Framework for a Pan-Arctic Network of Marine Protected Areas

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PAME
Protection of the Arctic Marine Environment

ARCTIC COUNCIL

Framework for a Pan-Arctic Network of Marine Protected Areas

A Network of Places and Natural Features Specially-managed for the Conservation and Protection of the Arctic Marine Environment

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1.0   Introduction

This framework for a pan-Arctic network of marine protected areas (MPAs) sets out a common vision for international cooperation in MPA network development and management, based on best practices and previous Arctic Council initiatives. This framework aims to inform the development of MPAs and networks of MPAs that are located within the national jurisdiction of Arctic States, . and chart a course for future collaborative planning, management and actions for the conservation and protection of the Arctic marine environment. This framework offers guidance; it is not legally binding. Each Arctic State pursues MPA development based on its own authorities, priorities and timelines.

The purpose of the pan-Arctic MPA network, composed of individual Arctic State MPA networks and other area-based conservation measures (see definitions in box below) , is to protect and restore marine biodiversity, ecosystem function and special natural features, and preserve cultural heritage and subsistence resources for present and future generations. Individual MPAs and MPA networks can strengthen marine ecosystem resilience that underpins human wellbeing, including traditional and current livelihoods and ways of life. A network of MPAs can fulfill ecological aims more effectively and comprehensively than individual sites could alone by providing spatial links needed to maintain ecosystem processes and connectivity, as well as improving resilience by spreading risk in the case of localized disasters, climate change and other hazards (IUCN-WCPA, 2008). Development of the pan-Arctic network of MPAs can also contribute a major conservation element to and benefit from marine spatial planning (MSP) and ecosystem-based management (EBM) in the circumpolar region.

This framework aims to inform the development of MPA networks under the national jurisdiction of the Arctic States. While the principal aspects of the framework are relevant for the entire Arctic Ocean, the framework does not pursue MPA approaches specific to Areas Beyond National Jurisdiction (ABNJ).

Having a joint framework in place confers a number of advantages that can support and enhance the work of individual Arctic States, such as:

- Advancing cohesion and conservation effectiveness by strengthening ecological linkages among MPAs and MPA networks across the Arctic;

- Applying best practices for establishing and managing MPAs and MPA networks to the Arctic environment;

- Supporting achievement of domestic conservation objectives and international commitments and targets;

- Strengthening intergovernmental cooperation on MPA management and scientific issues among Arctic MPA authorities; and

- Addressing some issues of concern for shared species.

A pan-Arctic MPA network framework also contributes significantly to several Arctic Council objectives, including: elements of the Kiruna Ministerial Declaration of 2013 to protect the Arctic Marine Environment; implementing ecosystem-based management; responding to the Arctic Biodiversity Assessment and the Arctic Oil and Gas Assessment recommendations; furthering management of "areas of heightened ecological and cultural significance" identified under the Arctic Marine Shipping Assessment; advancing goals of the Arctic Marine Strategic Plan; and operating in a cooperative, coordinated and integrated approach to the management of the Arctic marine environment.

This framework was drafted by an MPA Network Expert Group (MPA-EG) reporting to the Arctic Council's Protection of the Arctic Marine Environment Working Group (PAME). The Expert Group was co-led by Canada, Norway, and the United States; all Member States of the Arctic Council were active participants (see Annex 1 for the full list of participants). The Arctic Council first called for the establishment of MPAs, including representative networks, in the 2004 Arctic Marine Strategic Plan. The Framework also builds on work of the Ecosystem Approach to Management Expert Group (EA-EG) led by PAME, and the Arctic Council Expert Group on ecosystem-based management (EBM), as well as the previous work of the Conservation of Arctic Flora and Fauna (CAFF) Working Group on an Arctic Biodiversity Assessment and a Circumpolar Protected Area Network (CPAN).

2.0 Value of a Pan-Arctic Marine Protected Area Network

2.1 Vision

In the context of ongoing efforts to implement EBM in the Arctic, which recognizes humans and their activities as an integral part of the ecosystem, the vision for a pan-Arctic MPA network is:

An ecologically connected, representative and effectively-managed network of protected and specially managed areas that protects and promotes the resilience of the biological diversity, ecological processes and cultural heritage of the Arctic marine environment, and the social and economic benefits they provide to present and future generations.

2.2 Sense of Urgency

Protecting and conserving the Arctic marine environment and biodiversity (Figure 1) is an important Arctic Council priority, due to the role of Arctic waters in moderating the global climate, protecting marine biodiversity, and providing food security, income and cultural identity for Arctic peoples and communities.

The Arctic is experiencing some of the most rapid and large scale climate and other CO2-related impacts occurring anywhere on the planet. Significant ecological changes underway in the Arctic have been documented by the Arctic Council (e.g., AMAP 2012; CAFF 2013; Eamer et al. 2013; PAME 2013a) and many other organizations (e.g., WWF (Sommerkorn and Hassol 2009); IPCC 2013). Of particular concern from a marine biodiversity perspective are the climate-related trends of diminishing sea ice resulting in habitat loss; melting permafrost and glaciers and reduced snow cover resulting in changes in ocean chemistry; releases of methane; increasing sea surface temperatures; and increased coastal erosion of some shorelines. The distribution of many species of flora and fauna is shifting or expanding northwards as the Arctic continues to warm (CAFF 2013). This includes non-indigenous species which may also arrive in the Arctic through increased vessel traffic and may pose a serious threat to the ecosystem. In addition, the increasing concentration of atmospheric carbon dioxide and absorption by the ocean is leading to acidification of ocean waters, and may impact many groups of organisms such as plankton, shellfish, deep sea corals, fish (including larval stages of fish), and marine mammals, therefore altering the composition of the Arctic ecosystem (Yamamoto-Kawai et al 2009).
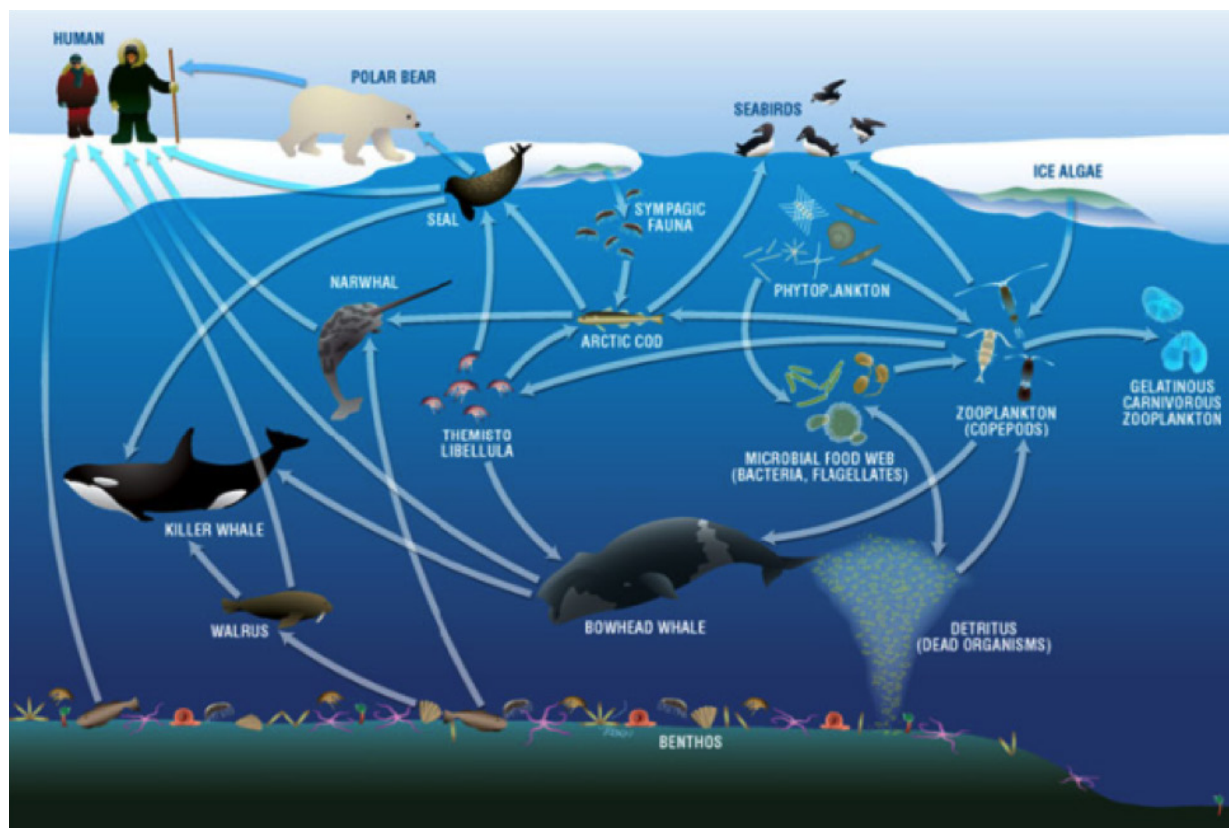

Figure 1. Example of an Arctic Marine Food Web (Adapted from Darnis et al. 2012).

The reduction in sea ice is contributing to the increased accessibility of the Arctic for industrial activities, including shipping, oil and gas development activities, mining, commercial fishing and tourism. These activities can impact the quality of marine habitats and the fitness of species that depend on those habitats for survival, as well as the rich cultural heritage of the Arctic region. Acute accidental events, marine and coastal habitat alteration and additional pollution loads (some land-based) add to the incremental and cumulative pressures on the Arctic marine environment (PAME 2013a; Arctic Council 2014). Moreover, these activities are increasing, while marine conservation actions frequently lag behind.

Coastal communities have expressed concern about the impacts of environmental changes on their livelihoods and well-being. In one study on climate change impacts, public hearings held across Alaska showed that rural communities had concerns about erosion, flooding, loss of permafrost, and subsistence (impacts on fish and game) (Alaska Climate Impact Assessment Commission 2008). Changes in the timing of the ice season were reported to impact the frequency and timing of hunting activities, with implications for food security and nutritional health among communities that rely significantly on subsistence (Furgal and Seguin 2006).

The complex, interconnected and trans-boundary nature of these drivers of change and pressures on the Arctic marine environment, including its peoples, requires a collaborative international response. Building on previous protected area work of CPAN/CAFF and other circumpolar initiatives, this framework responds to the need for enhanced cooperation to conserve and manage the coastal and offshore marine environments in light of increasing changes and pressures. A well-designed MPA network can also improve regulatory predictability and inform sound and sustainable business plans by allowing resource users to better plan development to mitigate adverse effects, avoid ecologically and culturally sensitive areas, avoid undesirable costs, and reduce conflicts with other interests.

2.3 Benefits of MPAs and MPA Networks

A well-coordinated Pan-Arctic network of effectively-managed MPAs and other area- based conservation measures that are situated within a system of broader sustainable management practices will provide benefits beyond what individual MPAs can provide. Some of these benefits are described below.

2.3.1 Ecological Resilience

Ecosystem resilience is the capacity of an ecosystem to respond to a perturbation or disturbance by resisting

degradation and recovering quickly. A pan-Arctic MPA network can strengthen the ecological resilience of the Arctic, for example by:

- Protecting natural ecological values (e.g., species habitats, especially habitats of species at risk or IUCN red-listed species; key species for Arctic food webs and human harvest; places of importance for ecological processes, such as primary productivity);

- Connecting and protecting spatially separate habitats essential to the life cycles of trans-boundary marine species, such as feeding, breeding, and nursery grounds and migration corridors for marine mammals, fish and seabirds;

- Providing refuge for marine species (often referred to as redundancy or replication). For example, by protecting multiple examples of important habitat features, a network can provide insurance that at least one sample of the habitat type and its associated biodiversity will remain intact, should a catastrophic event occur in the area;

- Protecting and connecting features and habitats that support the ability of species to be resilient to, or adapt to, climate change (e.g., sea ice areas with forecasted persistence) by providing biodiversity reservoirs that can help species repopulate after extreme events and areas that are protected from other stressors that deplete resilience;

- Supporting or restoring marine community structure, productivity, and food web complexity; and

- Protecting natural bio-physical values (e.g., sequestration of carbon; filtration of pollutants; features such as recurring leads and polynyas and corals that are important for ecosystem structure and function).

2.3.2 Cultural and Socio-economic Benefits

Closely aligned with the ecological benefits listed above are the cultural and socio-economic values and benefits stemming from Arctic MPA networks. Protecting marine biodiversity and ecosystem processes is important for maintaining associated ecosystem goods and services (i.e., the range of benefits people receive from nature), which comprise:

- Direct economic values (e.g., monetary, commercial, and employment benefits to communities and countries);

- Cultural and heritage values (e.g., preservation of cultural connections to the sea and the way of life in coastal communities; preservation of the elements that formed a society's distinct character; protection of

historically important sites that had a role in shaping a society or people; honoring spiritual values attributed to a site; and protection of subsistence resources);

- Societal and existence values (e.g., importance to society at large, including people who are not visitors or users);

- Landscape / seascape values (e.g., visual aesthetics of importance locally, nationally, or globally);

- Educational values (e.g., opportunities to teach people about their physical and natural surroundings, local biodiversity, and the interconnected nature of the environment);

- Scientific and research values (e.g., contributing to a better understanding of the natural environment and the consequences of natural vs. human-caused, or anthropogenic, changes by providing undisturbed ecological benchmarks to compare and assess environmental change in surrounding areas); and

- Management values (e.g., better coordinated international efforts, adoption of best practices).

Arctic MPA network processes can facilitate incorporation of Traditional and Local Knowledge (TLK) and local knowledge into decision-making. The relevance of TLK for resource management purposes is recognized in many Arctic Council documents including the Arctic Offshore Oil and Gas Guidelines (AOOGG, 2009), the AMSP (2004), ABA (2013), AMSA (2009), and the AMSAIIc (2013). The Sustainable Development work group, in collaboration with other Arctic Council working groups and Task Forces, has developed TLK recommendations that will be implemented under the U.S. Chairmanship of the Arctic Council and may be helpful in the development and management of a Pan-Arctic MPA Network. Traditional knowledge is also recognized in the 2007 United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), an aspirational document that speaks to the individual and collective rights of indigenous peoples, taking into account their specific cultural, social and economic circumstances.[1] The UNDRIP calls for respecting indigenous knowledge, cultures and traditional practices; fostering indigenous peoples' contributions to sustainable and equitable development; and the proper management of the environment (DFO 2011b).

