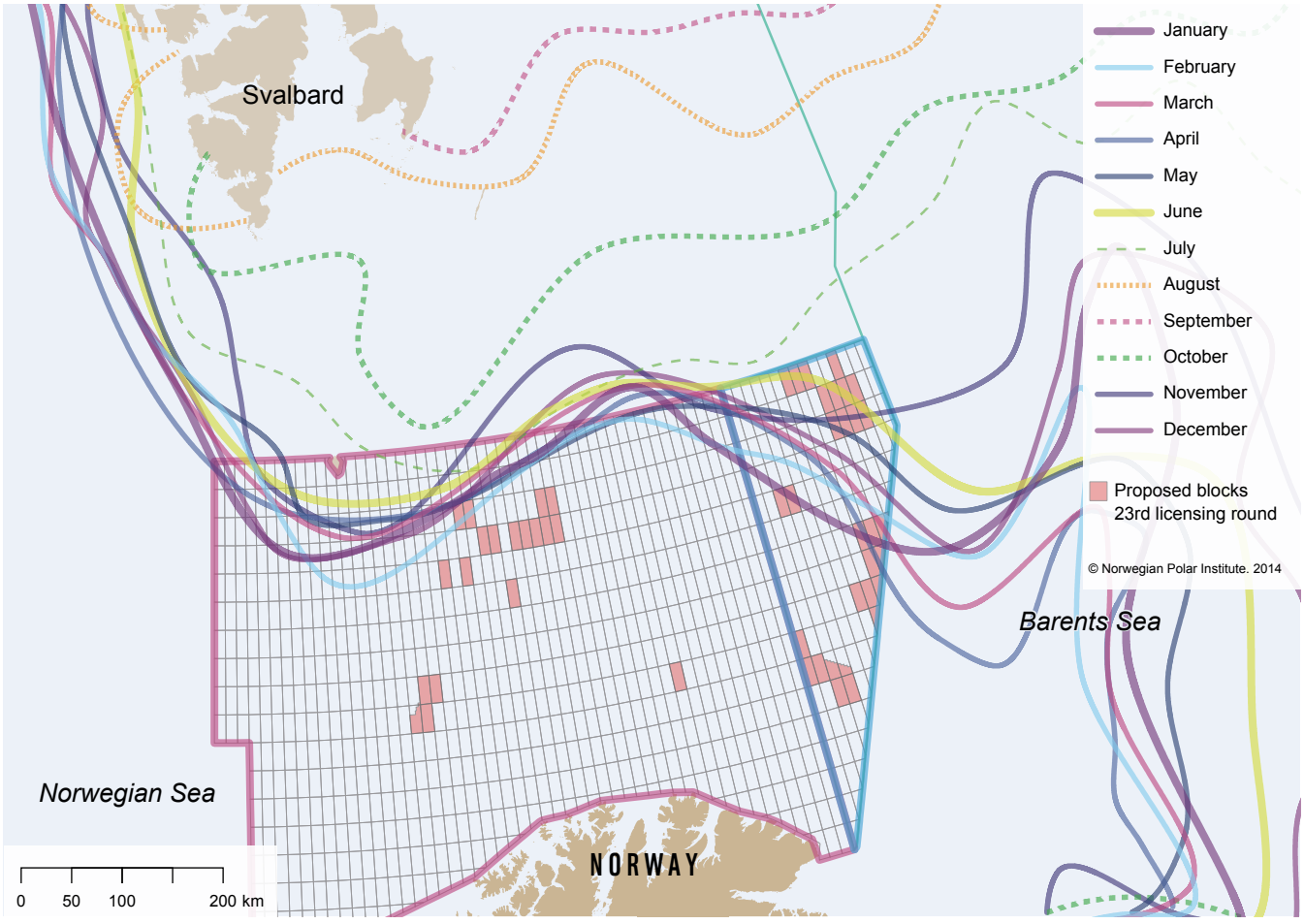


A CHALLENGE FOR MANAGING THE ARCTIC

Many environmental values vary in time and space, as does the sea ice. Properly managing dynamic systems such as ice-covered waters is a substantial challenge. Diminishing sea ice presents opportunities for the expansion of human activities in the Arctic in the near future. Human influence may negatively affect stocks and populations of many Arctic species. Contributing to the integrated, knowledge-based management of the region, the Norwegian Polar Institute has recently assembled

Maximum and minimum sea ice extent 1984-2013

Monthly maximum sea ice extent for the period 1984-2013. Suggested licenses in the 23rd licensing round are shown as squares on the map



statistics on sea ice conditions in the Barents Sea and described the vulnerability of this area. The Institute also provides knowledge on ecosystems and physical conditions in the Arctic, including sea ice. It has described this zone based on satellite monitoring of the ice cover for the last 30 years (1984-2013) and produced maps to show variations in the timing and location of sea ice during each month of the year.

FOR A FEW WEEKS IN SPRING, THE SEA ICE ZONE BECOMES A HOTBED OF PRIMARY PRODUCTION, A BLOOMING GARDEN OF PLANT PLANKTON AND ICE ALGAE

The 23rd licensing round for oil and gas prospecting in the south-eastern part of the Barents Sea opens the door for petroleum activities further northwards than ever before. In a consultative statement to the Norwegian authorities, the Norwegian Polar Institute has pointed out the vulnerability of this region on account of the seasonal presence of sea ice and a general lack of knowledge of the area and its variability. The proposed hydrocarbon exploration areas will be closer to vulnerable seabird colonies on the island of Bjørnøya (Spitsbergen archipelago), closer to the maximum extent of sea ice, overlapping the Polar Front*, in the south-eastern part of the Barents Sea and partly within areas which have been defined as particularly valuable and vulnerable in the Integrated Management Plan for the Norwegian Part of the Barents Sea and the Areas outside Lofoten.

