

# Progress Report on The Economics of Ecosystems and Biodiversity (TEEB) Scoping Study for the Arctic

## CONTEXT

---

The TEEB Arctic scoping study is being developed by the Conservation of Arctic Flora and Fauna working group (CAFF), with Sweden as the lead country, jointly with partners: the UNEP TEEB Office, the UNEP Regional Office for Europe, WWF Global Arctic Programme and GRID-Arendal.

Senior Arctic Officials' approval of The Arctic TEEB scoping study will be sought at their Fall 2015 meeting. A draft report is currently under CAFF Board review. This status report provides a description of the project, its current status and a summary of the issues being addressed.

## WHAT IS TEEB?

---

The Economics of Ecosystems and Biodiversity (TEEB) is a global initiative coordinated by the United Nations Environment Programme (UNEP). TEEB draws attention to the benefits that people gain from nature (ecosystem services), including food from fishing and hunting, maintenance of culture, water, enjoyment of wilderness, nature and wildlife, and provision of raw materials. Equally important but less obvious benefits include climate regulation and flood control. TEEB also brings attention to the costs to society when ecosystems are damaged and when plant and animal populations are lost. TEEB provides an analytical approach, tools and guidance that can help make the range of nature's benefits more visible when politicians, businesses and others make decisions that might affect these benefits or put them at risk.

TEEB aims to bring biodiversity into mainstream decision making—making nature an important part of policy related to business, social and economic development, not just policy directly related to environmental management. Mainstreaming biodiversity across government and society is an increasingly important target for work carried out through the Convention on Biological Diversity (CBD), as well as a major new focus for the Arctic Council.

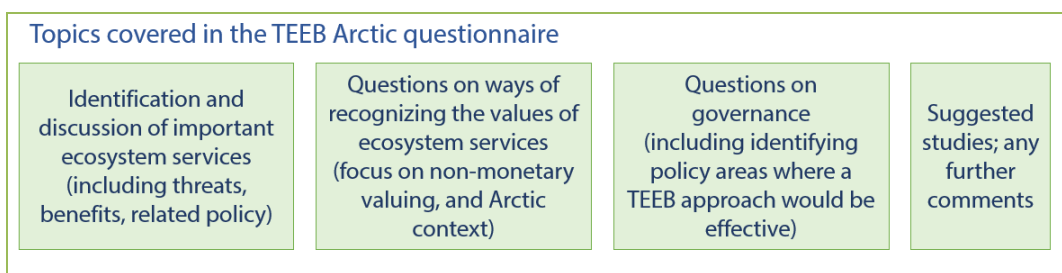
## STATUS OF SCOPING STUDY

The TEEB Arctic Scoping Study is an early implementation pilot project that follows up on specific recommendations of the Arctic Biodiversity Assessment (ABA). A key objective of both this scoping study and options presented in the Way forward section is implementation of ABA recommendations, in particular recommendation #4 on incorporating biodiversity objectives and provisions into tools specific to development in the Arctic, and recommendation #12 on evaluating services provided by Arctic biodiversity to support decision making.

The project was run and governed through a Steering Group consisting of representatives of partner organizations. Funding for the project was provided by the Nordic Council of Ministers, UNEP and WWF.

Progress was reported to CAFF at its regular meetings, and CAFF provided progress updates as appropriate to the Arctic Council Senior Arctic Officials meetings during 2014. Preliminary results of the project and its progress were also presented jointly by CAFF and partners at several international events, including the 12<sup>th</sup> Conference of the Parties to the CBD (October 2014), the second meeting of the Arctic Circle (October 2014) and the first Arctic Biodiversity Congress (December 2014). A communications team and project website ([www.arcticteeb.net](http://www.arcticteeb.net)) were established.

The TEEB Arctic scoping study was conducted mainly in 2014, designed with the aid of a workshop in Reykjavik in May of that year and informed by 60 responses to an online questionnaire that was active from April to July. Questionnaire input will be included throughout the scoping study report, both in synthesis form and as direct quotes.