1. http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf
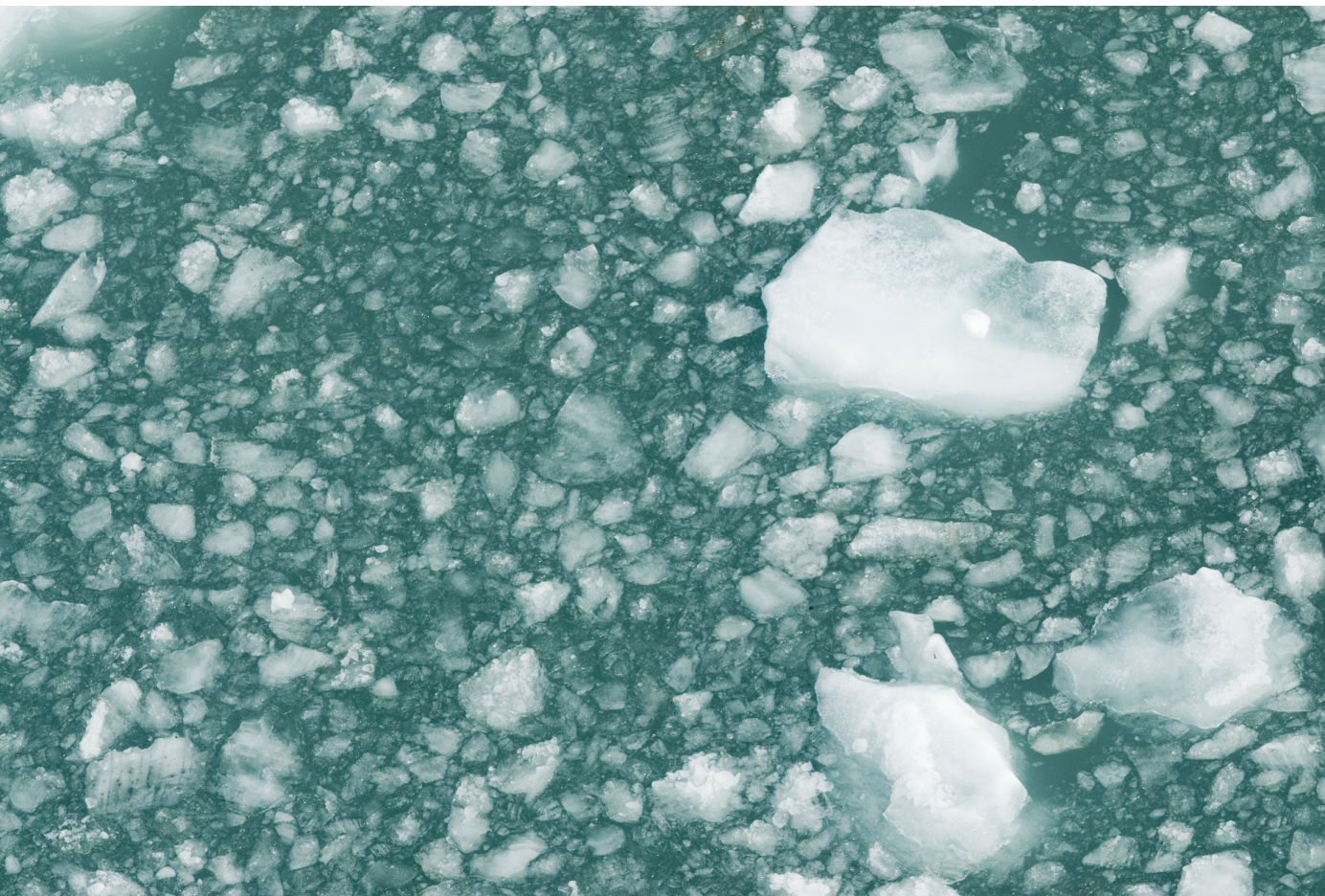
3.0 Principles, Goals and Objectives of a Pan-Arctic MPA Network

3.1 Common Principles

All stages in the development and implementation of a pan-Arctic MPA network should be guided by these nine principles:

1. **Coherent or systematic approach**. Where possible, ensure that MPA networks are linked to ecosystem-based management efforts within the broader seascape, across EEZ boundaries, in the high seas, and with terrestrial areas.

2. **Respect rights and activities**. Respect the rights of government authorities and provisions of applicable agreements and treaties. Take into consideration harvesting by indigenous peoples and others, and other activities carried out in accordance with licenses, regulations and legal agreements.

3. **Ensure open and transparent processes**. Employ open, transparent and inclusive processes, with opportunities for partnership, participation, consultation and timely information exchange. Enhance awareness of MPA network planning processes, promote benefits of marine conservation and encourage public support.

4. **Use the full suite of best available knowledge**. Apply the best available scientific, traditional, community, and industry knowledge to conservation efforts and use a precautionary approach when considering policy decisions about the protection of priority areas, as appropriate.

5. **Focus on resilience and adaptation to change**. Design and strive to implement the pan-Arctic MPA network for ecological conservation and the protection of marine biodiversity in the context of actual and projected climate and other CO2 related changes given the accelerating nature of associated impacts.

6. **Take cultural and socio-economic considerations into account**. Take cultural and socio-economic needs and benefits provided by MPA networks into account in the development of an optimal, cost-effective MPA network design to inform placement of future MPAs and "other area-based conservation measures.

7. **Apply appropriate protection measures**. Make every effort to ensure that the level of protection afforded is appropriate to contribute to achieving the stated goals and objectives for individual MPAs and the network. Network MPAs and other area-based conservation measures should provide sufficient protection to allow Arctic ecosystems to be resilient in the face of large-scale, globally-induced changes.

8. **Employ and evaluate best management practices.** Develop and implement management plans for both individual MPAs and MPA networks so they are effective in achieving their conservation objectives. Monitor and report on effectiveness of management measures and practices on an ongoing basis, and adjust them in response to new ecological or socio-economic information and emerging issues.

9. **Integrate efforts across institutions**. Ensure cooperation and integration of relevant institutions in managing MPAs for conservation effectiveness. These may be national, multilateral, and international institutions or organizations, including those that govern economic sectors.

3.2 Goals

These goals of a Pan-Arctic MPA network contribute to several goals of the Arctic Council, including: conserving Arctic marine biodiversity and ecosystem functions; promoting the health and prosperity of all Arctic inhabitants; and advancing sustainable Arctic marine resource use. They also address many other conservation and sustainable development goals, including Goal 1.1. of the Convention on Biological Diversity, which is "to establish and strengthen national and regional systems of protected areas integrated into a global network as a contribution to globally agreed goals."

A pan-Arctic MPA network has four inter-related goals:

1. To **strengthen ecological resilience** to direct human pressures and to climate change impacts, to promote the long-term protection of marine biodiversity, ecosystem function and special natural and cultural features in the Arctic.

2. To **support integrated stewardship**, conservation and management of living Arctic marine resources and species and their habitats, and the cultural and socio-economic values and ecosystem services they provide.

3. To **enhance public awareness** and appreciation of the Arctic marine environment and rich maritime history and culture.

4. To **foster coordination and collaboration** among Arctic states to achieve more effective MPA planning and management in the Arctic.

3.3   Objectives

3.3.1   Strengthen Ecological Resilience

Protection and management for conservation of:

- Areas of high natural biological productivity, such as polynyas;

- Linked and replicated habitats necessary for biological processes and life histories such as feeding and reproduction;

- Areas of high species and/or habitat diversity and such as coral and sponge aggregations;

- Ecologically important geological features and enduring/recurring oceanographic features, such as underwater canyons, hydrothermal vents, retention areas and oceanographic fronts;

- Critical habitat of endangered and threatened species, such as IUCN red-listed habitats and species;

- Unique or rare species, habitats, and associated communities, such as seabird colonies;

- Areas important for migratory species, such as molting, wintering or resting sites;

- Pristine areas that safeguard core ecosystem characteristics and offer long-term sustainable conservation that can balance possible impacts from future development in other areas, or have a role as refugias in anticipated changed conditions; and

- Examples of all natural marine habitat types, in order to safeguard biodiversity, ecological processes and ecological function overall.

3.3.2   Sustain cultural, social and economic values and ecosystem services:

Protection and management for conservation of:

- Marine and coastal areas of high spiritual or cultural value, such as archaeological sites and traditional use areas of indigenous peoples and coastal communities;

- Areas of high primary productivity that capture and store carbon to mitigate the effect of climate change, such as coastal wetlands.

- Reproduction areas of important commercial or subsistence harvestable species, such as spawning and nursery grounds;

- Areas for maintaining natural age/sex structure of important harvestable species, such as groundfish;

- Areas that sustain or restore high-priority fishing or hunting;

- Areas that mitigate the impacts of bycatch;

- Areas that provide compatible opportunities for education and research;

- Cultural sites that are important to a culture's identity and/or survival; and

- Cultural and historic sites that may be threatened.

3.3.3   Enhance Public Awareness and Support

- Conduct education and outreach activities to demonstrate and share the ecological, social, and economic values of MPAs and MPA networks with indigenous peoples and local communities as well as members of the general public and business communities who benefit from functioning Arctic ecosystems but may never visit these remote areas;

- Conserve and manage areas that provide compatible and sustainable opportunities for recreation and ecotourism; and

- Conserve and manage cultural and historic sites that provide opportunities for heritage tourism.

3.3.4   Foster Coordination and Collaboration

- Conduct capacity development to improve MPA management effectiveness;

- Establish mechanisms for intergovernmental coordination and cooperation for MPA network management and planning;

- Identify priorities and opportunities for scientific cooperation; and

- Develop best practices for priority MPA management and planning issues.

- Promote the active involvement of indigenous peoples in the management and sustainable use of MPAs, as appropriate.

4.0 Key Definitions and Concepts

The following terms and concepts are central to this framework; see Annex 2 for a complete glossary of terms and acronyms used.

4.1 Marine Protected Area (MPA)

Marine Protected Area (or MPA) is a generic term that includes a variety of types of protected areas in the marine environment, some of which are known by other terms. As defined by the International Union for the Conservation of Nature / World Commission on Protected Areas (IUCN/WCPA), and as used in this framework, an MPA is:

> *A clearly defined geographical space recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.*

All Arctic states have legal and policy tools for designating and managing MPAs in the Arctic that offer flexibility with respect to level of protection and management regime. IUCN has developed categories in order to compare protected areas at a global scale, and guidelines for applying these categories (See Annex 3).

4.1.1 Criteria for MPAs in a Pan-Arctic Network

Arctic States should ensure that each MPA that is to be included in the pan-Arctic MPA Network meets the following criteria:

1. The MPA conforms to the IUCN definition of a marine protected area, including each of the key terms as described by the IUCN (such as 'effectively protected'; see Annex 3).

2. The MPA contributes to achieving at least one of the pan-Arctic MPA network goals and one or more of the corresponding objectives (see Section 3).

3. There is a corresponding management plan, or protection regime explicitly specified in supporting legislation or regulation, and the plan is being implemented.

Geographic Boundaries of the Pan-Arctic Network

Several separate yet linked and overlapping spatial frameworks are in place for dividing the circumpolar Arctic into a manageable set of marine ecological regions that have relevance for the pan-Arctic MPA network. These initiatives by the Arctic Council and other organizations define regions of the Arctic based on bio-geographical aspects and identify regions based on their distinct sets of biota and geophysical characteristics (see Figure 2).

The Framework focuses on and links MPA networks within the EEZs of Arctic states, but recognizes linkages to inland areas and the high seas, since activities that are land-based or occur in the high seas may impact the health of EEZ and coastal habitats and biodiversity. It encompasses MPA network planning that occurs at any spatial scale (e.g., within an LME; within an EEZ; within a multi-national management region).

The term 'marine' in MPA is considered to include coastal zones, estuaries and other areas that are connected to Arctic marine ecosystems, to be consistent with the Arctic Council's Arctic Marine Strategic Plan (AMSP) for 2015-2025. For reporting purposes, the mean high water mark within a coastal protected area will be considered the boundary between marine and terrestrial protection. The MPA portion will extend from the high water mark out to sea to the protected area boundary. If the protected area is mainly terrestrial but includes the shoreline, the MPA will be the intertidal area between mean high and mean low water marks. Where a protected area includes both terrestrial and marine components, only the marine area is included within MPA figures in this Framework.

4.2 Pan-Arctic Marine Protected Area Network and Aichi Target 11

The definition of the <u>Pan-Arctic Marine Protected Area Network</u> is:

An ecologically representative and well-connected collection of individual marine protected areas and other effective area-based conservation measures in the Arctic that operate cooperatively, at various spatial scales, and with a range of protection levels, in order to achieve the long-term conservation of the marine environment with associated ecosystem services and cultural values more effectively and comprehensively than individual sites could alone.

This definition supports and aligns with the conservation target known as Aichi Target 11, adopted in 2010 by Parties to the Convention on Biological Diversity (CBD):

By 2020, at least…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… seascape. (CBD 2010)

4.3 Other Area-based Conservation Measures

The pan-Arctic MPA network is composed of spatial measures -- both MPAs and some "other effective area-based conservation measures" (see Figure 3). Not every spatial management measure is part of the MPA network, as not all contribute to MPA network goals and objectives. The term *"<u>other effective area-based conservation measure</u>"*, as used in Aichi Target 11, was evolving as this framework was being developed.   Generally the term is understood to refer to place-based / spatial conservation measures that have some protection under national or subnational law or policy, or regional management regime, but do not meet the IUCN definition of an MPA. These measures may also have a temporal component, such as areas protected during fish spawning or bird nesting periods. For our purposes, such measures may contribute to achievement of conservation objectives including MPA network objectives. It is anticipated that some fisheries management measures, important bird areas, critical habitat for species at risk, and conservation areas established by indigenous peoples may qualify as such measures. The other measures listed in Annex 4 are based on the working definition noted above. This list may be modified to align with the internationally accepted definition once it is finalized.
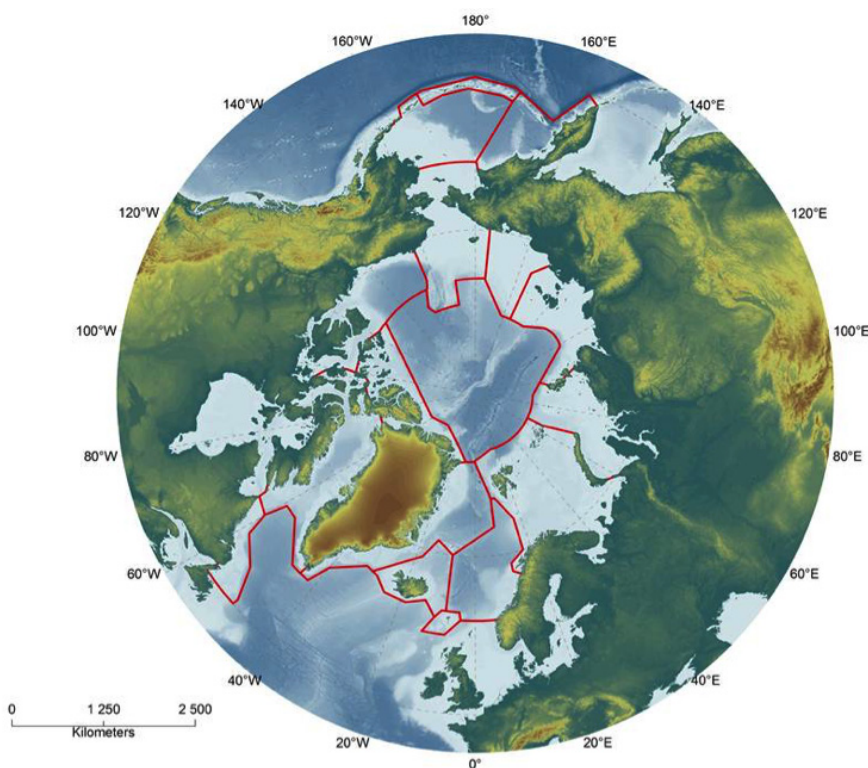

Figure 2. Boundaries of Large Marine Ecosystems in the Arctic (PAME, 2013b).