The Institute has also highlighted the need for increased preparedness for oil spills and other accidents in the region. ○

* The polar front is a physical density gradient in the water column defined by temperature and salinity. It influences current patterns in the area and it is itself influenced by surface ice melt (fresh water release) and to some extent bottom topography. Through current patterns it may cause upwelling of nutrients and at the right time of the year this stimulates production.

Working within and beyond national waters

The Arctic is home to more than 21,000 known species of highly cold-adapted mammals, birds, fish, invertebrates, plants and fungi including lichens, plus tens of thousands of microbial species. But NENGYE LIU warns climate change is inducing an ecosystem regime shift in some areas, resulting in a very different Arctic species composition.

Summer temperatures in the Arctic in recent decades have been warmer than at any time in the past 2000 years, with the region warming twice as fast as the rest of the planet. Arctic summer sea ice cover, particularly the amount of multi-year ice, is decreasing at an accelerating rate leading to increased human activities such as fishing, navigation and extractive industries within this fragile environment.

Dr. **NENGYE LIU** is a Marie Curie Fellow at the School of law, University of Dundee, United Kingdom. His current research focuses on the European Union and the protection of marine biodiversity in the Arctic.

Protected areas have been described by the Convention on Biological Diversity (CBD) as an important means to achieve conservation gains. The IUCN defines a marine protected area (MPA) as: "any area of the intertidal or sub tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features which has been reserved by law or other effective means to protect part, or all, of the enclosed environment". The Convention is in agreement that by 2020, at least 10 per cent of the world's coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, should be conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures. As of 2010, 11 per cent of the Arctic, about 3.5 million km², has protected status in 1127 protected areas. Over 40 per cent of Arctic protected areas have a coastal component but for the majority of these areas it is not possible to determine the extent to which they incorporate the adjacent marine environment. Therefore, the question is how to establish MPAs in the Arctic Ocean.

In 2008 in Bonn, Germany, the 9th meeting of the Conference Parties of the CBD (COP 9) adopted a set of seven scientific criteria to identify ecologically and biologically significant areas (EBSAs) in the global marine realm. These include:

- Uniqueness or rarity
- Special importance for life-history stages of species

PROTECTED AREAS HAVE BEEN DESCRIBED BY THE CONVENTION ON BIOLOGICAL DIVERSITY AS AN IMPORTANT MEANS TO ACHIEVE CONSERVATION GAINS

Photo: Peter Prokosch, www.grida.no/photolib

Fulmar Franz Josef Land, Russian Arctic National Park. The park is of high importance for Arctic marine mammal populations and hosts one of the largest bird colonies in the Northern Hemisphere.

- Importance for threatened, endangered or declining species and/or habitats
- Vulnerability, fragility, sensitivity, or slow recovery
- Biological productivity
- Biological diversity
- Naturalness

In 2010, COP 10 noted that the application of the EBSA criteria is a scientific and technical exercise, that areas found to meet the criteria may require enhanced conservation and management measures, and that this can be achieved through a variety of means, including MPAs and impact assessments. A regional EBSA Workshop for the Arctic took place in Helsinki, Finland from 3-7 March 2014. The workshop described 11 areas meeting the EBSA criteria, of which 9 areas were within the national jurisdiction of the Russian Federation. According to United Nations Convention on the Law of the Sea (UNCLOS), waters within 370 kilometres (200 nautical miles) of shore make up exclusive economic zones (EEZs) of Arctic coastal states (US, Russia, Canada, Norway and Denmark/Greenland). Within EEZs, only coastal states are entitled to establish MPAs. One example is the U.S., which has adopted a closure of commercial fishing in its waters north of the Bering Strait until there is appropriate scientific understanding and management in place. The moratorium prohibits commercial fishing in all marine areas in the American EEZs of the Chukchi and Beaufort seas.

But beyond EEZs there are high seas in the Arctic Ocean. To date, there is no international legal regime that provides for cross-sector MPAs on the high seas. The lack of a regime addressing biodiversity in areas beyond national jurisdiction has already been identified by the international community and, during the UN Conference on Sustainable Development (Rio+20), states committed, on an urgent basis, to addressing the issue. The agreement to act included a commitment to taking a decision on the development of an international instrument under UNCLOS, before the end of the sixty-ninth session of the UN General Assembly to address biodiversity in areas beyond national jurisdiction. If the new implementing protocol of the UNCLOS can be adopted in the foreseeable future, it will provide a solid legal basis for the establishment of MPAs in the Arctic high seas, particularly in the central Arctic Ocean. ○

Across the Kane Basin.

Photo: Mads Peter Heide Jørgensen

THE NORTH WATER POLYNYA

"The great upwelling"

The North Water polynya in Baffin Bay is a huge stretch of open water surrounded by ice between Canada and Greenland. This key wintering area attracts abundant numbers of marine mammals such as polar bears and narwhals and numerous seabirds. The mixing of water currents originating from the Atlantic and Pacific causes the upwelling of nutrients to the surface. This triggers plankton blooms, which in turn boost the rest of the food web. PARNUNA EGEDE says Inuit communities are calling for a commission to consult on the protection and future use of this extraordinarily productive polynya.

WHAT MAKES this polynya one of the most biologically productive in the Arctic is the formation of an ice bridge in Kane Basin north of the polynya. It blocks the otherwise constant flow of sea ice from the Arctic Ocean. When the ice bridge is absent, productivity is much lower. But formation of this ice bridge occurs less frequently now due to climate change.

PARNUNA EGEDE is the Advisor on Environmental Issues for the Inuit Circumpolar Council-Greenland

The ice bridge is not only important biologically, but also historically. It served as an actual bridge for the earliest immigration and settlement of human populations from North America to Greenland beginning in 2500 B.C. up until the middle of the 20th century. This rich biological habitat still sustains Inuit communities on both sides of the bay. It is no coincidence that the Greenlandic name for the North Water polynya is Pikialasorsuaq – "the great upwelling".