The scoping study is predominantly based on the TEEB approach and methodology for a scoping study, as outlined in the TEEB guidance manual for country studies.<sup>1</sup> It differs from this model, however, in two ways: 1) it includes information and discussion related more generally to improving understanding of the full range of Arctic ecosystem services, as well as information and discussion on aspects of governance and of valuing ecosystem services in the context of the circumpolar Arctic and Arctic Council; and 2) it does not conclude with a defined set of specific policies for assessment in a full TEEB study, but rather provides

<sup>1</sup> TEEB. 2013. Guidance manual for TEEB country studies. The Economics of Ecosystems and Biodiversity

guidance and examples on policy focus areas that could be further refined and assessed using TEEB methodology. These differences are related to the multi-jurisdictional nature of Arctic governance, the diversity of value systems around the Arctic, and to meeting the needs identified by Arctic Council, both through the ABA and through recommendations on implementation of Ecosystem Based Management in the Arctic.

The scoping study evolved over the course of its development from a focus on design of a full TEEB assessment for the Arctic as a single option to identification of a suite of opportunities for understanding Arctic ecosystem services and raising their profile in decision making. This suite includes applications of TEEB methodology to assessing policy alternatives as well as other initiatives, including development of tools, methodologies and knowledge. These options complement one another but can be initiated separately and with different working group leads within the Arctic Council work agenda. Each option tackles a specific question or issue and contributes to the overall goal of mainstreaming Arctic biodiversity and ecosystems in decision making.

Resistance to or caution about approaches to policy that focus on valuation of ecosystem services arose throughout the scoping study period, often related to concern about putting prices on aspects of Arctic nature that cannot or should not be priced. A related concern is that monetary valuation would result in turning nature into a commodity and that this would exacerbate existing power imbalances between development interests and local people, and/or between Indigenous Peoples and others when it comes to decisions involving trade-offs. The capacity of a TEEB approach to fully account for differences in value systems was questioned, in particular by indigenous contributors to the scoping study.

These are valid concerns to be brought forward for consideration in all future work in this field. They are not concerns unique to the Arctic, and the TEEB programme has recently published a discussion of challenges and responses.<sup>1</sup> Of primary importance is the understanding that value is not the same as price—the TEEB approach is not about imposing economic valuations in situations where they would be misleading or would not contribute to the goal of making the benefits all people derive from ecosystem services visible in decision making. TEEB studies include participatory approaches to determine the appropriate way to assess ecosystem services, including whether monetary valuation is required or not. Moreover, any exercise in valuation will be subjective and will only represent certain views—the key is to be explicit about these views and to be inclusive of different value and knowledge systems. Guidance on valuation of ecosystems and biodiversity has also been developed through the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES).

---

<sup>1</sup> Sukhdev, P., H. Wittmer, and D. Miller. 2014. The Economics of Ecosystems and Biodiversity (TEEB): Challenges and Responses. *Nature in the Balance: The Economics of Biodiversity*. Oxford.

## SUMMARY

---

The full report will present the results of the scoping study on ecosystem services and the application of a TEEB approach and methodology in the Arctic and will present options for follow-up work. This summary is divided into three sections:

1. Laying the foundations: results from compiling and synthesizing information, issues, current practices, methodologies and perspectives on Arctic ecosystem services and their values in relation to decision making.
2. Policy focus areas: list and discussion of policy areas identified during the scoping study for potential follow up using TEEB methodology.
3. Way forward: options for the next steps. This includes, but is not limited to, application of TEEB methodology to policy focus areas and considers options for practical implementation of TEEB at a range of jurisdictional and spatial scales.

## Laying the foundations

### I. Context and issues

I.1. Featuring ecosystem services in policy development and implementation is needed to help define and balance societal needs and priorities in the rapidly changing Arctic policy landscape.

There is growing pressure to find solutions to questions of resource allocation and to address impacts on socio-economic development and quality of life in the Arctic. The benefits of biodiversity and ecosystems already have a high profile in the Arctic. Nature is important to Arctic residents and Arctic landscapes and iconic species are well-known around the world. But this does not necessarily translate into policy, especially for economically based decisions.

Issues identified as setting the context and defining the needs for further work on Arctic ecosystem services are:

1. Climate change and the risks and associated uncertainty it brings to the future of many ecosystem services and the biodiversity these services depend on;
2. Changes, increases and projected growth in industrial development and shipping;
3. Globalization in terms of economic interests in the Arctic, but also in terms of communications and cultural and economic change around the Arctic;
4. Concerns about food and water security, and
5. Arctic governance and policy regimes in the context of the above issues.