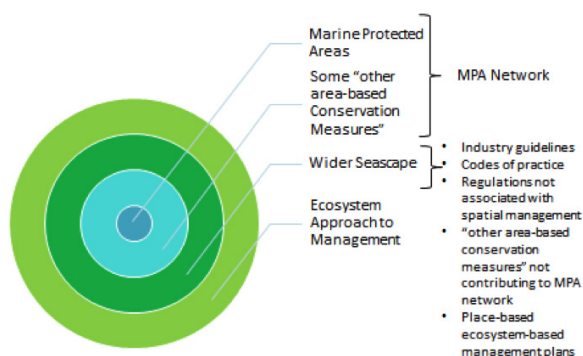## MPA Networks as Part of an Ecosystem Approach to Management

Figure 3. Relationship between MPAs, "other area-based conservation measures," wider seascape and an ecosystem approach to management.

Many such areas have been established globally for specific conservation or management purposes, for example to protect vulnerable marine ecosystems from the impacts of fishing. The 2006 United Nations General Assembly Resolution on Sustainable Fisheries includes a protocol for protecting vulnerable marine ecosystems from the impacts of bottom fishing; this protocol was reviewed in 2009 and 2011. In 2009, the Food and Agriculture Organization of the United Nations adopted *International Guidelines for the Management of Deep-Sea Fisheries in the High Seas* to provide guidance on implementing the General Assembly's commitments. States, individually and through regional fisheries management organizations (RFMOs), continue to identify vulnerable marine ecosystems and implement fishing restrictions as necessary in order to protect such ecosystems from significant adverse impacts.

Including *other effective area-based conservation measures* in the pan-Arctic MPA network provides more flexibility in choice of management tools for addressing conservation gaps and responding to climate change effects. Such areas may also be strengthened or expanded if additional threats are identified and a higher level of protection is deemed necessary, and may then meet the definition of an MPA.

4.4   Identification of Significant Areas in the Wider Seascape

The language of Aichi Target 11 also recognizes that MPAs and other area-based conservation measures must be "*integrated into the wider… seascape*". The pan-Arctic MPA Network will not wholly achieve its conservation objectives unless it is integrated into a broader Arctic management regime such as EBM (see Figure 2). Management practices that are not place-based, such

as industry guidelines and codes of practice, and an ecosystem approach to management, help conserve the marine environment and support many of the objectives of the Pan-Arctic MPA Network (see Figure 3).

There are several possible approaches to identify ecologically significant areas in the wider seascape. These areas may include areas that are currently MPAs or other area-based conservation measures, or may warrant future protection under these management regimes.

4.4.1   Ecologically or Biologically Significant Areas

The Conference of the Parties to the Convention on Biological Diversity (CBD) has established a global process for describing ecologically or biologically significant areas (EBSAs). This work has been carried out through the organization of a series of regional workshops at which the application of scientific criteria and other relevant compatible and complementary nationally and inter-governmentally agreed scientific criteria is applied to define the EBSAs within that region. A list of the CBD EBSA criteria is found in Table 1.

EBSAs have been defined by the CBD as:

> *Geographically or oceanographically discrete areas that provide important services to one or more species/populations of an ecosystem or to the ecosystem as a whole, compared to other surrounding areas or areas of similar ecological characteristics, or otherwise meet the criteria (See Table 1).*

A CBD regional EBSA workshop for the Arctic was convened in March 2014 in Helsinki, Finland.[2] The workshop described 11 areas as meeting the scientific criteria for EBSAs, and these descriptions, alongside those of areas from other marine regions, were subsequently approved by the CBD Conference of the Parties (COP) in October 2014 for inclusion in the EBSA repository.[3,4]

The geographic scope of the Helsinki workshop is shown on Figure 4. At the workshop, Russia was the only Arctic coastal state that included the consideration of EBSAs within their own EEZ.

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2.   http://www.cbd.int/doc/?meeting=EBSAWS-2014-01 and http://www.cbd.int/doc/?meeting=sbstta-18

**Note-text in this paragraph to be updated based on the outcome of the decision on Arctic EBSA's at CBD COP in October 2014.

3.   Ibid., para. 8.

4.   http://www.cbd.int/doc/?meeting=EBSAWS-2014-01 and http://www.cbd.int/doc/?meeting=sbstta-18

**Note-text in this paragraph to be updated based on the outcome of the decision on Arctic EBSA's at CBD COP in October 2014.
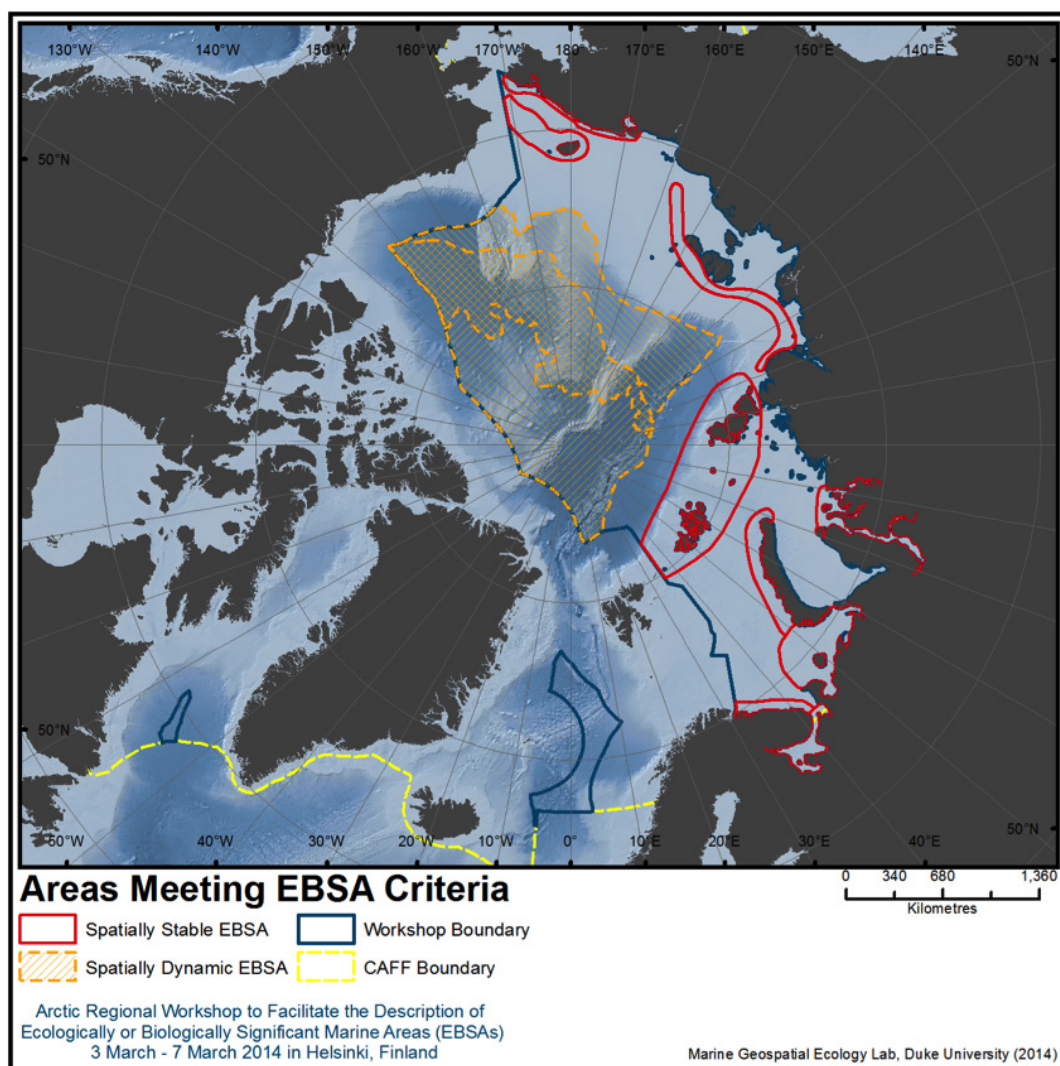
Figure 4. Map of Ecologically or Biologically Significant Areas as found in the High Seas of the Arctic and Russian EEZ (UNEP/CBD/EBSA/WS/2014/1/5). (Map is for illustrative purposes; workshop boundaries may not fully reflect international maritime boundaries or high seas limits. CAFF boundary was used by workshop participants.)

The Helskinki workshop participants agreed that the four types of areas meeting the EBSA criteria (described in the report of the North Pacific Regional Workshop to Facilitate the Description of Ecologically or Biologically Significant Marine Areas, Moscow, Russian Federation[5]) might be useful in reporting on areas meeting the EBSA criteria in the Arctic as well. These were:

a. Spatially stable features whose positions are known and individually resolved on the maps. Examples include individual seamounts and feeding areas for sharks and seabirds. Such areas do not have to be used as important habitats all year round, nor does all the area have to be used every year. However, the

feature(s) is entirely contained in the corresponding map polygons;

b. Spatially stable features whose individual positions are known, but a number of individual cases are being grouped. Examples include a group of coastal areas, seamounts or seabird breeding sites where the location of each is known but a single polygon on the map and corresponding description encompasses all the members of the group. The grouping may be done because there may be insufficient knowledge to evaluate each separately or the information is basically the same for all members of the group, so one description can be applied to all group members;

c. Spatially stable features whose individual positions are not known. Examples include areas where

5. http://www.cbd.int/doc/meetings/mar/ebsa-np-01/official/ebsa-np-01-04-en.pdf

coral or sponge concentrations are likely, based on, for example, modelling of suitable habitats, but information is insufficient to specify the locations of each individual concentration. Each such area may be represented by a single map polygon and description, but the entire area inside the polygon is not to be interpreted as filled with the feature(s) meeting the criteria. Narrative about these areas should stress the importance of getting better information on the spatial distribution of these features; and

d. Features that are inherently not spatially fixed. The position of this feature moves seasonally and among years. The map polygon for such a feature should include the full range occupied by the front (or other feature) during a typical year. However, the description and its narrative should describe seasonal movement of the key feature(s). The text for description should also make very clear that at any given time, the ecological importance usually is highest wherever the feature is located at that time and often decreases as distance from the feature increases. It may even be the case that at any given time some parts of the total area contained in the polygon are ecologically little different from areas outside the polygon.

As highlighted in Figure 4, EBSAs that are spatially dynamic are a dominant feature of this region.

The EBSA process uses the best available scientific information to identify significant marine areas. This provides useful information in designing MPA networks, but is a separate process from identifying appropriate protection measures where needed.

4.4.2   Areas of heightened ecological and cultural significance

"Areas of heightened ecological and cultural significance" have also been identified by Arctic States within their EEZs (Skjoldal et al 2013 and AMAP/CAFF/SDWG, 2013). Areas were identified as having heightened ecological and cultural significance using the International Maritime Organization (IMO) criteria for Particularly Sensitive Sea Areas (PSSA) which is similar to the CBD criteria (Table 1) for EBSAs. The term stems from Recommendation IIC of the Arctic Council's 2009 Arctic Marine Shipping Assessment (AMSA): "That the Arctic states should identify areas of heightened ecological and cultural significance in light of changing climate conditions and increasing multiple marine use and, where appropriate, should encourage implementation of measures to protect these areas from the impacts of Arctic marine shipping, in coordination with all stakeholders and consistent with international law." (PAME 2009)
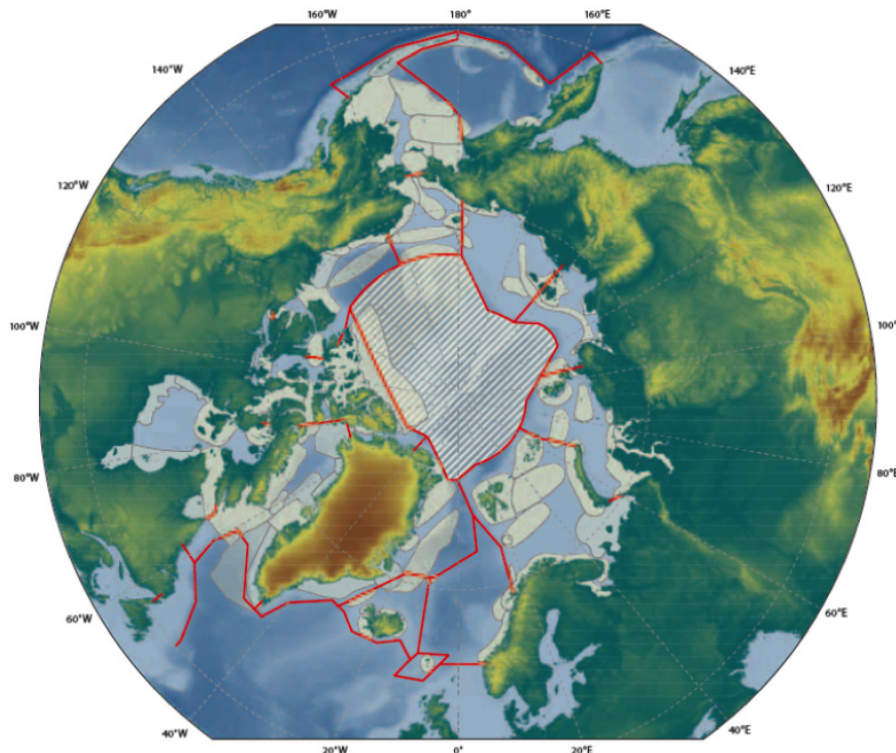
Figure 5. Map of areas of heightened ecological significance (such as areas with aggregations of fish, birds and mammals for purposes of migration, staging, breeding, feeding and resting) and boundaries of Arctic Large Marine Ecosystems (AMAP/CAFF/SDWG, 2013).