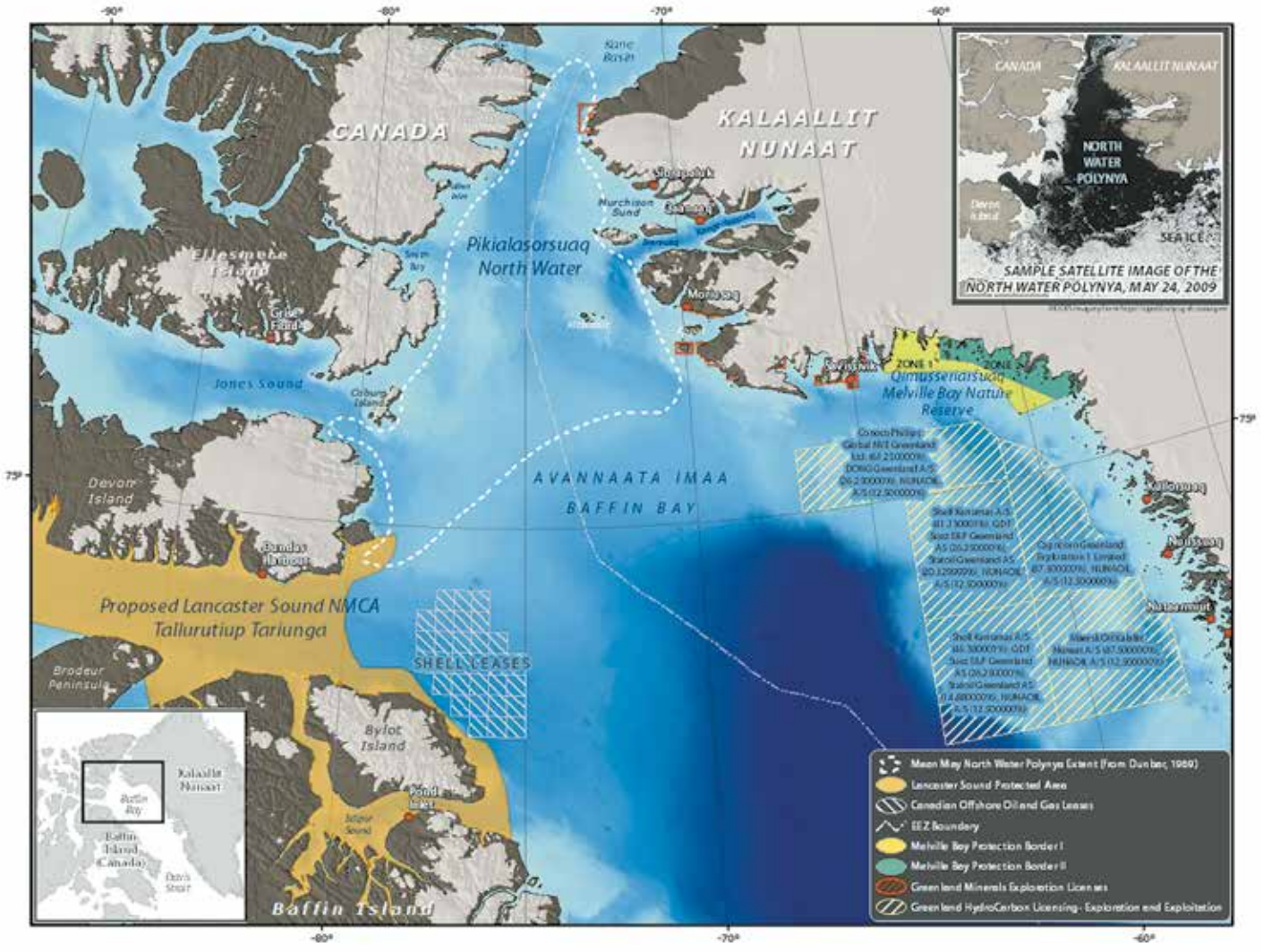
BRIDGING THE BAY

Acknowledgement of the critical importance of Pikialasorsuaq to the Inuit was the impetus for a workshop organized by the Inuit Circumpolar Council – Greenland and co-sponsored by Oceans North Canada on "*Pikialasorsuaq – Bridging the Bay*" in Nuuk in September, 2013. Over twenty participants attended the two-day workshop.

Inuit hunters and fishermen from communities surrounding the North Water polynya – Pond Inlet, Grise Fiord and Arctic Bay in Nunavut, and Kullorsuaq and Qaanaaq in Greenland – shared their observations on changes in sea ice and snow conditions as well as distribution and behaviour of marine mammals. Scientists from both countries also presented their current understanding of the geology, oceanography, biology and history of this region.

This dialogue served as a basis for the discussion on potential uses and non-uses of the polynya. For example, KNAPK, The Organization of Fishermen and Hunters in Greenland advise halting seismic activities and hydrocarbon exploration offshore of Northwest Greenland. They are concerned about potential harmful effects of these activities on fishing and hunting as well as the environment, and the lack of proper compensation to fishermen and hunters for adverse effects.

The workshop succeeded in "bridging the bay", creating a strong consensus to explore joint strategies for safeguarding and monitoring the health of this region for future generations. One siganificant outcome was agreement to work towards creating a joint commission mandated to consult with local communities about the future use and protection of the area.



SHORTCOMINGS OF THE INTERNATIONAL PROCESS

The input gained from the Pikialasorsuaq workshop was then shared by ICC-Greenland at the *Arctic regional workshop to facilitate the description of Ecologically or Biologically Significant Areas* (EBSA). This workshop was organized by the Convention on Biological Diversity (CBD) in Helsinki in March, 2014. ICC-Greenland was invited in its capacity as a Permanent Participant of the Arctic Council.