## 2. Arctic ecosystem services

This scoping study is a first cut at an inventory and synthesis of ecosystem service categories, with a focus on the less visible regulating and supporting services. While the ABA includes a chapter on provisioning and cultural services, it did not address regulating and supporting services explicitly, due to insufficient information. The ecosystem services discussion draws on the project's draft ecosystem services inventory (see box below) and on input to the on-line questionnaire, which invited comment from experts on what ecosystem services they saw as important and what they perceived as risks to these services.

Based on this information, and within the framework of a scoping study, major characteristics of Arctic ecosystems and biodiversity are presented, status and trends of selected Arctic ecosystem services and their relationship to beneficiaries are summarized and major risks to services are identified. Risks to ecosystem services and biodiversity are of two types: those related to physical, ecosystem and biodiversity processes (for example, decreasing sea ice cover and changing patterns of marine biodiversity), and risks related to social responses to these drivers of change (such as increased marine shipping, oil and gas and mining development, and expansion of commercial fisheries).

## Arctic ecosystem services inventory

As part of the scoping study, and as a response to ABA recommendation #12 (to evaluate the range of services provided by Arctic biodiversity), a systematic inventory of ecosystem services was initiated. This inventory, if further developed, will lay the foundation for “assessing the value of significant Arctic ecosystem services relevant to the well-being of local communities and regional economics, and those of particular global significance” (recommendation of the Arctic Council Expert Group on Ecosystem-Based Management). The inventory is a work in progress. It will be available on the project website and through CAFF’s Arctic Biodiversity Data Service as a supplementary document to the scoping study.

### What the inventory includes

Ecosystem Service	Ecosystem(s) it depends on	Scale (level) at which it operates	Who benefits	In what way it is important	Status, trends, information on resilience	Current & projected risks (threats)	Studies (examples) on valuation	State of knowledge
-------------------	----------------------------	------------------------------------	--------------	-----------------------------	---	-------------------------------------	---------------------------------	--------------------

### Ecosystem services

#### CULTURAL SERVICES

- Aesthetic information
- Cultural identity, heritage, and sense of place
- Information for cognitive development
- Inspiration for human creative thought and work
- Knowledge systems and education
- Recreation and tourism
- Spirituality and religion
- Well-being: psychological and physical health

#### HABITAT / SUPPORTING SERVICES

- Food web maintenance
- Genetic resources
- Nutrient cycling
- Primary productivity
- Soil fertility (including soil formation)

#### PROVISIONING SERVICES

- Biochemical and medicinal resources
- Food – reindeer husbandry, other terrestrial mammals, berries and mushrooms, birds, marine mammals, commercial fisheries, small-scale fisheries, aquaculture, agriculture
- Fresh water for human consumption and use
- Raw materials – timber, fibres, resins, animal skins, feathers and down, ornamental resources, biomass fuel

#### REGULATING SERVICES

- Air quality regulation
- Biological control (disease regulation and pest regulation)
- Carbon storage and sequestration
- Climate regulation (global, regional, and local)
- Erosion regulation
- Natural extreme events (e.g. storms, floods)
- Pollination
- Water flow regulation
- Water purification and waste treatment

2.1. Systematic conclusions on Arctic ecosystem services and their status and trends cannot yet be made based on the data gathered in the scoping study.

This conclusion is in line with the general lack of comprehensive information for the whole of the Arctic, and reflects the findings of the ecosystem services chapter of the ABA. Nevertheless sufficient information exists to allow identification of general characteristics and trends, which are outlined in the points below. A full discussion on gaps in knowledge

on Arctic ecosystem services cannot be derived from this scoping study, but some key gaps that are flagged in recent assessments are listed.

## 2.2. Ecosystem services work should take a holistic approach and operate at the level of ecosystem service bundles.

Regardless of the type of ecosystem service being discussed (provisioning, cultural, regulating, or habitat/supporting), no one service can be treated as a separate, unconnected entity. In all cases ecosystem services arise from functioning ecosystems and are thus intertwined. For example, the provisioning of food and water clearly builds on a range of regulating services, such as pollination and regulation of water supply. Similarly, the potential of ecosystems to sustain cultural services depends on the functioning of ecosystems, including their ability to moderate the effects of environmental hazards such as flooding and drought.

This holistic approach is consistent with Indigenous world views and traditional knowledge. An important principle behind Inuit monitoring methodologies, for example, is focusing on the relationships among components of the ecosystems as opposed to individual pieces. As noted by the Inuit Circumpolar Council-Alaska:

For example, monitoring walrus includes monitoring stomach contents, benthic species, ice thickness, wind directions, water temperatures, and the associated social components. Examples of social components include the transfer of knowledge and importance of a young hunter hunting walrus for the first time and transitioning from one being provided for to one that is providing. Social components also include village feast and sharing systems.