CBD EBSA	IUCN MPA	IMO PSSA
Uniqueness or rarity • Species, populations, communities • Habitats or ecosystems • Geomorphological or oceanographic features	Rare biogeographic qualities Unique or unusual geological features Rare or unique habitat	Uniqueness or rarity
Special importance for life history stages of species • Breeding grounds, spawning areas, nursery areas, juvenile habitat, etc. • Habitats of migratory species	Presence of nursery or juvenile areas Presence of feeding, breeding or rest areas	Spawning, breeding and nursery grounds Migratory routes Critical habitat for the survival, function, or recovery of fish stocks
Importance for threatened, endangered or declining species and/or habitats	Presence of habitat for rare or endangered species Rare or unique habitat for any species	Critical habitat for rare or endangered marine species
Vulnerability, fragility, sensitivity, or slow recovery • Sensitive habitats, biotopes or species that are functionally fragile or with slow recovery		Fragility
Biological productivity	Ecological processes or life-support systems	Productivity
Biological diversity • Ecosystems, habitats, communities • Species • Genetic diversity	The variety of habitats Degree of genetic diversity within species	Diversity
Naturalness	Naturalness	Naturalness
	Integrity	Integrity
		Dependency
	Representative of a biogeographic "type" or types	Representativity - Bio-geographic importance, representative of a biogeographic "type" or types

Table 1.   Comparison of criteria for identifying Ecologically and Biologically Significant Areas (EBSAs), Marine Protected Areas (MPA) and Particularly Sensitive Sea Areas (PSSAs). Source: Skjoldal and Toropova (2010)..

With respect to the high seas, a report called for by PAME assessed the risks posed by international shipping activities and reviewed available IMO measures suited to protect vulnerable marine areas, including routeing and reporting measures, Special Area designation under the International Convention for Prevention of Pollution from Ships (MARPOL), and Particularly Sensitive Sea Areas (PSSA). The report authors recommended as the preferred option that Arctic States pursue a PSSA for one or more core sea ice areas within the high seas area of the Central Arctic Ocean with non-mandatory areas to be avoided (ATBAs) as the underlying routeing area (DNV 2013). At PAME II-2014, no Arctic State embraced this recommendation. PAME member governments instead decided additional work and analysis was needed to evaluate the feasibility of the recommended options, and that additional options needed to be explored.

4.5 Steps for Network Development

As previously noted, the pan-Arctic MPA Network will be based on the individual efforts of States to develop MPAs and MPA networks within their respective national waters. Steps for building the pan-Arctic MPA Network include, but are not limited to: creating an inventory of existing network MPAs and other area-based conservation measures; creating maps of network MPAs; analyzing and describing the contribution of these places to the network objectives; identifying and mapping areas of high ecological and biological significance that could contribute to the network and may warrant protection; and identifying opportunities for collaboration on shared management challenges, enhancing public awareness, and scientific research.

Developing a network will require designated points of contact within each Arctic state and a mechanism within the Arctic Council to facilitate ongoing coordination. The Expert Group will serve this ongoing coordination and network development function, with membership modified if necessary to address this role. The following actions will assist in the formation and execution of the pan-Arctic MPA Network.

4.6 Arctic States' Approaches to Design and Management of MPAs and MPA Networks

The eight Arctic States involved in development of this framework for the pan-Arctic MPA network follow a variety of approaches in the design and management of their MPAs and MPA networks. Detailed information on each State's MPAs is shown in Annex 4.

Canada

Canada recently announced the National Conservation Plan, demonstrating a renewed interest in strengthening marine and coastal conservation in Canada, including the Arctic. Canada currently has 40 areas that protect part of its Arctic marine environment, with two additional marine protected areas in progress. MPA planning is a shared responsibility in Canada's Arctic. Three federal departments have legislation that enables them to create, manage and monitor marine spaces: Fisheries and Oceans Canada creates Marine Protected Areas (MPA); Parks Canada creates National Marine Conservation Areas (NMCA); and Environment Canada creates Migratory Bird Sanctuaries and National Wildlife Areas. These departments together with Inuit, community groups, scientists and others have identified ecologically and biologically significant areas, representative areas, and key habitat sites for marine birds that underpin their protected area planning. MPA Network development is led

by Fisheries and Oceans Canada (DFO) and is guided by the 2011 National Framework for Canada's Network of Marine Protected Areas that DFO produced in collaboration with Parks Canada, Environment Canada, and provincial and territorial government partners (Government of Canada 2011). The document sets out an overarching direction for the establishment of five Arctic bioregional networks of MPAs. In addition, territorial and provincial planning processes are underway that should lead to increased protection for Arctic marine areas, including wildlife conservation, protection and management.

Greenland/Denmark

Five areas can be recognized as MPAs according to the criteria in this Framework. Greenland also has other area-based conservation measures to protect fauna, flora or ecosystems, such as areas designated as seabird breeding sanctuaries and regulation of activities near and at seabird colonies in the breeding season. Over the past decade, considerable effort has been invested in identifying marine areas and coastlines vulnerable to oil spills as well as key habitats, migration routes, and the population size and ecology of sensitive species and resources in Greenland, resulting in a number of strategic environmental impact assessments (SEIAs) for hydrocarbon exploration and exploitation activities (Boertmann, D. & Mosbech 2011, Boertmann et al. 2013, Boertmann, D. & Mosbech, A. b 2011, Frederiksen et al. 2012, Merkel et al. 2012). Recent (and ongoing) processes that build on the SEIAs have been made to identify ecologically valuable and sensitive marine areas. Two of these processes were based on IMO´s Criteria for Particular Sensitive Sea Areas (PSSA) (Christensen et al., 2012, and Mosbech, Christensen & Falk in AMAP/ CAFF/ SDWG, 2013 – the AMSA II C report). Through these processes 12 areas have been identified and ranked in four priority categories.

Another ongoing study will result in a report identifying important biodiversity areas (including hotpots) in Greenland. Included is a thorough analysis of the distribution of single species (including IUCN Red Listed species), ecosystems, areas with high diversity of certain groups, etc. The study includes a ranking, based on internationally accepted criteria (such as the EBSA criteria) and nationally criteria (such as importance for ecosystem services).

Iceland

Iceland has protected around 30 marine areas on the basis of the Law on Nature Conservation and Law on Fishery within its EEZ. Some of those areas have the aim of protecting vulnerable bird species based on the Nature Conservation Strategy. Many areas have been closed and designated as MPAs in order to protect cold-water corals. Two areas include hydrothermal vents and one area, Surtsey, is a World Heritage site. The 30 areas are

either multiple use areas or no-take zones depending on the objective of the protection. Fourteen of the 30 areas have been submitted to the OSPAR MPAs network. All the areas are within the large marine ecosystem (LME) that surrounds Iceland. In addition to the 30 MPAs, extensive areas are protected within Iceland's EEZ either with temporary closures or by permanently closing areas. Within those areas, either all fishing is prohibited or the use of certain fishing gears is prohibited in order to protect fish stocks, spawning grounds or benthic species. The number and sizes of those additionally protected areas are not available at this time. Efforts to strengthen and expand the national system of MPAs are ongoing.

Norway

In the inaugural declaration of the Norwegian government that came into power in the autumn of 2001, ecosystem-based plans for all Norwegian Sea areas were promised. The management plan for the Barents Sea–Lofoten area (set in place in 2006) identified particularly valuable and vulnerable areas within the management plan area that were identified as being of great importance for biodiversity and for biological production in the entire management plan area. Adverse impacts in these areas, especially as a result of climate change, might be long-lasting or irreversible. Special caution will be required in these areas. Furthermore, Norway submitted the marine part of seven national parks and four nature reserves in Svalbard as OSPAR Marine Protected Areas. The aim of designating these areas as OSPAR MPAs reflects that of the national regulation, and also aims to protect and conserve several species and habitats on the OSPAR list in a part of the OSPAR maritime area not presently covered by existing OSPAR MPAs. In ad¬dition, a network of smaller marine protected areas will be established along the coast of Norway, in order to maintain biodiversity and keep certain areas more or less undisturbed to facilitate research and monitoring. A plan for marine protected areas has been drawn up, but the final selection of areas must still be decided.

Russia

In the Arctic zone of the Russian Federation there is a national protected area network as well as seven regional networks. Efforts to strengthen and expand the national and regional systems of protected areas are ongoing. Five new federal MPAs are currently in the process of being established. The identification and planning of new protected areas are initiated by federal and regional governments through independent processes. There is no independent planning system for MPAs. The identification and planning of new MPAs is part of general protected area system planning. In 2008, a national gap analysis was conducted that identified 37 key marine areas in need of protection in the Arctic (http://www.wwf.ru/resources/publ/book/eng/293). In 2011, an atlas of marine and coastal biodiversity in the Russian Arctic was issued (available at http://www.wwf.ru/resources/publ/book/eng/500). Gap analysis for Arctic MPAs is in preparation.

United States

The United States has established 15 MPAs in the Arctic, all of which allow multiple uses. Eight of these MPAs are managed by NOAA Fisheries to protect marine mammals from fisheries impacts, and do not provide broad protection for biodiversity or marine ecosystems generally. Two are national parks and two are national wildlife refuges. The National System of MPAs is made up of existing MPAs managed by federal, state and tribal agencies, and aims to enhance management through collaboration and capacity development. Efforts to strengthen and expand the National System of MPAs are ongoing, and three of the MPAs in the U.S. Arctic are members of the National System. The U.S. is not conducting a separate regional MPA network planning process in the Arctic. Efforts to identify and plan new MPAs are initiated by individual MPA programs, states and communities, not through a single central planning process. Alaska is the only state in the U.S. Arctic.

5.0 Key Challenges

Advancing toward the pan-Arctic Network of MPAs is likely to face a variety of challenges. The scientific and policy complexities of MPAs and MPA networks are made even more prominent by the Arctic's dynamic marine environment and the region's multiple governing structures.   Among the more pronounced challenges likely to be encountered are: limitations in the availability of scientific information, diverse and widely-dispersed stakeholder communities, variability in governance regimes and national priorities, sustainable funding, and a shifting environmental baseline. While these challenges are real, and in some cases considerable, progress can be made through strategic and targeted collaboration on shared priorities.

Natural and social science data limitations in regions of the Arctic seas remain, fueled by insufficient scientific funding driven in part by the high cost of doing science in the remote, hostile Arctic environment. The lack of a robust scientific baseline on which to base analyses and inform decision-making about the pan-Arctic network of MPAs is a key consideration and will require concerted efforts to address. Ongoing efforts to synthesize existing information include the CBD EBSA Arctic Workshop held in Helsinki March 2014,[6] but additional efforts to fill knowledge gaps are still needed. Gathering TLK will also contribute valuable information and help to fill science gaps. International databases such as the World Database on Protected Areas track MPA establishment globally (www.protectedplanet.org; www.MPAtlas.org), and databases developed through Arctic Council initiatives, and the GRID database (www.grida.no) provide timely and usable environmental data to the world community of researchers and policy makers. Cooperation on Arctic marine science, TLK, data sharing, and rigorous scientific analyses, complimented by a proactive approach to decision-making using the best available scientific data will best equip Arctic States to meet this challenge.

Engaging stakeholders to build awareness and ensure local input in the context of the pan-Arctic network will be challenged by the geographic expanse of the Arctic region and subsequent remote and isolated location of most communities. Local communities may have concerns about the potential restrictions on resource use, with impacts to food security and ways of life. Other interested stakeholder groups – from conservation organizations to industry -- are geographically located far from the Arctic region, also making engagement difficult. Involving all interested stakeholders is nevertheless a cornerstone of establishing and managing effective MPAs and MPA networks.   Deliberate, well-planned and resourced stakeholder engagement around the pan-Arctic MPA network will be required. Through its extensive network

6.   http://www.cbd.int/doc/meetings/sbstta/sbstta-18/information/sbstta-18-ebsaws-2014-01-05-en.pdf

of stakeholders and convening power, the Arctic Council offers a significant contribution to coordination broader stakeholder engagement efforts and sharing information and best practices about the stakeholder engagement efforts of Members.

A similarly diverse range of MPA governance regimes, national priorities, and planning approaches across Arctic States may also present challenges in the context of coordinating the pan-Arctic MPA Network.   At the most basic level, each State's approach to MPA is uniquely defined its statutory authorities, MPA programs, and related conservation objectives for which MPAs are authorized (see Annex 4 for more information on each State's MPA authorities and programs).   Adding to the complexity, and partly due to the diversity of stakeholder interests, prioritization of MPAs in the context of marine management varies across Arctic States generally, but also shifts over time as changes in ruling political party and public opinion occur.   To this end, a pan-Arctic Network that emphasizes intergovernmental cooperation and information sharing will be necessary to create a stable basis for long-term relationships to meet desired goals that can cultivate synergies and opportunities for improved collaboration and coordination on the range of MPA issues.

To facilitate and encourage robust participation in the pan-Arctic MPA network, the effort will need to produce useful and value-added outcomes to the States and others involved. Doing so will require funding to engage and convene interested parties, develop and disseminate useful science and management tools and products, and advance cooperation in advancing a network. The specific amount of funding is scalable to the level of effort being undertaken and may be complemented or offset by in-kind contributions from States or other possible sources of funding.

Finally, as impacts from changing ice conditions, warming ocean waters, ocean acidification, and other CO_2-related continue and are expected to increase in the Arctic, conservation needs and priorities will also need to respond accordingly. MPAs and MPA networks offer Arctic States a key tool to strengthen ecological resilience in the marine environment in the face of these changes. The rapidly changing landscape and dynamics of the Arctic marine environment will require multi-faceted, and likely new approaches to planning and mainstreaming adaptive management in MPAs.   A better understanding of how knowledge of ecological impacts can inform spatial planning is needed so that necessary adjustments can be made to MPA boundaries, conservation objectives and management measures. It can take a long time—a decade or more—to establish new MPAs and other habitat conservation measures (Beaufort Sea Partnership 2009).   Processes to update management plans and

regulations can also span long time periods. The rate of change in habitat conditions might exceed the capacity of Arctic States, co-management institutions and partners to reassess and establish MPAs early enough to be effective and avoid critical tipping points (Eamer et al 2013).