Supported by social and cultural criteria, ICC-Greenland submitted the North Water polynya as a cross-border area fulfilling the criteria of an EBSA. But despite the fact that participating Canadian and Greenlandic/Danish scientists agreed to the importance of the polynya, it was not possible to include it as an EBSA at this level.

The reason seemed to be political reluctance to submit an area that spans national Economic Exclusive Zones for consideration. Since the EBSA process is a national process, it became evident that it falls short when it comes to:

- scientific coordination between states when EBSA are cross-border in nature
- incorporation of input from cross-border Indigenous Peoples' Organizations
- social and cultural criteria, including significance for Indigenous Peoples

ADDED VALUE OF A COMMISSION

In the international process only states can put options on the table and take decisions. ICC-Greenland could only have its submission included in the report as an example of challenges to incorporate indigenous input in the EBSA process. To acknowledge the importance of the North Water polynya in the CBD, Canada and Greenland will have to submit their halves of the polynya into the CBD repository – And hope that the two pieces of the puzzle fits together.

ICC-Greenland believes that a joint commission between Canada and Greenland is the best way to ensure full and active participation of Inuit on both sides of the North Water polynya. The collective input from Inuit will add value along with scientific coordination when working towards gaining EBSA status to the polynya. This will help any conservation efforts strike a proper balance between the socially and culturally important subsistence hunting and the need to protect the habitat for generations to come. ○

Creating protected areas

Developing scientific criteria for determining ecologically or biologically significant areas (EBSAs) was one of the key components of Canada's plans to implement the Oceans Act in 1997. These criteria highlight waters that may have high functional significance for species that use the area; are fragile or highly vulnerable to perturbation; serve as centres of aggregation for populations; or are otherwise exceptionally diverse or productive. JAKE RICE says these criteria have since been applied to all of Canada's marine areas and are proving to be of value in freshwater systems as well.

JAKE RICE is the Chief Scientist for Canada's Dept. of Fisheries and Oceans, providing advice for international and domestic marine policy and management, including the EBSA process.

INITIAL MEETINGS to apply the criteria in the more southern areas of Canada's Atlantic and Pacific oceans relied primarily on extensive and spatially resolved sets of systematically-collected scientific data sets. When attention turned to the Beaufort Sea and Arctic Archipelago there were fewer such data sets, and their coverage was often limited in space and time. The Department of Fisheries and Oceans turned to social scientists who worked with elders and long-time residents of the Canadian north to record knowledge of areas of ecological or biological significance in ways that were culturally respectful and directly usable in the expert meetings for those two Arctic marine areas. The process for meeting and collecting this knowledge took time, but no more time than consolidating all the data sets of oceanographic and biological information in other areas. Some EBSAs were indeed recognized based on "scientific" data sets from remote sensing or ship-based surveys of ocean productivity, current patterns, and ice conditions, or by technologies for tracking tagged animals. Many others were identified based on Inuit and Indigenous knowledge of migration routes of marine mammals and where they bred, fed, and overwintered, or areas where they have long fished or found seabirds. Often the available scientific data and knowledge of the Indigenous people worked in complementary ways to highlight the areas that were most significant on one or several of the criteria. Maps of all the EBSAs that have been identified are available on-line at www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm, along with rationales for each one.

The process of identifying the EBSAs focused on information-sharing and objectively using the knowledge from all sources to identify the areas that best reflected the pre-adopted criteria. The maps and justifications of EBSAs that were produced are rich in information. But maps are only maps until they are used as a resource for planning and management. This is where we are seeing concrete evidence that the time invested in creating them was time well spent.

First of all, in the process of applying the criteria, we learned some things about EBSAs that had not been grasped before. In the Artic, many of the areas found to be ecologically or biologically significant got much of their significance from the position and nature of the ice front, which of course moves seasonally. For the first time, the meetings delineated EBSA boundaries that might have encompassed the entire area covered by the ice edge from its winter maximum to its summer minimum. But the justifications stress that within those larger boundaries, the features that made the area special would be found in association with the smaller subarea where the ice edge was located at any particular time. Importantly, the management implication of that situation was spelled

Seal hunting, Pond Inlet, Nunavut, Canada. Indigenous knowledge about where marine mammals live is important for locating ecologically or biologically significant areas.

Photo: Peter Prokosch, www.grida.no/photolib

MAPS ARE ONLY MAPS UNTIL THEY ARE USED AS A RESOURCE FOR PLANNING AND MANAGEMENT

out. In planning for activities that involve permanent built infrastructure, the entire area in the EBSA boundary needs to be considered as requiring particularly risk-averse management. In planning for activities which are inherently mobile, such as ecotourism or fishing, risk-averse management is still needed, but should be focused on the much smaller sub-area where the ice front is located at the time the activity is occurring. Since the Arctic EBSA workshops, this way of thinking about different kinds of EBSAs has spread to oceans all over the world, at is applies equally well to important features like oceanographic fronts.

So we now have these maps of EBSAs and their individual justifications. Are they making a difference? The short answer is that it is too soon to tell. Planning for uses and, where appropriate, protection of the Arctic is an ongoing process. Plans such as the Integrated Ocean Management Plan for the Beaufort Sea make extensive use of the results of the EBSA identification process in developing the plan. However that Plan is still fairly high level, implementing the concepts is another piece of work. What, if anything, ends up being different in the EBSAs versus other parts of the Arctic remains to be seen. Importantly though, the EBSAs are part of all the discussions for other topics such as Marine Protected Area networks in the Arctic, the routing of shipping, tourism etc. Having the information systematically available is already helping. As the EBSA identification process spreads to the rest of the Arctic, and as information accumulates and areas are reviewed, it can only get better. ○

Answering the where

People living in remote subsistence-based communities know very intimately the places that are important to the well-being of their village. It is the beach where their grandpa taught them the seasonal patterns of the seal, or a family's salmon camp that has been there as long as anyone can remember. As MARYANN FIDEL writes, there is a critical need to translate this knowledge into something that can be used to inform decisions.