All of these components; how these components interact; and changes within the connections and/or new connections made are all important monitoring objectives for Inuit survival. This may result in multiple different suggestive research actions, such as the need to identify cultural key stone species as well as ecological key stone species. (Inuit Circumpolar Council-Alaska, p. 11<sup>1</sup>)

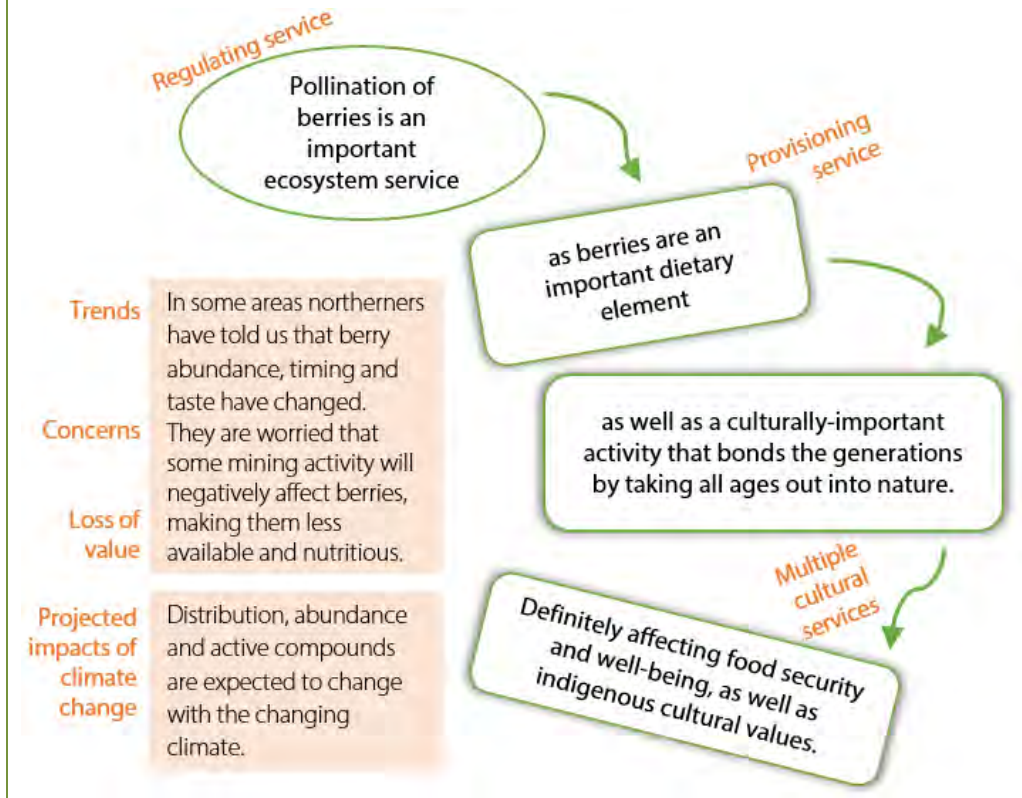
Similar holistic approaches are part of most, if not all, indigenous cultures in the Arctic.

---

<sup>1</sup> Inuit Circumpolar Council-Alaska. 2014. *How to Assess Food Security from an Inuit Perspective: Building a Conceptual Framework on How to Assess Food Security in the Alaskan Arctic. Progress Report to the 2014 General Assembly.*

### Pollination of berries: a holistic view of ecosystem services

This example, taken directly from one response to the TEEB questionnaire, illustrates how ecosystem services come in bundles that are difficult to tease apart, and that a holistic approach to them is the common approach taken by Arctic Peoples. In this case, pollination of berries, a regulating service, affects provisioning and cultural ecosystem services and has an associated set of trends, impacts and concerns.



2.3. Although syntheses, guidelines and analysis of policy options at the pan-Arctic scale can raise the profile of ecosystem services and provide direction, work on ecosystem services is most effective when it builds in work at smaller scales.

The way in which ecosystem services are recognized and valued varies a great deal across the Arctic due to the social component of services, such as what people see as being important for their livelihoods. Ecosystem services also vary from place to place due to differences in climate, landscapes and ecosystems. This means that work on Arctic ecosystem services, including on valuation of services and their integration into policy, must always pay attention to local and regional scales.