These challenges to the pan-Arctic MPA network must not be overlooked. Any such effort that does not consider the core social and environmental characteristics of the surrounding landscape not only risks near-term lack of success, but could also jeopardize the prospects for intergovernmental coordination on Arctic MPAs for many years to come. A pan-Arctic MPA network that emphasizes and mainstreams the principles outlined in Section 3.1 will be well-suited to addressing these and other institutional and environmental challenges.

6.0   Arctic Council Implementation

6.1   Moving Forward: A Regional Arctic Approach

Given the unique circumstances of the Arctic, the following approaches will be particularly important to the successful development of MPA networks in this region.

- Managing for change. As noted, climate change impacts are already being felt in the region, together with associated economic and social changes. The pan-Arctic network must be designed to adaptively manage areas in light of current and expected changes. This will require a proactive approach, and a recognition that the spatial distribution of resources is likely to change over time, including the introduction of new species. Connectivity is particularly important as a network principle in a dynamic environment.

- Being flexible. MPAs have been a successful management tool in many diverse regions because they can be adapted to local circumstances. Arctic managers will need to consult with indigenous peoples and local communities to identify appropriate boundaries and levels of protection. Examples could include dynamic MPAs that protect ecologically important areas that move over time, or seasonal protective measures.

- Engaging indigenous peoples. Indigenous communities are closely tied to and dependent on the land and sea for survival, and must be active partners in decisions regarding the design and management of MPAs. Moreover, traditional knowledge embodies a broad and deep understanding of this environment and the changes it is undergoing – providing information essential to the effective management of these areas.

• Communicating and engaging stakeholders about MPAs. It will be important to communicate and engage with all relevant stakeholders; including indigenous peoples, local communities and more distant but interested stakeholders about the purpose and goals of MPAs, and the benefits they can provide.

• Building on and connecting with related Arctic Council work. Because MPA networks are place-based, and address a wide range of issues within those geographic spaces, there are many opportunities for strengthening the network through collaboration between Arctic Council working groups.

• Cooperate with and through relevant competent authorities to support the implementation of the actions identified in this framework.

Arctic States, the working groups, and the MPA-EG in particular could collaborate on several common actions to build and strengthen the pan-Arctic MPA network from both ecological and administrative perspectives, in support of network objectives.

6.2 Near Term Actions (2015-2017)

1. Widen the participation and remit of the MPA-EG so that it becomes a forum for Arctic nation's implementing agencies to discuss shared issues and develop and apply best practices and adaptive management in implementing the Framework for a pan-Arctic MPA network.

2. Develop communications tools for a general audience to expand public understanding and support for the goals and objectives of the Pan-Arctic MPA network.

3. Describe how this Framework will be implemented including options for ensuring meaningful, comprehensive and sustained stakeholder participation.

4. Develop a consistent approach for achieving MPA network design (e.g. representativity, replicated ecological features, adequate and viable site size and density, and connectivity), for example by aligning habitat classification schemes used in different areas of the Arctic to identify the major habitat types within each Large Marine Ecosystem or other management region that could be represented.

5. Refine and map the existing draft inventory of MPAs, "other effective area-based conservation measures" and MPA networks, in order to identify opportunities to enhance and apply network design properties such as, representativity, replication, and connectivity at the pan-Arctic scale.

6. Identify types of important marine areas for protection at the pan-Arctic scale based on common criteria, goals, or objectives developed by the working groups and MPA-EG, as well as identify areas/species in need of joint conservation measures.

7. Identify practical measures to addressing change in the Arctic through adaptive management of MPA networks, including developing options for management measures designed to address changing conditions (e.g. special management for marginal ice zone, seasonal MPAs, etc).

8. Develop and communicate options for financing Arctic MPAs and MPA networks.

9. Identify the range of benefits that MPAs and MPA networks have for sustaining livelihoods and ecosystem services to Arctic indigenous peoples and local residents, especially in light of supporting social-ecological resilience and the capacity to adapt to rapid Arctic change. Communicate these benefits to Arctic decision makers.

6.3 Long Term Actions (2015-2020)

1. Work with other Arctic Council working groups and others to identify and collaborate on shared issues. For example:

a. Ecosystem Approaches (e.g. LME Strategic Objectives, data sharing, risk assessments, etc).

b. Sustainable Development Working Group (e.g. best practices for consulting with indigenous peoples and Arctic communities, incorporating traditional knowledge, etc)

c. Arctic Monitoring and Assessment Program (AMAP) and Conservation of Arctic Flora and Fauna (CAFF) (e.g. MPA monitoring strategies, community based monitoring, links to existing circumpolar biodiversity monitoring program)

d. Pacific Arctic Group and Distributed Biological Observatories (research and monitoring).

2. Develop an agreed methodology to determine regional effectiveness of a pan-Arctic MPA network, and further develop an agreed mechanism to achieve this. Communicate status and progress to the Arctic Ministers.

7.0   Conclusion

Advancing the pan-Arctic MPA network will be an iterative process that will take time, public engagement and support, political commitment and sufficient financial investment. This work should be undertaken as a matter of urgency, given the rapidity of change underway in the Arctic marine environment. Arctic States may choose to identify additional MPAs to strengthen the biodiversity and ecological resilience of the circumpolar Arctic. The actions identified above represent specific opportunities to begin to realize the potential of the pan-Arctic MPA network and the benefits of collaboration across the region.

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Annex 1. PAME Intercessional Expert Group for a Pan-Arctic Network of Marine Protected Areas

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* These individuals are not active participants, but are contributing expertise and monitoring progress

Annex 2. Glossary of terms and acronyms

2.1 Acronyms

ABA	Arctic Biodiversity Assessment
ABNJ	Areas Beyond National Jurisdiction (high seas)
AMAP	Arctic Monitoring and Assessment Programme Working Group (of the Arctic Council)
AMSP	Arctic Marine Strategic Plan (of the Arctic Council)
ArkGIS	Arctic Geographical Information System (developed by WWF)
CAFF	Conservation of Arctic Flora and Fauna Working Group (of the Arctic Council)
CBD	Convention on Biological Diversity
CBMP	Circumpolar Biodiversity Monitoring Program (of CAFF)
CEC	Commission for Environmental Cooperation (under North American Free Trade Agreement)
CPAN	Circumpolar Protected Area Network (of CAFF)
DFO	Fisheries and Oceans Canada
EA-EG	Ecosystem Approach to Management Expert Group (of PAME)
EBM	Ecosystem-based management
EBSA	Ecologically and Biologically Significant Area
EEZ	Exclusive Economic Zone
GIS	Geographic Information System
HELCOM	Helsinki Commission
ICES	International Council for the Exploration of the Sea
IMO	International Maritime Organization
IOMP	Integrated Ocean Management Plan
IUCN	International Union for the Conservation of Nature
LME	Large Marine Ecosystem
MARPOL	International Convention for the Prevention of Pollution from Ships (of the IMO)
MPA	Marine Protected Area
MPA-EG	Pan-Arctic MPA Network Expert Group (of PAME)
MSP	Marine Spatial Planning
NMCA	National Marine Conservation Area (of Parks Canada)
NOAA	National Oceanic and Atmospheric Administration
NRDC	Natural Resources Defense Council
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PAME	Protection of the Arctic Marine Environment Working Group (of the Arctic Council)
PISCO	Partnership for Interdisciplinary Studies of Coastal Oceans
PSSA	Particularly Sensitive Sea Area
SWIPA	Snow, Water, Ice and Permafrost in the Arctic (of AMAP)
TLK	Traditional and Local Knowledge
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNEP	United Nations Environment Programme
VEC	Valued Ecosystem Component
WCPA	World Commission on Protected Areas (of IUCN)
WDPA	World Database on Protected Areas (of UNEP / IUCN)
WCMC	World Conservation Monitoring Centre (of UNEP)
WWF	World Wildlife Fund

2.2   Terms

Adaptive management: A systematic process for continually improving management policies and practices by learning from the outcomes of previously employed policies and practices.

Adequacy and viability: CBD network design criterion related to ensuring that all MPAs in the network have the size and protection necessary for ecological viability and integrity. MPAs need to be large enough and sited appropriately to protect and maintain ecological processes that help to maintain biodiversity (such as nutrient flows, disturbance regimes and food-web interactions).

Aichi Target 11: By 2020, at least 17 per cent of terrestrial and inland water areas 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 landscape and seascape. (CBD)

Arctic: The land and sea north of the Arctic Circle, where the sun does not set on the summer solstice and does not rise on the winter solstice. This includes the land north of the tree line (comprising about 7.1 million km2, or some 4.8% of the land surface of Earth) and the extent of cold Arctic water bordering temperate waters (EEZs + high seas), covering about 10 million km2. (CAFF-ABA)

Connectivity: CBD network design criterion related to ensuring that individual MPAs can benefit from each other, for example, by establishing functional linkages between larval production areas and other geographically separate areas required for subsequent life stages.

Conservation feature: A valued ecosystem component (VEC) that has an operational network objective and conservation target associated with it. In systematic conservation planning, a conservation feature is: "a measurable, spatially definable component of biodiversity that is to be conserved within a reserve network. Conservation features can be defined at different levels of ecological scale, e.g., it is possible to protect species, communities, habitat types, populations, and genetic subtypes.

Conservation Target: In general terms, a target is a clearly defined development goal that should be "SMART" (i.e., specific, measureable, achievable, realistic and time related). In the context of the network, a conservation target is a spatial, quantitative interpretation of a network objective (usually in the form of a percentage, but not always) that reflects the desired coverage of each conservation feature in the network. Conservation targets may also relate to spatial rules of thumb for size and spacing of individual spatial conservation measures in the network.

Culture: The totality of the created world, including the constructed physical and social environments, material artefacts, social institutions, knowledge systems and worldviews. Culture is comprised of multifaceted, interconnected systems that cannot be understood without giving attention to the different parts.

Culturally important area: An area identified as having cultural importance according to criteria in the framework. These areas are incorporated into the MPA network design process.

Cumulative impact: The impact on the environment caused by a human activity which results in an incremental impact in combination with other past, present and reasonably foreseeable future human activities.

Depleted or rare species: Depleted or Rare species are species that are both currently at a very low abundance, and usually were much more abundant at some time in the past. Because of their status, they warrant particularly risk averse management to ensure their survival and recovery.

Ecologically and Biologically Significant Area (EBSA): As defined by the CBD, an EBSA is a geographically or oceanographically discrete area that provides important services to one or more species/populations of an ecosystem or to the ecosystem as a whole, compared to other surrounding areas or areas of similar ecological characteristics, or that otherwise meets the criteria as identified in annex I to decision IX/20. (Annex I is more commonly known as the Azores Report, published by the CBD Secretariat in 2009)

Ecological risk assessment: The process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors.

Ecological component: Ecosystems consist of various non-living abiotic and living biotic components. The abiotic components of an ecosystem include various physical and chemical factors.

Ecological resilience: The capacity of an ecosystem to respond to a perturbation or disturbance by resisting degradation and recovering quickly.

Ecosystem: A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. The concept is applicable at any scale, from the planet as an ecosystem to a microscopic colony of organisms and its immediate surroundings.

Ecosystem Approach: The comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.

Ecosystem services: Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other nonmaterial benefits.

Focal species: Focal species are those which, for ecological or social reasons, are believed to be valuable for the understanding, management and conservation of natural environments.

Functional food web: A food web that consider the impact of each species or trophic species on the population sizes and dynamics of the other species in the food web.

Human activities: Human activities, sources or sub-activities are entities or actions that are released or impose pressures on the environment.

Marine Protected Area (MPA): A clearly defined geographical space recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (IUCN)

Marine Protected Area Network: A collection of individual marine protected areas that operates cooperatively and synergistically, at various spatial scales, and with a range of protection levels, in order to fulfill ecological aims more effectively and comprehensively than individual sites could alone. (IUCN)

Measurable endpoint: A measurable ecological, social, cultural or economic value that is related to the valued component chosen as the endpoint. A measurable endpoint establishes the link between an endpoint and the management or conservation objective identified by resource managers.

Other Effective Area-Based Conservation Measure: A spatial conservation measure that meets certain criteria for inclusion in domestic or international reporting against the CBD target known as Aichi Target 11.

Pan-Arctic Marine Protected Area Network: A collection of individual marine protected areas and other effective area-based conservation measures in the Arctic that operate cooperatively and synergistically, at various spatial scales, and with a range of protection levels, in order to fulfill ecological aims more effectively and comprehensively than individual sites could alone.

Pressure: Any chemical, physical or biological entity that can cause an adverse effect on a measurable endpoint(s).

Replication: CBD network design criterion related to ensuring that more than one example of each ecological feature (e.g., species such as whales, fish, seabirds, invertebrates; habitats such as seamounts, banks, basins, canyons; ecological processes such as upwellings) is protected to safeguard against unexpected loss from natural events or human disturbance.

Representative habitat classification scheme: A scheme to subdivide regions, such as LMEs or bioregions, based on habitat differences and species data, where available.

Representative habitat: The more commonly used term for a bioregional subdivision identified through a representative habitat classification scheme.

Representativity: This CBD network design criterion is captured in a bioregional MPA network when the network consists of areas that reasonably reflect the full range of ecosystems within the bioregion, including the biotic and habitat diversity of those marine ecosystems.

Risk: Risk refers to the uncertainty that surrounds future events and outcomes. It is the expression of the likelihood and impact of an event on the environment.

Social, cultural or economic values: Social, cultural or economic values (market or non-market) that can be affected by a change in an ecosystem component or function.

Spatial conservation measure: An inclusive term that can refer to an MPA, an "other effective area- based conservation measure", or any other spatial conservation measure.

Threshold: A limit of change in an ecosystem component/attribute which, if exceeded, requires a change in management for protecting the ecosystem component/attribute. A threshold is defined here as a point between alternate regimes in ecological or social-ecological systems. When a threshold along a controlling variable in a system is passed, the nature and extent of feedbacks change, such that there is a change in the direction in which the system moves. A shift occurs when internal processes of the system (e.g., rates of birth, mortality, growth, consumption, decomposition, leaching, etc.) have changed such that the variables that define the state of the system begin to change in a different direction, towards a different attractor. In some cases, crossing the threshold brings about a sudden, large and dramatic change in the responding variables, whilst in other cases the response in the state variables is continuous and more gradual.