MARYANN FIDEL is the CONAS Project Manager at the Aleut International Association, a permanent participant of the Arctic Council. She works with rural Bering Sea communities in Alaska and the Russian Far East on a community-based observation and monitoring network.

WHEN CREATING MAPS of harvest areas it is essential that local people are meaningfully engaged in the design of the study, data collection and presentation. Maps often contain sensitive information and are frequently created to address issues that affect the community. Identifying marine areas important for traditional hunting and fishing are crucial for minimizing conflicts between coastal communities and marine-based industries, which are expected to increase in the Arctic. This has been recognized at the international level with the Arctic Council's publication, *The Arctic Marine Shipping Assessment 2009*.

Photo Credit: USFWS Photo

Walrus, Round Island, Alaska

Two recommendations from this report address the need to identify areas used by Arctic communities, as well as areas of cultural significance. As a follow up to these recommendations a report entitled *'Identification of Arctic marine areas of heightened ecological and cultural significance'* attempted to identify areas of particular ecological and cultural importance in 2013. The short chapter that examines areas of cultural significance concludes 'available information makes the extent of this cultural legacy clear, but details are lacking. It is important to fill in gaps in knowledge so that important sites or activities are not neglected through ignorance.'

The Aleut International Association (AIA) – a permanent participant in the Arctic Council – has taken an active role in the mapping of culturally significant areas.

The Bering Sea Sub-Network (BSSN) was an international, community-based observing network that began in 2007 and ran until 2014. It was a partnership involving AIA, the University of Alaska Anchorage, the Alaska Native Science Commission and 8 indigenous, subsistence-based communities in Chukotka and Kamchatka in the Russian Federation, and Alaska, USA. This project brought together people from a variety

IT IS IMPORTANT TO FILL IN GAPS IN KNOWLEDGE SO THAT IMPORTANT SITES OR ACTIVITIES ARE NOT NEGLECTED THROUGH IGNORANCE.

of different backgrounds and cultures who share a dependence on the health of the Bering Sea.

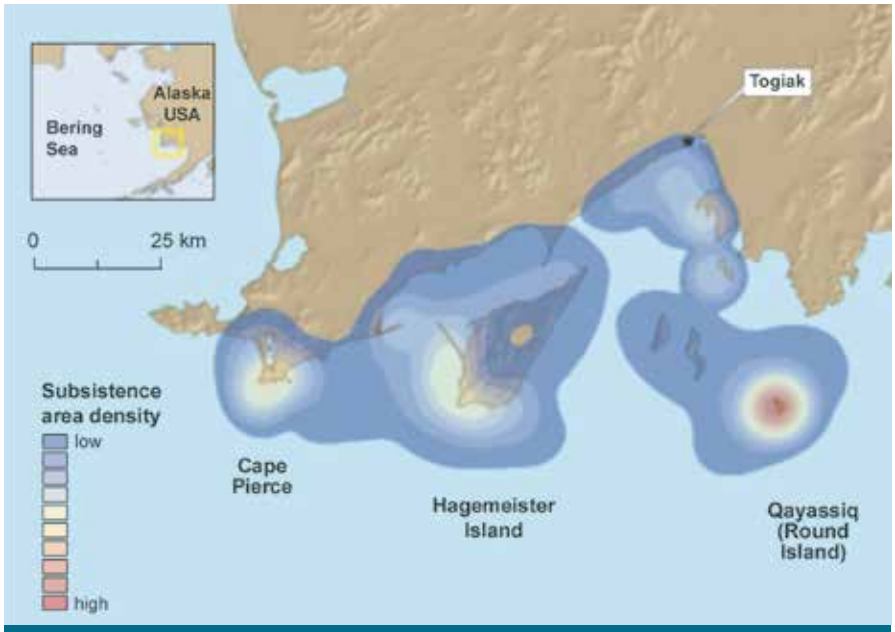
One aspect of the research included a mapping effort to characterize where people harvested important subsistence species. Surveys were administered by local Community Research Assistants to the same respondent pool of high harvesters every six months over a four year period. During the interview hunters and fishers were asked to circle on a map where they had gone to harvest select species during the past six month period. These methods were based on the idea that harvest areas are dynamic, people go to different places depending on the time of year and depending on environmental conditions such as storms, animal migration patterns, etc. A single map of a subsistence harvest, while useful, is unable to capture this dynamic reality. These techniques helped to not only answer the question of *where* people go to harvest, but *when*. An innovative mapping methodology was developed to protect the confidentiality of individual harvest areas, incorporate large amounts of spatial information, and present use areas on a gradient scale (from high to low use).

The map above right, demonstrates change over time. This particular change is likely due to a convergence of factors including: a change in the range and availability of species; climatic change; a complex regulatory structure; industry practices and/or socioeconomic factors.