2.4. Arctic ecosystem services provide benefits to a range of stakeholders at various scales, both directly and indirectly—and the stakeholders who benefit from services and those who affect the availability of the same services are not always the same.



The variety of beneficiaries—ranging from local to global (see illustration below) highlights the overall importance of Arctic ecosystem services that goes beyond the immediate inhabitants of Arctic ecosystems. Understanding the flow of ecosystem services and related benefits forms the basis for assessing the value of these services and understanding and improving their governance. Individuals, communities, businesses and the public sector are all beneficiaries of Arctic ecosystem services. Examples of indirect benefits are governments who benefit from regulating services such as flood and climate regulation through mitigation of environmental risks and related cost savings.

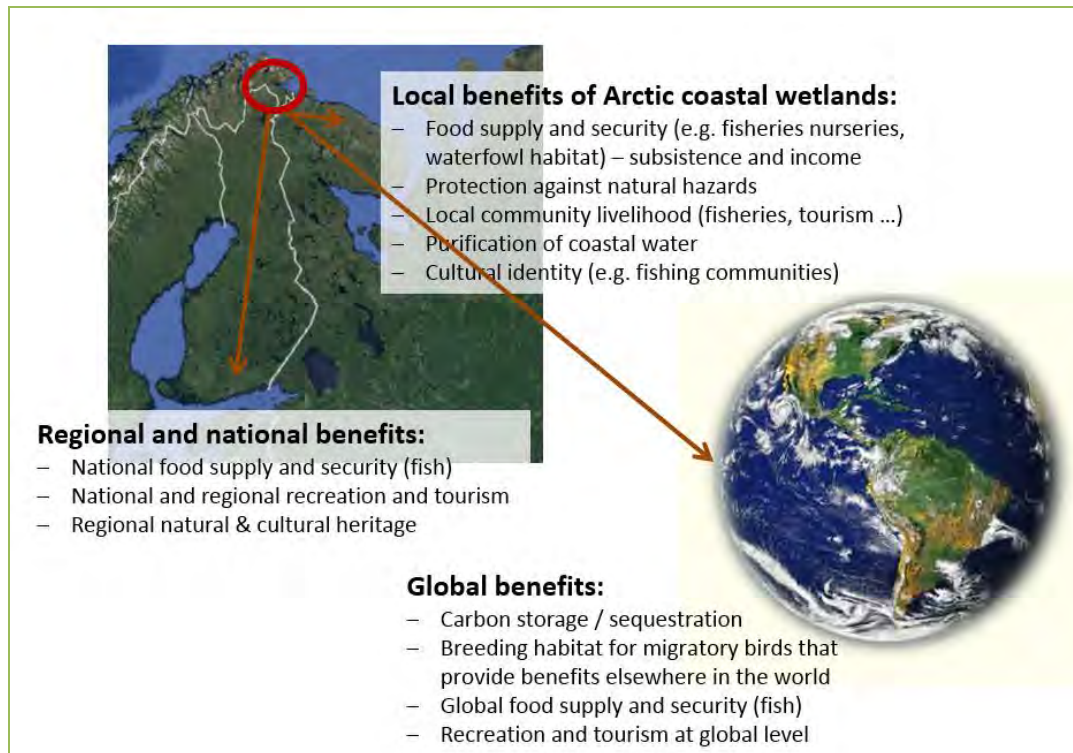


Illustration of the flow of ecosystem services from an Arctic ecosystem to a range of beneficiaries at different scales (M. Kettunen)

## 2.5. Reduction of greenhouse gases remains a top priority for conserving ecosystem services.

Certain ecosystem types are key for certain services—for example, polynyas, shore leads, and wetlands are essential for providing food provisioning and maintaining biodiversity, lichen pastures are essential for winter reindeer herding, and ice and snow dynamics are essential for climate regulation. Whereas conservation actions can be taken to protect specific key ecosystems, physical changes such as sea ice and permafrost melt can only be addressed by a global effort in reducing greenhouse gas emissions. In the Intergovernmental Panel on Climate Change (IPCC) 5<sup>th</sup> assessment report, the Arctic is shown as the global region with the largest number of types of current impacts attributed to climate change, including impacts on physical, biological, and human and managed systems.

2.6. Arctic environmental conditions are associated with potential for rapid changes in ecosystem services and high uncertainty—providing a strong incentive to include ecosystem services in policy.