Traditional and Local Knowledge (TLK): Traditional and local knowledge (TLK) refers to a body of evolving practical knowledge based on observations and personal experience of local residents over an extensive, multi-generational time period. TLK typically finds expression in a specific environmental context, as technical mastery or expertise that promotes survival and well-being in that location and is shared primarily through kinship or household networks (Clement, et al., 2013).

Valued ecosystem component (VEC): Any part of the environment that is considered important by proponents, members of the public, scientists and/or governments. Importance may be determined on the basis of cultural values or scientific concerns.
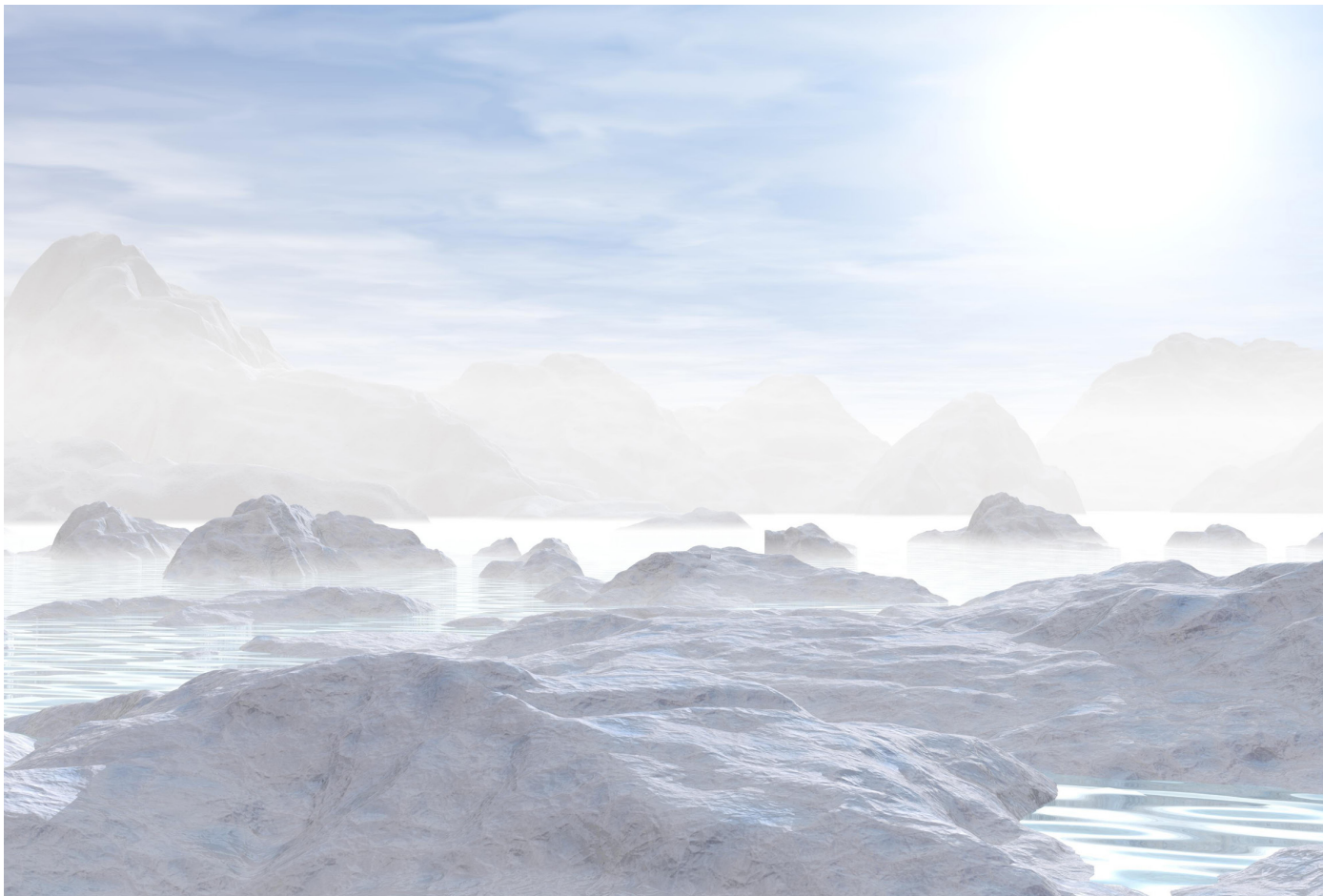
Annex 3. IUCN MPA Definitions and Categories

Marine Protected Area Network (2007):

A collection of individual marine protected areas that operates cooperatively and synergistically, at various spatial scales, and with a range of protection levels, in order to fulfill ecological aims more effectively and comprehensively than individual sites could alone.

Convention on Biological Diversity (CBD) Aichi Target 11:

By 2020, at least…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… seascape. (CBD 2010)

Table 2. IUCN Protected Areas Categories.

IUCN Protected Areas Categories System

IUCN protected area management categories classify protected areas according to their management objectives; they represent the global standard for defining and recording protected areas.

I.a. Strict Nature Reserve: Strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphical features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values.

I.b. Wilderness Area: Usually these are large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

II. National Park: Large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

III. Natural Monument or Feature: Areas set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.

IV. Habitat/Species Management Area: Areas that aim to protect particular species or habitats and management reflects this priority.

V. Protected Landscape/ Seascape: A protected area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value; and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

VI. Protected area with sustainable use of natural resources: Protected areas that conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.

See the IUCN guidelines (Dudley 2008; Day et al. 2012) for guidance in applying these categories.

Annex 4. Status of MPAs, "other measures" and MPA networks in the Arctic

The following tables show details on existing and planned MPAs for the Arctic States. Data were provided by each Arctic State. MPAs encompass a range of protection from multiple use areas to "no take" areas where extractive uses are prohibited, and the level of protection is noted in the tables.

The term *"other effective area-based conservation measure"*, as used in Aichi Target 11 is understood to refer to place-based / spatial conservation measures that have some protection under national or subnational law or policy, or regional management regime, but do not meet the IUCN definition of an MPA (see discussion on p. 15). This list of other measures may be modified to align with the internationally accepted definition once it is finalized.

Greenland (Denmark) - Existing Marine Protected Areas and Other Area Based Conservation Measures

Existing MPAs within the Arctic EEZ:

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Nationalparken i Nord- og Østgrønland (National Park in North- and East Greenland)	Government of Greenland (State)	Ministry of Environment and Nature	87,911	Multiple use	V	To conserve the wilderness of the region and at the same time allow research and public admission. Protection of landscapes, flora, wildlife, prehistoric remains and other cultural relics of the past is the overall objective.
Naturreservatet i Melville Bugt (Nature Reserve in Melville Bay)	Government of Greenland (State)	Ministry of Environment and Nature	8,412	Multiple use	V	Officially to protect "the wildlife", but indirectly more specific to protect narwhal and polar bear in the area
Ilulissat Isfjord (Protection of Ilulissat Icefjord)	Government of Greenland (State)	Ministry of Environment and Nature	399	Multiple use	V	To protect the natural beauty of the Icefjord, as well as the area's natural and cultural history, and other natural values
Kitsissunnguit (Protection of the Ramsar Site Green Ejland)	Government of Greenland (State)	Ministry of Environment and Nature	61	Multiple use	V / VI	To protect and improve the Ramsar site - its ecosystem and the rich biodiversity of the area with special focus on breeding arctic terns and the importance as recreation site
Ivittuut og Kangilinnguit (Protection of the Ikka Fjord and adjacent landarea)	Government of Greenland (State)	Ministry of Environment and Nature	106	Multiple use	V / VI	To protect the inner part of Ikka Fjord that hosts a unique ecosystems

Existing "Other Effective Area-based Conservation Measures" within the EEZ

Area Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (5)
Zonation around all birdclifs	Government of Greenland (State)	Ministry of Fisheries, Hunting and Agriculture	802			Protection of bird species
13 Bird Reserves	Government of Greenland (State)	Ministry of Fisheries, Hunting and Agriculture	339			Protection of birds on particular locations

GENERAL NOTES:

(1) Federal, State, Provincial, Other

(2) Includes marine area up to high water mark only; no terrestrial area

(3) No-take or Multiple use

(4) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage

(5) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage or Sustainable Production (fisheries management)

Canada - Existing and Planned Marine Protected Areas

Existing MPAs within the Arctic EEZ:

MPA Name	Level of Government (1)	Management Agency	Approximate Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Tarium Niryutait	Federal	Fisheries and Oceans Canada (DFO)	1,740 (total for DFO areas)	Multiple use	Not assigned	Natural Heritage
Aulavik National Park of Canada	Federal	Parks Canada (PC)		Multiple use	II	Natural Heritage
Ivvavik National Park of Canada	Federal	Parks Canada		Multiple use	II	Natural Heritage
Quttinirpaaq National Park of Canada	Federal	Parks Canada		Multiple use	II	Natural Heritage
Ukkusiksalik National Park of Canada	Federal	Parks Canada		Multiple use	II	Natural Heritage
Wapusk National Park of Canada						
Sirmilik National Park of Canada	Federal	Parks Canada		Multiple use	II	Natural Heritage
Auyuittuq National Park of Canada	Federal	Parks Canada	7,927 (total for Parks Canada areas)	Multiple use	II	Natural Heritage
Hannah Bay Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Banks Island Migratory Bird Sanctuary No. 1	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Banks Island Migratory Bird Sanctuary No. 2	Federal	Environment Canada (EC)		Multiple use	IA	Natural Heritage
Prince Leopold Island Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Anderson River Delta Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Kendall Island Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Nirjutiqavvik National Wildlife Area	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Akpait National Wildlife Area	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Ninginganiq National Wildlife Area	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Akimiski Island Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Harry Gibbons Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
East Bay Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Seymour Island Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IA	Natural Heritage
Dewey Soper Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Polar Bear Pass National Wildlife Area	Federal	Environment Canada (EC)		Multiple use	IA	Natural Heritage
Moose River Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage

MPA Name	Level of Government (1)	Management Agency	Approximate Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Boatswain Bay Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IA	Natural Heritage
McConnell River Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IA	Natural Heritage
Cape Parry Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IA	Natural Heritage
Queen Maud Gulf Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	IB	Natural Heritage
Bylot Island Migratory Bird Sanctuary	Federal	Environment Canada (EC)		Multiple use	II	Natural Heritage
Qaqulluit National Wildlife Area	**Federal**	**Environment Canada (EC)**	**19,204 (total for Environment Canada areas)**	**Multiple use**	**IB**	**Natural Heritage**
Proposed Quaqtaq-Kangirsuk Biodiversity Reserve	**Provincial**	**Quebec (Arctic shoreline)**		**Multiple use**	**III**	**Natural Heritage**
Proposed Kangiqsujuaq Biodiversity Reserve	**Provincial**	**Quebec (Arctic shoreline)**		**Multiple use**	**III**	**Natural Heritage**
Proposed Fjord-Tursukattaq Biodiversity Reserve	**Provincial**	**Quebec (Arctic shoreline)**		**Multiple use**	**III**	**Natural Heritage**
Kuururjuaq National Park (Quebec)	**Provincial**	**Quebec (Arctic shoreline)**		**Multiple use**	**II**	**Natural Heritage**
Cap-Wolstenholme National Park Reserve (Quebec)	**Provincial**	**Quebec (Arctic shoreline)**		**Multiple use**	**II**	**Natural Heritage**
Monts-de-Puvirnituq National Park Reserve (Quebec)	**Provincial**	**Quebec (Arctic shoreline)**		**Multiple use**	**II**	**Natural Heritage**
Lac-Burton-Rivière-Roggan-et-la-Pointe-Louis-XIV Land Reserved For Protected Area	**Provincial**	**Quebec (Arctic shoreline)**		**Multiple use**	**II**	**Natural Heritage**
Proposed Estuaire-des-Rivières-Koktac-et-Nauberakvik Biodiversity Reserve	**Provincial**	**Quebec (Arctic shoreline)**		**Multiple use**	**III**	**Natural Heritage**
Proposed Paakumshumwaau-Maatuskaau Biodiversity Reserve	**Provincial**	**Quebec (Arctic shoreline)**	**939 (total for Quebec areas)**	**Multiple use**	**III**	**Natural Heritage**
Kaskatamagan Wildlife Management Area	**Provincial**	**Manitoba**	**82**	**Multiple use**	**II**	**Natural Heritage**
(n/a)	**Territorial**	**YT / NT / NU**				

Planned MPAs within the Arctic EEZ:

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Anguniaqvia Niqiqyuam	Federal	DFO	2,361	Multiple use	Not defined	Natural Heritage
Lancaster Sound	Federal	Parks Canada	44,000	Multiple use	Not defined	Natural Heritage

GENERAL NOTES:

(1) Federal, State, Provincial, Other

(2) Includes marine area up to high water mark only; no terrestrial area

(3) No-take or Multiple use

(4) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage

(5) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage or Sustainable Production (fisheries management)

Web link for MPAs information: available via Google Earth (http://www.ccea.org/tools-resources/carts/visualize-carts/)

Iceland - Existing Marine Protected Areas

Existing MPAs within the Arctic EEZ:

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Hornafjarðardjúp 1	State	Directorate of Fisheries	8			
Hornafjarðardjúp 2	State	Directorate of Fisheries	32			
Skaftárdjúp 1	State	Directorate of Fisheries	7			
Skaftárdjúp 2	State	Directorate of Fisheries	22			
Reynisdjúp	State	Directorate of Fisheries	9			
Skeiðarárdjúp	State	Directorate of Fisheries	65			
Lónsdjúp	State	Directorate of Fisheries	77			
Lónsdjúp-Papagrunn landgrunnskantur	State	Directorate of Fisheries	78			
Papagrunn	State	Directorate of Fisheries	17			
Rósagarður	State	Directorate of Fisheries	164			
Hverastrýtur 1	State	Environmental Agency	0		III	
Hverastrýtur norður af Arnarnesnöfum	State	Environmental Agency	1		III	
Eldey	State	Environmental Agency	14		Ia	
Surtsey	State	Environmental Agency	65		Ia	
Breiðarfjörður	State	Environmental Agency	2,809		V	
Andakill	State	Environmental Agency	31		IV	
Fjaran við Kasthússtjórn	State	Environmental Agency	0		V	
Grotta	State	Environmental Agency	0		IV	
Gunnafjörður	State	Environmental Agency	14		IV	
Hvaleyrarlon og Hvaleyrarhofdi	State	Environmental Agency	0		V	
Hlið, Alftanesi	State	Environmental Agency	0		V	
Hleinar	State	Environmental Agency				
Skerjafjordur innan Gardabaejar	State	Environmental Agency	4		VI	
Skerjafjordur innan Kopavogs	State	Environmental Agency	1		IV	

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Skrúður	State	Environmental Agency	2		VI	
Strondin vid Stapa og Hellna	State	Environmental Agency	1		VI	
Vatnsfjörður	State	Environmental Agency				
Hrísey	State	Environmental Agency				
Flatey	State	Environmental Agency				
Melrakkaey	State	Environmental Agency				

GENERAL NOTES:

(1) Federal, State, Provincial, Other

(2) Includes marine area up to high water mark only; no terrestrial area

(3) No-take or Multiple use

(4) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage

(5) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage or Sustainable Production (fisheries management)

Web link for MPAs information: http://mpa.ospar.org/home_ospar/mpa_datasheets

Norway - Existing Marine Protected Areas and Other Area-Based Conservation Measures

Existing MPAs within the EEZ (add rows as necessary): MPA 1-7 are "OSPAR MPAs". Area 8 is part of the national network of MPAs.