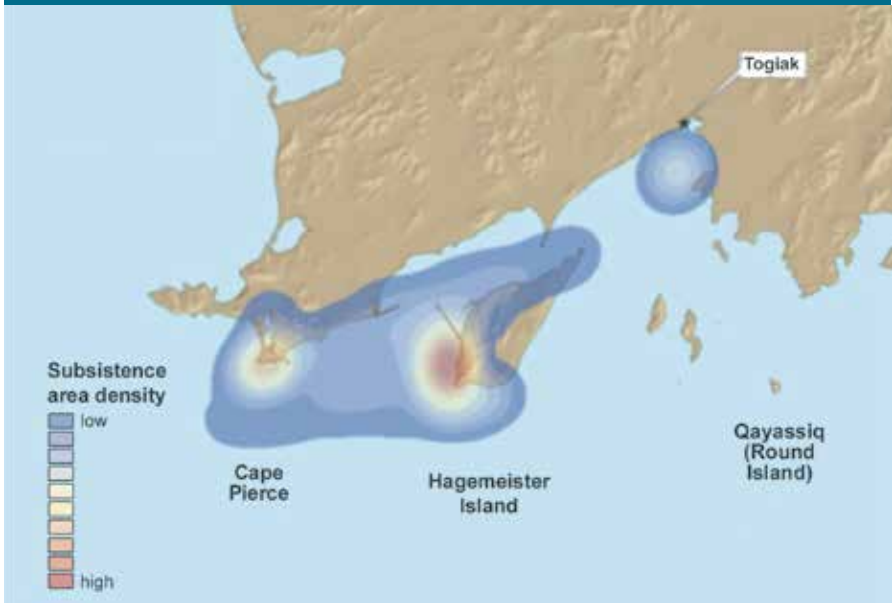
The Community Observation Network for Arctic Subsistence (CONAS) is a new project initiated by the Aleut International Association and the University of Idaho which builds on BSSN. It is continuing this dynamic subsistence mapping effort in Bering Sea communities.

AIA has also initiated a project within the Arctic Council's Protection of the Arctic Marine Environment (PAME) working group called, *'Arctic marine subsistence use mapping: Tools for communities'*. The goal of this project is to provide communities with the tools to produce high quality maps of locally important, sensitive or vulnerable areas.

It is important to keep in mind maps of harvest areas represent just one aspect of how Indigenous communities relate to the environment. They should be used in conjunction with, not instead of, community consultation. ○



The maps demonstrate how harvesting of important subsistence species changes over time.



Reprinted from Fidel M., Kliskey A., Alessa, L., & Sutton O. (2014) Walrus harvest locations reflect adaptation: a contribution from a community-based observation network in the Bering Sea, Polar Geography, 37:1, 48-68, DOI: 10.1080/1088937X.2013.879613

Areas beyond national jurisdiction

The Arctic is dominated by a marine area that is equal in size to continental Africa and is surrounded by the landmass of six countries. The primary international legal framework applicable to the Arctic is the United Nations Convention on Law of the Sea (UNCLOS), although it has not been ratified by the United States. The high seas and the ocean floor beyond continental shelves together form what is defined in the Convention as Areas Beyond National Jurisdiction (ABNJs). The states party to the Convention enjoy a set of rights in such areas, including exploitation of marine resources. They also have an obligation to conserve marine biodiversity. However, KAMRUL HOSSAIN says this obligation is general in nature and not underpinned by any clear protection mechanism.

Photo: NOAA's National Ocean Service

Dr. **KAMRUL HOSSAIN** is a senior research scientist at the Northern Institute for Environmental and Minority Law of the Arctic Centre, University of Lapland.

THE ARCTIC OCEAN faces numerous changes and challenges. The consequences of climate change, rapidly melting sea ice, the emergence of new shipping routes, increased access to extractive resources and other possible commercial uses of the Arctic marine environment pose alarming risks, the likely effect of which will be destruction of the marine ecological balance. Given the sensitive and fragile nature of the Arctic ecosystem, the Arctic Ocean can be regarded as an ecologically and biologically significant area (EBSA), which requires a special protection regime.

Even though the concept of EBSAs is endorsed within the Convention on Biological Diversity (CBD) regime, it has yet to offer any concrete tool for the conservation of marine biodiversity. The CBD nevertheless endorses the concept of Marine Protected Areas (MPAs), one of the objectives of which is to protect marine biodiversity. Consequently, the UNCLOS obligations concerning the preservation of marine biodiversity are complemented by the CBD. While it has been argued that UNCLOS provides a legal basis for the creation of MPAs under the general obligation set forth in article 192 in combination with article 194(5), it is not unequivocally clear whether MPAs can be established in an area beyond national jurisdiction. The general view is that an MPA can be established within an Exclusive Economic Zone, over which the coastal state has the authority to extend national regulations.

However, the Conference of the Parties to the Convention on Biological Diversity has addressed the issue of MPAs in an ABNJ on a number of occasions. At the present, setting up MPAs in an ABNJ has taken place under the auspices of the regional sea organisations. Unlike some other sea areas, the Arctic Ocean does not have any such body – despite the coastal states' ongoing process of cohesion since the 2008 Ilulissat meeting. The Convention for the Protection of the Marine Environment of the North-East Atlantic has established a regional sea organisation that covers part of the Arctic Ocean. The

An iceberg captured during mission to map areas of the Arctic aboard the NOAA Ship Fairweather.

Convention provides a comprehensive legal framework for implementation of Part XII (Marine Environmental Protection) of the UNCLOS in line with the objective of the CBD, which covers a sizeable area beyond national jurisdiction. While Regional Fisheries Management Organizations (RFMO) play an important role in the conservation of fish stocks, the Arctic Ocean is, again, only partly covered - by the North East Atlantic Fisheries Commission. There is no Arctic-wide organization.

The International Maritime Organization (IMO) has established special protective measures in defined areas – both within and beyond areas of national jurisdiction – where shipping presents a risk of impacts on marine biodiversity. The International Convention for the Prevention of Pollution from Ships, adopted under the auspices of the IMO, designates Special Areas, in which maritime activities are closely regulated. The process of designating a Special Area has been further supplemented by the guiding concept of Particularly Sensitive Sea Areas (PSSA), areas requiring special protection because of recognised ecological, socioeconomic or scientific attributes that may be vulnerable to damage by international shipping activities. Whereas to date the IMO has not designated any PSSAs in an ABNJ, the

GIVEN THE SENSITIVE AND FRAGILE NATURE OF THE ARCTIC ECOSYSTEM, THE ARCTIC OCEAN CAN BE REGARDED AS AN ECOLOGICALLY AND BIOLOGICALLY SIGNIFICANT AREA (EBSA), WHICH REQUIRES A SPECIAL PROTECTION REGIME.

ecological and biological importance of the central Arctic Ocean make it particularly sensitive as a site of marine biodiversity. The International Whaling Commission, an international body set up by the International Convention for the Regulation of Whaling, has established whale sanctuaries in which whaling is strictly prohibited. These may in principle be set up in the Arctic Ocean. Nevertheless, neither PSSAs nor whale sanctuaries constitute MPAs, as they would not comprehensively regulate human activities that potentially interfere with the marine environment.