The extreme environmental conditions experienced in the Arctic make the coupling between physical processes, biological processes and human processes extremely tight and visible. This means that changes in physical and biological function have very immediate, clear and strong consequences for ecosystem services (for example, changes in sea ice extent and seasonality immediately translate into shifts in hunting grounds). This provides an incentive to feature ecosystem services in policy: there are immediate rewards in human benefits from policies that conserve favourable physical and biological ecosystem processes. But this sensitivity of ecosystem services to environmental change also makes the future of ecosystem service provision in the Arctic highly uncertain. The main certainty is that large changes are occurring or expected to occur to most ecosystem services—and that climate change compounds the risks from other stressors.

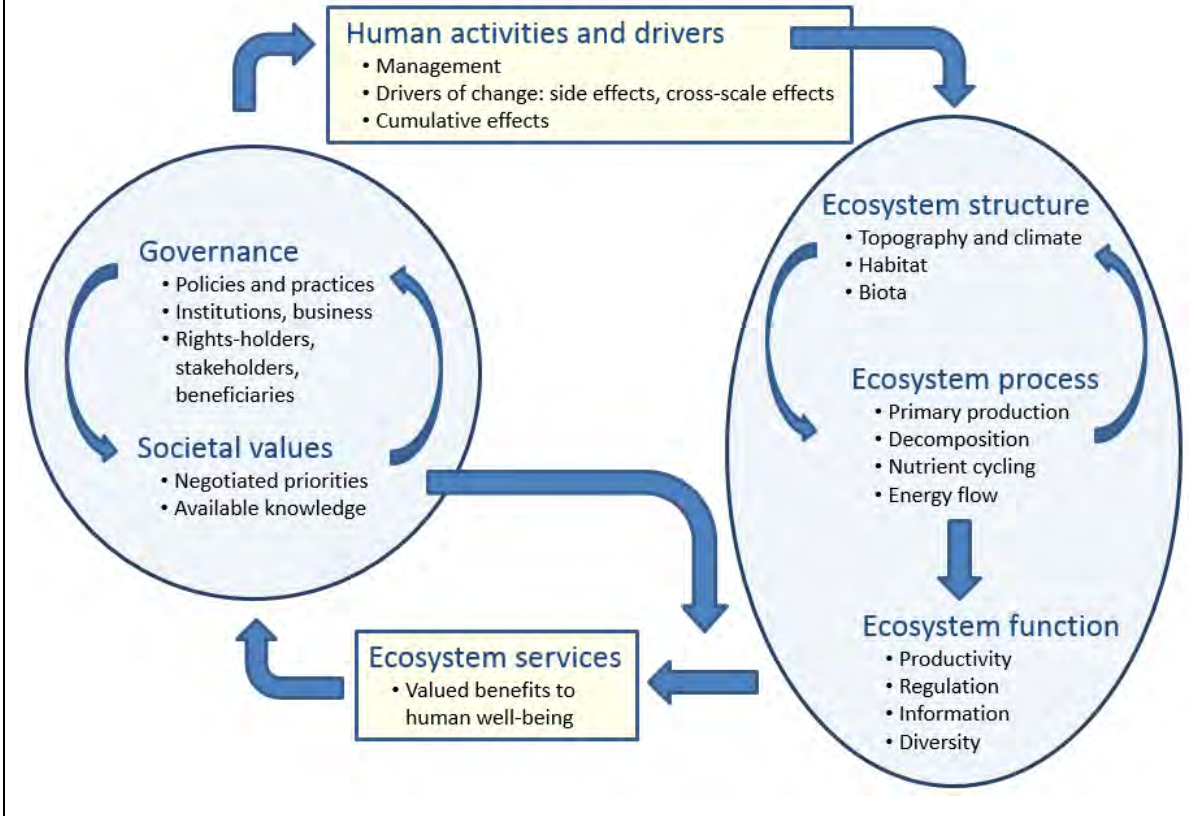
### 3. Governance

The concept of ecosystem services has its origin in efforts to include in policy processes the role of ecosystem functions in many aspects of human well-being. The concept is thus linked to governance in general, and to formal policy processes in particular. This role becomes clear when looking at ecosystems and governance as part of social-ecological systems. Ecosystems and the social world are linked both through social processes and through human activities that affect ecosystems services (see the figure below).