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Røstrevet	Federal	Directorate of fisheries	305	Multiple use, but restrictions on trawling on coral reefs (bottomtrawl prohibited)		Natural Heritage.
Svalbard West	Federal	The governor of Svalbard	20,044	Multiple use		Natural Heritage.
Svalbard East	Federal	The governor of Svalbard	55,467	Multiple use		Natural Heritage.
Bjørnøya	Federal	The governor of Svalbard	2,805	Multiple use		Natural Heritage.
Jan Mayen	Federal		4,315	Multiple use		Natural Heritage.
Korallen	Federal	Directorate of fisheries	4	Multiple use, but restrictions on trawling on coral reefs (bottomtrawl prohibited)		Natural Heritage.
Trænarevet	Federal	Directorate of fisheries	445	Multiple use, but restrictions on trawling on coral reefs (bottomtrawl prohibited)		Natural Heritage.
Saltstraumen	Federal		25	Multiple use, but restrictions on activities that may harm benthic organisms.		Natural Heritage. Aims to protect an area containing endangered, rare and vulnerable nature, represent specific nature types and having special scientific value. The area will also serve as a reference area for research and monitoring. The worlds strongest tidal current.

Existing "Other Effective Area-based Conservation Measures" within the EEZ

The areas listed below are identified in the Norwegian management plans for the Barents Sea (no. 1 - 6) and the Norwegian Sea (7. -) as particularly valuable and vulnerable areas that require spcial attention. These are areas that on the basis of scientific assessments have been identified as being og great importance for biodiversity (e.g. diversity, endangered or vulnerable species or habitats, key areas etc.) and for biological production, and where adverse impacts might persist for many years.

Area Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (5)
Area from the Lofoten Islands to the Tromsøflaket, including the edge of the continental shelf	Federal	Directorates		Multiple use, but restrictions on petroleum activity and trawling on coral reefs.	N/A	Spatial and temporal consentration of eggs and larvae of various fish species. Important feeding, breeding, moulting and wintering area for seabirds and marine mammals. Valuable sponges and cold water coral habitats.
The Tromsøflak bank area	Federal	Directorates		Multiple use, but restrictions on petroleum activity.	N/A	Area where the water masses have a relatively long residence time. This gives longer retention times for fish larvae and other passively drifting organisms. Important breeding and wintering areas for seabirds. Large and important sponge communities.
50-km zone outside the baseline from Tromsflaket to the border with Russia	Federal	Directorates		Multiple use, but restrictions on petroleum activity.	N/A	Spatial and temporal consentration of eggs and larvae of various fish species. Important feeding, breeding, moulting and wintering area for seabirds and marine mammals. Valuable coral habitats.
The marignal ice zone (MIZ)	Federal	Directorates	563,324	Multiple use. No petroleum activity.	N/A	Highly productive area. Important feeding area for zooplankton, fish, seabirds and marine mammals. Consentrations of grazing species can be very high. Several Red listed speceis.
Polar front	Federal	Directorates	23,641	Multiple use, No petroleum activity.	N/A	A limited area with high concentration of biolgical production that supports high biodiversity.
The waters around Svalbard, including Bjørnøya	Federal	Directorates		Multiple use, but restrictions on certain types of fisheries. No petroleum activity.	N/A	Important feeding, breeding, moulting and wintering area for seabirds and marine mammals. Several Red listed species.
Jan Mayen	Federal	Directorates	16,045	Multiple use	N/A	Natural Heritage.
Arctic front	Federal	Directorates	58,132	Multiple use	N/A	Natural Heritage.
Edge of the continental shelf	Federal	Directorates	53,262	Multiple use	N/A	Natural Heritage. The larger part of this area streches out of the CAFF area.
Vestfjorden/Vesterålen islands	Federal	Directorates	23,224	Multiple use	N/A	Natural Heritage. Partly overlap with area 1. above.

GENERAL NOTES:

(1) Federal, State, Provincial, Other

(2) Includes marine area up to high water mark only; no terrestrial area

(3) No-take or Multiple use

(4) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage

(5) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage or Sustainable Production (fisheries management)

Russia - Existing and Planned Marine Protected Areas and Other Area-Based Conservation Measures

Existing MPAs within the EEZ

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Total area (including coastal and marine parts)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Great Arctic	Federal	Ministry of Natural Resources and the Environment	9,809	41,692	No-take	Ia,Ib	Natural Heritage
Gydansky	Federal	Ministry of Natural Resources and the Environment	-	8,782	No-take	Ia,Ib	
Kandalakshsky	Federal	Ministry of Natural Resources and the Environment	496	705	No-take	Ia,Ib	Natural Heritage
Nenetsky zapovednik	Federal	Ministry of Natural Resources and the Environment	1,819	3,134	No-take	Ia,Ib	Natural Heritage
Nenetsky zakaznik	Federal	Ministry of Natural Resources and the Environment	-	3,085	Multiple use, but in fact the area is inaccessible	IV	
Franz-Joseph Land	Federal	Ministry of Natural Resources and the Environment	25,647	42,000	Multiple use, but in fact the area is inaccessible	IV	Natural Heritage
Nizhne-Obsky	Federal	Ministry of Natural Resources and the Environment	-	1,280	Multiple use, but in fact the area is inaccessible	IV	
Severozemelsky	Federal	Ministry of Natural Resources and the Environment	748	4,217	Multiple use, but in fact the area is inaccessible	IV	Natural Heritage
Wrangel Island	Federal	Ministry of Natural Resources and the Environment	14,300	22,257	No-take	Ia	Natural Heritage
Wrangel Island buffer zone	Federal	Ministry of Natural Resources and the Environment	36,040	-	Multiple use, but in fact the area is inaccessible	IV	Natural Heritage
Taymyrsky	Federal	Ministry of Natural Resources and the Environment	370	17,819	No-take	Ia	Natural Heritage
Russian Arctic	Federal	Ministry of Natural Resources and the Environment	7,939	14,260	No-take	II	Natural Heritage
Beringia	Federal	Ministry of Natural Resources and the Environment	3,322	18,199	No-take	II	Natural Heritage
Onezhskoe Pomorie	Federal	Ministry of Natural Resources and the Environment	210	2,017	No-take	II	Natural Heritage
41 regional PAs	Regional	Regional Governments	-	200,000	No-take	Ib	Natural Heritage

Planned MPAs within the EEZ:

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Total area	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
New Siberian Islands national park	Federal	Ministry of Natural Resources and the Environment			no-take	II	Natural Heritage
Enlargement of the Russian Arctic national park	Federal	Ministry of Natural Resources and the Environment			no-take	II	Natural Heritage
Buffer zone of the Taymyr reserve	Federal	Ministry of Natural Resources and the Environment			multiple use, but in fact the area is inaccessible	IV	Natural Heritage
Buffer zone of the Russian Arctic national park	Federal	Ministry of Natural Resources and the Environment			multiple use, but in fact the area is inaccessible	IV	Natural Heritage
Buffer zone of the Onezhskoe Pomorie national park	Federal	Ministry of Natural Resources and the Environment			multiple use	IV	Natural Heritage
Buffer zone of the Kandalaksha reserve	Federal	Ministry of Natural Resources and the Environment			multiple use	IV	Natural Heritage
Buffer zone of the Beringia national park	Federal	Ministry of Natural Resources and the Environment			multiple use	IV	Natural Heritage
Buffer zone of the Nenetsky reserve	Federal	Ministry of Natural Resources and the Environment			multiple use	IV	Natural Heritage

Planned "Other Effective Area-based Conservation Measures" within the EEZ

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)		Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Temporary Fishery closures	Federal	Fishery Agency	500,000		Multiple use	N/A	Sustainable Production
Marine Mammals protection Zones	Federal	Fishery Agency	70000		No take	N/A	Ecosystems & biodiversity protection
Fishery Marine Protected Zone	Fishery Agency	Fishery Agency	21,000		Multiple use (no drilling)	N/A	Sustainable Production

GENERAL NOTES:

(1) Federal, State, Provincial, Other

(2) Includes marine area up to high water mark only; no terrestrial area

(3) No-take or Multiple use

(4) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage

(5) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage or Sustainable Production (fisheries management)

United States - Existing Marine Protected Areas and Other Area-Based Conservation Measures

Existing MPAs within the EEZ:

MPA Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (4)
Cape Krusenstern National Monument	Federal	National Park Service	36	Uniform Multiple Use		Cultural Heritage
Alaska Maritime National Wildlife Refuge	Federal	U.S. Fish and Wildlife Service	595	Uniform Multiple Use		Natural Heritage
Arctic National Wildlife Refuge	Federal	U.S. Fish and Wildlife Service	407	Uniform Multiple Use		Natural Heritage
Bering Land Bridge National Park and Preserve	Federal	National Park Service	358	Uniform Multiple Use		Natural Heritage
Northern Bering Sea Research Area	Federal	National Marine Fisheries Service	217,834	Uniform Multiple Use		Natural Heritage
Steller Sea Lion Protection Areas, Aleutian Islands Subarea - Groundfish, Pollock, Pacific Cod, and Atka Mackerel Closures	Federal	National Marine Fisheries Service	96,403	Zoned Multiple Use		Natural Heritage
Steller Sea Lion Protection Areas, Aleutian Islands Subarea - Seguam Foraging Area	Federal	National Marine Fisheries Service	7,282	Uniform Multiple Use		Natural Heritage
Steller Sea Lion Protection Areas, Bering Sea Subarea - Bogoslof Area	Federal	National Marine Fisheries Service	36,862	Zoned Multiple Use		Natural Heritage
Steller Sea Lion Protection Areas, Bering Sea Subarea - Groundfish, Pollock, Pacific Cod, and Atka Mackerel Closures	Federal	National Marine Fisheries Service	41,001	Zoned Multiple Use		Natural Heritage
Steller Sea Lion Protection Areas, Bering Sea Subarea - Pollock Restriction Area	Federal	National Marine Fisheries Service	5,350	Uniform Multiple Use		Natural Heritage
Steller Sea Lion Protection Areas, Gulf of Alaska - Atka Mackerel Closure	**Federal**	**National Marine Fisheries Service**	**32,686**	**Uniform Multiple Use**		**Natural Heritage**
Steller Sea Lion Protection Areas, Gulf of Alaska - Groundfish, Pollock, and Pacific Cod Closures	**Federal**	**National Marine Fisheries Service**	**17,727**	**Zoned Multiple Use**		**Natural Heritage**
Walrus Protection Areas	**Federal**	**National Marine Fisheries Service**	**3,234**	**Uniform Multiple Use**		**Natural Heritage**
Yukon Delta National Wildlife Refuge	**Federal**	**U.S. Fish and Wildlife Service**	**11,882**	**Uniform Multiple Use**		**Natural Heritage**
Walrus Islands State Game Sanctuary	**State**	**Alaska Department of Fish and Game**	**743**	**Zoned with No-take Areas**		**Natural Heritage**

Existing "Other Effective Area-based Conservation Measures" within the EEZ

Area Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (5)
Alaska Seamount Habitat Protection Areas	Federal	National Marine Fisheries Service	18,238	Uniform Multiple Use		Sustainable Production
Aleutian Islands Coral Habitat Protection Area	Federal	National Marine Fisheries Service	371	Uniform Multiple Use		Sustainable Production
Aleutian Islands Habitat Conservation Area	Federal	National Marine Fisheries Service	954,394	Uniform Multiple Use		Sustainable Production
Arctic Management Area	Federal	National Marine Fisheries Service	497,614	Uniform Multiple Use		Sustainable Production
Barrow Whaling Withdrawal	Federal	Bureau of Ocean Energy Management	942	Multiple Use		Natural Heritage
Bering Sea Habitat Conservation Area	Federal	National Marine Fisheries Service	157,558	Uniform Multiple Use		Sustainable Production
Bowers Ridge Habitat Conservation Zone	Federal	National Marine Fisheries Service	18,109	Uniform Multiple Use		Sustainable Production
Catcher Vessel Operational Area	Federal	National Marine Fisheries Service	50,739	Uniform Multiple Use		Sustainable Production
Chukchi Sea Coastal Buffer Withdrawal	Federal	Bureau of Ocean Energy Management	26,879	Multiple Use		Natural Heritage
Chukchi Sea Subsistence Withdrawal	Federal	Bureau of Ocean Energy Management	4,716	Multiple Use		Natural Heritage
Chum Salmon Savings Area	Federal	National Marine Fisheries Service	17,555	Uniform Multiple Use		Sustainable Production
Dungeness Crab Commercial Fishery Closures	State	Alaska Department of Fish and Game	1,018	Uniform Multiple Use		Sustainable Production
Groundfish Closed Waters - St. Matthew, Hall, & Pinnacle Islands	State	Alaska Department of Fish and Game	1,132	Uniform Multiple Use		Sustainable Production
Gulf of Alaska Slope Habitat Conservation Areas	Federal	National Marine Fisheries Service	7,224	Uniform Multiple Use		Sustainable Production
Halibut Longline Closed Area	Federal	National Marine Fisheries Service	122,311	Uniform Multiple Use		Sustainable Production
Hanna Shoal Withdrawal	Federal	Bureau of Ocean Energy Management	6,619	Multiple Use		Natural Heritage
Kaktovik Whaling Withdrawal	Federal	Bureau of Ocean Energy Management	491	Multiple Use		Natural Heritage
King Crab Closed Areas	State	Alaska Department of Fish and Game	23,746	Zoned Multiple Use		Sustainable Production
King Crab Closed Areas - St. Matthews, Hall and Pinnacles Islands	State	Alaska Department of Fish and Game	1,132	Uniform Multiple Use		Sustainable Production
Nearshore Bristol Bay Trawl Closure	Federal	National Marine Fisheries Service	64,945	Zoned Multiple Use		Sustainable Production
Non-Pelagic Trawl Gear Restriction Area - Alaska Peninsula	State	Alaska Department of Fish and Game	17,486	Uniform Multiple Use		Sustainable Production
Non-Pelagic Trawl Gear Restriction Area - Eastern Aleutian Islands	State	Alaska Department of Fish and Game	2,483	Uniform Multiple Use		Sustainable Production