The principal legal actor in the Arctic is the Arctic Council, an organisation whose membership includes all eight Arctic states. Under the Council's auspices and through the contribution of its working groups, the states have adopted a number of instruments relevant to the protection of marine biodiversity. While such instruments are typically not legally binding, today the Council serves as the venue to negotiate binding agreement. One record that merits mention is the 2013 Agreement on Cooperation on Marine Oil Pollution Preparedness and Response, which seeks to minimise risks from oil pollution at sea. Among the Council's other contributions, two working groups – the Conservation of Arctic Flora and Fauna (CAFF) and the Sustainable Development Working Group (SDWG) – have recently produced the Arctic Biodiversity Assessment report and the Best Practices in Ecosystems-Based Ocean Management report, both of which are useful for fisheries conservation and management, among other purposes. Other working groups – the Protection of Arctic Marine Environment (PAME), the Emergency Preparedness, Prevention and Response (EPPR), the Arctic Monitoring and Assessment Programme (AMAP) – together with CAFF, played a significant part in the states adopting the Arctic Offshore Oil and Gas Guidelines with a view to protecting the Arctic marine environment from unwanted environmental effects caused by offshore oil and gas activities.

The protection regime for Arctic marine biodiversity entails certain legal limitations. The designation of EBSAs does not yet have any concrete legal basis and the concept of a PSSA developed by the IMO is not a legally binding principle. Moreover, despite the fact that the UN Fish Stock Agreement is applicable to the Arctic Ocean, its scope is limited to highly migratory and straddling fish stocks; in addition, the lack of an Arctic-wide RFMO limits the protection of fish stocks occurring in the high seas. What is more, the absence of any defined legal framework for RFMOs makes it impossible to adopt concrete conservation measures, such as the establishment of Marine Protected Areas. The Arctic Council, despite its valuable contribution in producing assessment reports, has not to date focused on the conservation and management of targeted species as living resources. It does not have any working group, for example, on fisheries issues and, significantly, it may only set non-binding obligations.

Overall, the Arctic Ocean lacks a clear legal framework for comprehensive regulation of human activities that may compromise marine biodiversity in an Area Beyond National Jurisdiction. While a network of MPAs in the ABNJs of the Arctic Ocean could be an appropriate legal tool, the pertinent problem is the likely tension with regard to the rights and interests of the third states – those states that are not parties to the respective MPAs but have other rights granted under the Law of the Sea Convention within the MPAs.

Therefore, it is important to have consensus-based, multi-purpose MPAs that include actors from both inside and outside the Arctic who cooperate in negotiating comprehensive legal arrangements. The Arctic Council could take the lead here, given recent developments, such as the UN General Assembly's initiative for a legal framework for sustainable use of marine biodiversity beyond areas of national jurisdiction. The UN proposal covers various aspects of marine biodiversity management in what has been termed the package approach. ○

Photo: g75405, Flickr.com

A billion dollar ecosystem

The Sea of Okhotsk boasts an area of roughly 1.6 million square kilometers, water volume of more than 1300 cubic kilometers, and a coastline over 10 thousand kilometers long. The average depth of this remarkable body of water ranges from 820 meters, to a maximum depth of 3916 meters. EDUARD SHIRKOV says in terms of natural resources, these features combine to make the Sea of Okhotsk one of the largest and richest shelf seas in the world. Worth billions of dollars in ecosystem services, and critically important to human life, he says it needs and merits protection from over-exploitation.

THE WATERS of the Sea of Okhotsk create their own unique water masses due to the varying widths and depths of the Kuril Islands, which border the sea. Because of the high differentiation of hydrological factors and climate, a full water exchange between the Sea of Okhotsk and the ocean requires many years, creating unique ecosystems with very high biodiversity. The northern parts of the Sea predominantly contain ecosystems with Arctic species of flora ➤

Seismic vessel Pacific Explorer, Sea of Okhotsk.

Photo: Austronesian Expeditions

Seals, Sakhalin.

THE NATURAL RESOURCES POTENTIAL (NRP) OF THE SEA OF OKHOTSK IS BOTH A UNIQUE AND CONSIDERABLE PIECE OF THE NATURAL CAPITAL OF RUSSIA.

and fauna, while the rest of the Sea features boreal ecosystems.

The natural resources potential (NRP) of the Sea of Okhotsk is both a unique and considerable piece of the natural capital of Russia. It accounts for more than half of the far-eastern and nearly one quarter of all Russian fish catches. Due to its tidal sea influx, it is also an area of huge hydroenergy potential, again, unique in its scale, and a significant source on a national scale of expected hydrocarbon resources. In addition, the largely undisturbed ecosystems of the Sea of Okhotsk provide a stable generation of ecosystem services, critically important for human beings. But paramount to all of these benefits generated by the Sea of Okhotsk are the provisioning services derived from exploitation of bioresources, and its regulating effect through carbon sequestration and assimilation of other industrial and agricultural pollutants.

Dr. **EDUARD SHIRKOV** is the head of Laboratory of Environmental Economics Research, Kamchatka Branch of the Pacific Institute of Geography.

It should be noted, however, that the Sea of Okhotsk is the coldest of the Russian Far Eastern seas. The cold period (when the average daily temperature is below zero) lasts from 120 days in the south to 220 days in the north. A larger part of the Sea is covered with ice for up to 7 months annually. In January, the temperatures drop to minus 20-25 °C. Severe and frequent storms, icing, the lack of natural shelters for ships, as well as the high seismicity of the area pose serious risks for navigation and operation of offshore engineering facilities.