Viewing ecosystem services through a “TEEB lens” makes explicit how and why aspects of biodiversity and ecosystems are relevant for society and thus for governance practices that relate to the economy. The TEEB approach provides a means of assessing the broader economic impacts of human activities that affect biodiversity but are currently decoupled from their consequences on the functioning of ecosystems and biodiversity. The TEEB approach helps decision-makers recognize and demonstrate the wide range of benefits of ecosystems, landscapes, species, and other aspects of biodiversity and, where appropriate, pursue policies to safeguard them.

## Linkages between ecosystems and the social world

Ecosystems and the social world are linked in two basic ways. One is by the social processes and negotiations by which we assign value to ecosystem functions (lower pathway). The other is by the human activities that affect ecosystems (upper pathway).



Below are main points that will be elaborated on in the chapter on governance.

**3.1. Incorporation of Arctic ecosystem services into policies and governance practices is a key method for the integration of environmental, economic, and social policies.**

Such policy integration is at the heart of our ability to consider the long-term effects of human activities in ways that are reconcilable with the limited resources and limited regenerative capacity of our planet. This section will provide guidance on identifying policy tools and governance mechanisms for implementation of an ecosystem approach.

**3.2. Recognizing Arctic ecosystem services and capturing them in decision-making processes can strengthen the resilience of Arctic social-ecological systems to rapid changes in the region.**

Bringing ecosystem services into policy supports inclusive, integrated and adaptive decision-making, enables co-production of knowledge across knowledge traditions; and facilitates the establishment of feedbacks between cause and effect of human activities, including those that operate across spatial scales, time scales and governance levels.

3.3. The TEEB approach can make the diverse values that people hold for nature visible by assessing and communicating the role of biodiversity and ecosystem services in the economy and to society.

The TEEB approach does not limit the valuation and mainstreaming of ecosystem services into policies and practices to economic instruments—the use of legal instruments or resource management regimes may be just as effective and legitimate.

3.4. Recognizing, demonstrating and capturing the diverse values of ecosystem services in policy instruments for strategic planning and integrated management of natural resources and space can help to reconcile biodiversity conservation with development.

The integration of ecosystem services approaches into planning and management processes in the Arctic context serves to highlight the role of natural capital and ecosystem services as the basis for continued human well-being and livelihoods. It also contributes to ensuring that natural capital is not “traded in” to meet short-term needs in a manner that limits the freedom of future generations to choose their own development paths.

3.5. Capturing the benefits and the scarcity of Arctic ecosystem services in economic policies promotes the improvement of economic models and processes.

Making ecosystem services more visible in economic policies advances the capacity to account for natural values and to make closer links between opportunity and risk, between cost and benefit, and between private or corporate activities and public goods. Strengthening these links provides incentives for stewardship and helps to make decisions involving trade-offs transparent.

3.6. Mainstreaming of nature’s values by means of ecosystem services requires adjustments to existing policies and instruments as well as the development of new ones.

This transition will also require institutional changes as well as consideration in public and private decision making of evolving cultural values and norms.

3.7. The Arctic Council, as a forerunner in bringing together knowledge across the circumpolar north, has an important role to play for further work on Arctic ecosystem services. These ecosystem services are recognized through the values assigned to them from the perspectives of key Arctic stakeholders and rights holders.

Improved understanding of the issues surrounding regional environmental and resource governance, as well as issues surrounding sustainable human development (including economic development) under current and anticipated conditions, can provide a foundation for effective implementation of relevant policies, both in the Arctic and internationally.

3.8. Taking an economic approach to the benefits people receive from Arctic nature faces a number of challenges and concerns. However, it also offers a model for communicating to

decision makers the importance of nature to people, and a toolkit for evaluating policy options and integrating stewardship into decisions.

Challenges and concerns include inconsistencies of an economic focus with indigenous holistic worldviews, knowledge gaps, danger of commodification and marketization of nature, and limited capacity to build future outlooks into decision making and to accommodate a wide range of value systems.

#### 4. Valuing Arctic ecosystem services

The scoping study conducted an overview of concepts and techniques for valuing ecosystem services in the context of the Arctic, based on literature review and substantive input on this topic through the TEEB questionnaire and the Reykjavik workshop.

##### Ways of attributing value

**Monetary values** are often used when a common denominator is needed in a policy context to help describe a trade-off. Methods used to estimate monetary values are sometimes based on what people pay, or would be willing to pay, for a particular experience or benefit from nature.