Area Name	Level of Government (1)	Management Agency	Marine Area (km2) (2)	Level of Protection (3)	IUCN Category that applies (if known)	Primary Conservation Focus (5)
North Aleutian Basin OCS Planning Area	Federal	Bureau of Ocean Energy Management	135,360	Multiple Use		Natural Heritage
Nunivak/Etolin/Kuskokwim Habitat Conservation Area	Federal	National Marine Fisheries Service	33,023	Uniform Multiple Use		Sustainable Production
Pribilof Island Area Habitat Conservation Area	Federal	National Marine Fisheries Service	19,276	Uniform Multiple Use		Sustainable Production
Red King Crab Savings Area	Federal	National Marine Fisheries Service	13,680	Zoned Multiple Use		Sustainable Production
Scallop Closed Areas - Eastern Aleutian Islands	State	Alaska Department of Fish and Game	2,483	Uniform Multiple Use		Sustainable Production
Scallop Closed Areas - Eastern Bering Sea	State	Alaska Department of Fish and Game	98,708	Uniform Multiple Use		Sustainable Production
Scallop Closed Areas - Petrel Bank	State	Alaska Department of Fish and Game	44,542	Uniform Multiple Use		Sustainable Production
Scallop Closed Areas - Western Bering Sea / Aleutian Islands	State	Alaska Department of Fish and Game	44,541	Uniform Multiple Use		Sustainable Production
Scallop Closed Areas - Westward Gulf, South Alaska Peninsula	State	Alaska Department of Fish and Game	31,039	Uniform Multiple Use		Sustainable Production
St. Lawrence Island Habitat Conservation Area	Federal	National Marine Fisheries Service	24,136	Uniform Multiple Use		Sustainable Production
St. Matthews Island Habitat Conservation Area	Federal	National Marine Fisheries Service	14,953	Uniform Multiple Use		Sustainable Production
Trawl Gear Restricted Area - Bristol Bay	State	Alaska Department of Fish and Game	20,743	Uniform Multiple Use		Sustainable Production
Zone 1 (512) Closure to Trawl Gear	Federal	National Marine Fisheries Service	26,937	Uniform Multiple Use		Sustainable Production
Zone 1 (516) Closure to Trawl Gear	Federal	National Marine Fisheries Service	16,940	Uniform Multiple Use		

GENERAL NOTES:

(1) Federal, State, Provincial, Other

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(3) No-take or Multiple use

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(5) Natural Heritage (includes ecosystem & biodiversity protection) or Cultural Heritage or Sustainable Production (fisheries management)

Web link for MPA information: http://marineprotectedareas.noaa.gov/inventory

Annex 5.   Additional International Efforts to Build MPA Networks

Circumpolar Protected Areas Network Group

The Circumpolar Protected Areas Network (CPAN) Group that provided advice to CAFF was operational from 1996 to 2010. It promoted development of a protected areas network that would maintain ecosystem health and dynamic biodiversity of the Arctic region overall (both terrestrial and aquatic components). Its objective was to identify current and emerging protected area issues that required management attention, and to work to resolve them. It aimed to ensure sufficient protection of all habitat types in the Arctic (http://www.caff.is/protected-areas-cpan/about-cpan).

CPAN produced a series of nine Habitat Conservation Reports published by CAFF between 1994 and 2000 (see References section, under CAFF). *The sixth report, the Circumpolar Protected Areas Network Strategy and Action Plan*, provided an important foundation for the current pan-Arctic MPA network framework. The document contains many similar elements such as status of protected areas in the circumpolar Arctic; rationale, goal and objectives for a protected areas network; and an implementation section that lists actions to be taken at both national and international levels (CAFF 1996e). An annex to the Strategy and Action Plan summarizes the fourth report in the series, Circumpolar Protected Area Network Principles and Guidelines (CAFF 1996c), which together with *State of the Protected Areas in the Circumpolar Arctic* (CAFF 1994) and *Proposed Protected Areas in the Circumpolar Arctic* (CAFF 1996a) contributed useful information and ideas for how countries could work together to achieve a protected areas network.

CPAN is now dormant. Aspects of protected areas work have since been picked up in other CAFF projects and programs including the Circumpolar Biodiversity Monitoring Program and the Arctic Biodiversity Assessment.

Circumpolar Biodiversity Monitoring Program

At the broader seascape level, CAFF has been active in harmonizing and integrating biodiversity monitoring efforts across the Arctic (e.g., through its Circumpolar Biodiversity Monitoring Program (CBMP), http://www.caff.is/monitoring). Representatives from various agencies responsible for national and regional Arctic protected area management are engaged in identifying a suite of biodiversity measures to be commonly monitored across the Arctic and implemented in a standardized way by each agency. This will enable coordinated reporting of biodiversity in Arctic protected areas (both terrestrial and marine) and provide a circumpolar understanding of change occurring within protected areas around the Arctic region (Livingston et al 2011).

Convention on Biological Diversity – Guidance on MPA Network Design

Having a common approach to design of domestic MPA networks and identification of conservation priorities will bring greater cohesion to the pan-Arctic MPA network, though Arctic States will follow their individual MPA / MPA Network establishment processes as described in Section 5.

The international standard for MPA network design was set out in the previously mentioned CBD Secretariat's Azores Report (CBD 2009). This guidance defines and describes five MPA network properties and components:

- EBSAs, described in Section 4.4.2.
- Representativity, captured in a network when it consists of areas representing the different biogeographical subdivisions of the management region that reasonably reflect the full range of ecosystems, including the biotic and habitat diversity of those marine ecosystems.
- Connectivity, allowing for linkages whereby protected sites benefit from larval and/or species exchanges, and functional linkages from other network sites. In a connected network, individual sites benefit one another.
- Replicated ecological features, meaning that more than one site contains examples of a given feature in the given biogeographic area – where "features" means "species, habitats and ecological processes" that naturally occur in the given biogeographic area.
- Adequate and viable sites, indicating that all sites within a network should have sufficient size and protection to ensure the ecological viability and integrity of the feature(s) for which they were selected.

Several other international reports provide complementary ecological guidance on designing MPA networks to achieve fisheries management, biodiversity conservation and climate change adaptation outcomes; see for example PISCO 2007, IUCN-WCPA 2008, UNEP-WCMC 2008, Smith et al 2009, and Green et al 2014. CBD guidance on MPA network components is well supported in the literature (Airamé et al. 2003, Grorud-Colvert et al. 2014, Kirkman, 2014, Saarman et al. 2013,).

Commission for Environmental Cooperation – Guidance on Designing an MPA Network for Resilience to Climate Change

Design and management of the pan-Arctic MPA network is intended to strengthening the resilience of Arctic marine ecosystems in the face of climate change. The CBD design properties and components listed above were developed with climate change in mind, but may not adequately prepare the Arctic for the significant rate of climate change occurring and being projected for the future.

The North American Commission for Environmental Cooperation (CEC) undertook a science assessment of climate change effects in 2010 in association with an International Council for the Exploration of the Sea Study Group on Designing Marine Protected Area Networks in a Changing Climate (ICES-SGMPAN; ICES 2011) and then produced scientific guidelines based on that assessment (Brock et al 2011). The CEC then published detailed guidance for managers on designing resilient MPA networks in a changing climate (CEC 2012).

Ecosystems are already changing due to climate impacts. For example, fish are temperature sensitive and cannot control their body temperature so they try to stay in their optimal temperature range. Increases in sea surface temperature resulting from global warming will change physiological processes (e.g., metabolism, growth), spawning season timing (temporal shifts) and where spawning may occur (spatial shifts). Fish can avoid higher temperatures by shifting poleward or into deeper water. For example, scientists at the NOAA's Woods Hole Laboratory examined 40 years (1968-2007) of distribution data in North-East US waters and found that a majority of the fish species either moved northward or into deeper water during this period (Nye et al, 2009).

The CEC guidance describes specific steps to undertake four recommended actions:

1. Protect species and habitats with crucial ecosystem roles or those of special conservation concern. Some of the species or habitats that are crucial to a particular species, group of species or the functioning of an ecosystem may differ from those already identified following other network design criteria. Consider the vulnerability of the species or habitats to climate change impacts (e.g., habitats that could be lost due to rising sea levels) and whether or not an MPA or "other effective area-based conservation measures" could lessen their vulnerability.

2. Protect potential carbon sinks. Areas such as coastal salt marshes and sea grasses and kelp beds that sequester and store carbon should be protected so that they can continue to sequester carbon and also so that the carbon they have already stored is not released back into the atmosphere as a result of habitat loss or degradation. Protecting such habitats also helps to shelter and buffer coastal communities from extreme storm events.

3. Protect ecological linkages and connectivity pathways for a wide range of species. This action entails developing, applying and validating dynamic models of adult movement and migration, as well as larval transport, to test hypothesized connectivity among areas, including potential source-sink regions and migratory patterns. The objective is to optimize connectivity among MPAs and "other effective area-based conservation measures" by protecting areas of high biological productivity and key life-stage habitats that are important for maintaining and enhancing ecological linkages.

4. Protect the full range of biodiversity present in the target biogeographic area. The guidelines for this action, which is similar to the CBD property of representativity, describe how to identify representative examples of each habitat type using a habitat classification scheme, and then select for protection the individual habitat units that best represent the classification type.

Publications by Lemieux et al (2010) and WWF-UK (2011) also provide guidance on designing MPA networks to mitigate and adapt to climate change impacts.

OSPAR

The OSPAR Convention for the protection of the marine environment of the North-East Atlantic is a regional seas convention which has an extensive geographical scope, including a part of the Arctic. It has a mandate that can be instrumental in the establishment of MPAs within the geographical scope of the Convention. OSPAR has established several MPAs in areas beyond national jurisdiction. Together with national MPAs, these form the OSPAR network of MPAs. OSPAR also has a number of recommendations for the protection of endangered marine species living in the Arctic, such as OSPAR Recommendation 2013/12 on furthering the protection and conservation of the Steller's eider (Polysticta stelleri) in Region I of the OSPAR maritime area.

Annex 6. Tools for Design and Implementation of MPA Networks

Decision-support tools can be helpful when developing and consulting on MPA networks. Such tools overlay geospatial data layers of ecological, cultural and socio-economic information and perform trade-off analyses based on criteria set by MPA managers, stakeholders and other participants in the planning process. Their utility is in ensuring transparent public process, in adaptive management of MPA networks, and in evaluating how well MPA network objectives are being met. Software like Marxan is designed to aid systematic MPA design by generating networks that achieve particular biodiversity representation goals with reasonable optimality in a transparent way. The Ecosystem Based Management Tools Network database (www. ebmtools.org) provides information about the different types of decision-support tools available world-wide. Mapping traditional and local knowledge (TLK) can add new aspects especially in areas poorly covered by science and monitoring but nevertheless travelled by hunters.

Ecologically important areas within an MPA network design can be prioritized for protection through ecosystem-based risk analysis (e.g., to identify which areas of high ecological value are most vulnerable to current or anticipated cumulative impacts of human activities), or by resilience analysis (i.e. by identifying areas where ecosystem processes are extraordinary vibrant and strengthen ecosystems against shock and disturbance, e.g. WWF-RACER: Christie & Sommerkorn 2012). Conservation priorities can also be informed by MPA network objectives and lists of threatened and/or declining species and habitats (e.g., IUCN red and green lists).

The choice of decision-support tool depends on the amount, quality and type of data available; the technical skill of practitioners; and resource availability. Where use of computer software is not appropriate (e.g., data are sparse or communities do not have the necessary infrastructure), a simple GIS overlay analysis, Delphic approach (using expert knowledge), or scoring methodology can be used.

Annex 7. Strengthening Management Effectiveness of Existing MPA and MPA Networks

Management effectiveness is the degree to which management actions are achieving the goals and objectives of a given MPA, other area-based conservation measure or MPA network. Evaluation of management effectiveness leads to better (adaptive) management in a changing environment; assists in effective resource allocation; provides accountability and transparency; and helps involve communities and promote protected area values (Hockings et al 2000).

Monitoring the effectiveness of conservation measures is especially important in the Arctic given the rapid change occurring in this region. It is therefore crucial to establish ongoing monitoring of the status and trends of resources of concern within MPAs and to consider adjusting their boundaries or otherwise modifying management measures as necessary (Kujala 2012, in HELCOM 2013a). Engaging local people as environmental monitors can contribute to improved monitoring.

Evaluating the management effectiveness of MPAs is challenging, since it is often difficult to evaluate the added value of the protected areas or MPA network separately from trends in the broader environment. For example, natural or anthropogenic disturbances can radically alter ecosystems regardless of how well an MPA or MPA network is being managed. The evaluation needs to be appropriate and accurate in linking the degree of achievement to specific management actions. There are also challenges related to the additional costs and logistics of evaluating remote Arctic MPAs.

IUCN/WCPA have created a management effectiveness framework, with protected area management following six distinct stages or elements. It begins with reviewing <u>context</u> and establishing a vision for site management (within the context of existing status and pressures), progresses through <u>planning</u> and allocation of resources (<u>inputs</u>), and as a result of management actions (<u>process</u>), eventually produces goods and services (<u>outputs</u>) that result in impacts or <u>outcomes</u>. It does not contain a detailed methodology, but explains the steps in designing and conducting an assessment (i.e., defining assessment objectives, scope and resourcing; choosing and developing a methodology, including establishing an assessment team and defining indicators; implementing the assessment in the field and office; and interpreting, communicating and using results) and presents case studies as well as a list of helpful resources (Figure 6).

Arctic States have established monitoring programs and undertaken evaluations of the management effectiveness of individual MPAs, other conservation measures and MPA networks. Arctic states involved with HELCOM and OSPAR have been involved in evaluations of MPA networks through those organizations.

Figure 6 – The framework for assessing management effectiveness of protected areas (from Hockings et al 2000).