The maximal and stable level of the economic rent being held from NRP exploitation over a long time period can be taken as the main criterion of environmental and economic efficiency of natural resources management in a specific, ecologically isolated region. In the course of complex estimation of NRP elements of the Sea of Okhotsk, carried out by the scientists of the Kamchatka Branch of the Pacific Institute of Geography, the capitalized rent value of natural capital of the region is estimated at 454 billion US dollars. Extraction and utilization of all known Okhotsk hydrocarbons decrease this rent value by 134 billion US dollars. In addition, oil pollutants (without taking into consideration probable serious accidents)

Photo: Nohch, Flickr.com

Fishing boat, Sea of Okhotsk.

decrease NRP rent value that come from fish resources and relevant regulatory ecosystem services by another 39 billion US dollars. Modern technologies for offshore hydrocarbon exploration and transportation, and existing legal and

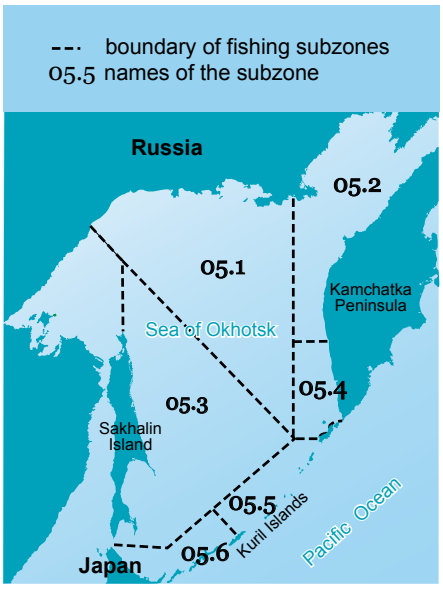


Fig. 1. Fishing subzones of the Sea of Okhotsk

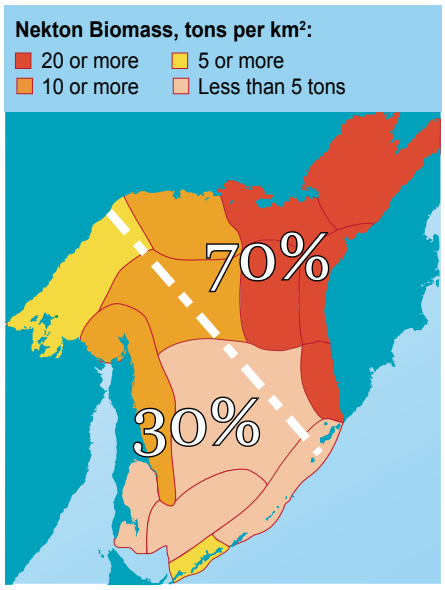


Fig. 2. Biological productivity of marked areas of the Sea of Okhotsk

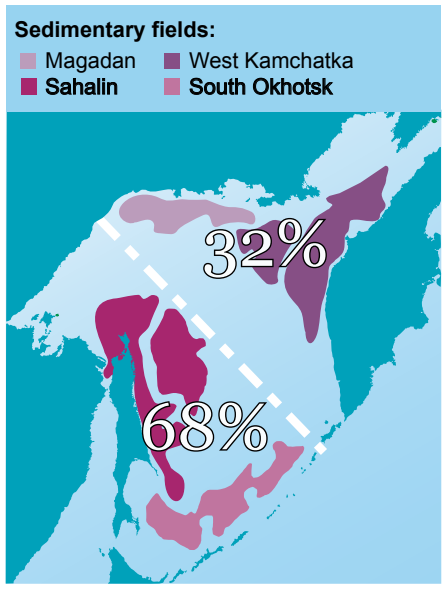


Fig. 3. Location and productivity of main hydrocarbon reserves in the Sea of Okhotsk

economic mechanisms for nature management do not offset these decreases in value. Therefore the compromise solution for this conflict lies in the area of spatial specialization or zoning of marine nature management in the north-eastern and south-western parts of the Sea of Okhotsk, two areas which are different both in the structure of resource potential and conditions of their exploitation.

Zoning of the Sea of Okhotsk according to resource specialization of its areas can be done according to potential conflicts of parallel exploitation of marine bioresources and hydrocarbons; conditions of exploitation; and existing fishery zoning. Taking into account both factors, the boundary between resource-specialized zones can be drawn as an extension to the North-West of the existing boundary between fishing subzones 05.1 – 05.3 (Fig. 1). Two-thirds of the biological potential of the Sea of Okhotsk would then be concentrated in the north-eastern area – including the Western-Kamchatka shelf (Fig. 2). However, two-thirds of hydrocarbon potential would be concentrated in the south-western area (Fig. 3).

Potential losses of natural capital value caused by existing practices of nature management in the Sea of Okhotsk can be reduced by $93 billion through integrated marine management. Only through these measures will it be possible to conserve the highest bio-productivity of the north-western area of the Sea of Okhotsk, including the Western Kamchatka shelf, nominated as an Ecologically or Biologically Sensitive Marine Area under the Convention for Biological Diversity. ○

Return WWF Global Arctic Programme
275 Slater Street, Suite 810,
Ottawa ON, K1P 5H9, CANADA

THE PICTURE

Sanctuary for gentle giants

Photo Credit Benjamin Wheeler

A bowhead whale surfaces in the world's first sanctuary for these majestic mammals of the deep which have been known to live up to 200 years. Heavily exploited in the early 19th century, bowhead whales were almost hunted to extinction. It may take centuries for them to regain their numbers. The bowheads find respite from modern day threats in Niginganiq National Wildlife Area in Isabella Bay on the northeast coast of Baffin Island, Nunavut. The sanctuary was established in 2009, with the support of local Inuit.