Monetary values are also estimated for loss or potential loss of benefits of nature—for example, the lost value of fisheries damaged by oil spills, or the cost of loss of climate regulation services due to climate change. What is being valued is often the cost of irreversible damage or damage that is only reversible at prohibitive costs. This type of monetary valuation can provide a powerful argument for taking a precautionary approach to avoid the damage and the associated cost, either by taking measures to reduce the risk of other damaging events (as in the oil spills example), or by making the argument for changes to current policy by showing the costs of the consequences of a business as usual approach (as in the climate change example.)

**Non-monetary methods of valuation** include ranking of preferences, and measures such as percentage of households that make use of a particular provisioning service. Biophysical measures can also provide information on values of ecosystem services, often through proxies or indicators—for example, measures of carbon sequestered or berries produced over specified areas.

Non-monetary valuation of ecosystem services can also be achieved through analysis of information gathered using narrative and descriptive methods, such as through interviews, focus groups and social survey questionnaires, as well as analysis of existing documentation, such as statements and submissions made in planning hearings or public meetings. Transcripts of ethnographic interviews and accounts by Indigenous Peoples of subsistence practices and associated ways of knowing and experiencing home ecosystems are especially

relevant in the Arctic. Working with indigenous organizations to ensure that such information is appropriately used is an important part of such valuation.

Some points highlighted in the overview:

4.1. The ecosystem services link is crucial when striving for sustainable management of complex social-ecological systems, and valuation in this context can provide powerful information for evaluating alternative management strategies. Cohesive, integrated and commonly accepted frameworks for assessment of the values of Arctic ecosystems are needed.

A theme running through many responses to the questionnaire was the need for systematic approaches to ecosystem services valuation. Frameworks are needed to move away from *“ad hoc lists of issues and concerns in narrowly defined geographies and with little attention to linkages.... We need to come up with some common agreement on a fundamental framework that policy or decision-makers, researchers, developers and community members can use and refine.”*<sup>1</sup>

4.2. Any effective, equitable and sustainable policy must account for a diversity of perspectives and encompass a diversity of value systems.

A resilient policy strategy will both identify a diverse suite of available policy actions and interventions and also cultivate means by which diverse audiences can participate in articulating the associated trade-offs in the present and future.

4.3. There is a persistent risk that social and cultural attributes of ecosystem services are neglected while the monetized economic benefits and ecological causes of ecosystem service change are over-emphasized.

Cultural ecosystem services are considered more challenging, less studied and ultimately less likely to be integrated into decision making. As such, they warrant special attention in the Arctic context, where social identity and well-being are so closely tied to ecology and landscape.

Cultural values are the significance of ecosystem services, as experienced and understood in a cultural context. Values can be researched and reported using a wide range of analytical methods, but in all cases the outcome is an understanding of how, and how much, a given ecosystem service matters to people. Inclusivity is a particularly important feature of an ecosystem service assessment. In particular, space must be made for indigenous perspectives and traditional knowledge, as these may differ sharply in world view and knowledge systems as compared to the dominant perspectives of many non-indigenous land and resource managers.

4.4. Health values are often overlooked in ecosystem services analyses

---

<sup>1</sup> TEEB questionnaire input

Parameters such as nature experiences, local identity and natural heritage are tightly linked to human health values. Health values are linked to food security, and also encompass values associated with a broad range of physical and psychological health benefits from nature.

## Policy focus

An important part of a TEEB scoping study is to identify policy areas that will most benefit from further assessment using the TEEB methodology.

The following lists synthesize input from the TEEB questionnaire and the Reykjavik workshop in response to questions and discussion on identifying policy areas for consideration for a TEEB Arctic study. There is overlap in this list, as issues were often framed from different perspectives. In addition, the list is a mix of policy areas, social-ecological systems and sectors associated with high risks to ecosystem services, and policy areas and tools and methods that have a high potential to benefit from an ecosystem services approach. Policy areas are interlinked: starting with any one policy area or policy type inevitably brings several others into consideration.

### Policy areas identified through the Reykjavik workshop and the TEEB questionnaire for potential focus areas of a TEEB Arctic study

#### Broad policy areas identified

- Marine shipping and marine oil and gas development
- Land-based mining and oil and gas
- Climate change
- Food security
- Infrastructure development

#### More specific policy areas identified

- Reindeer herding
- Northward movement of commercial fisheries; fisheries and aquaculture policies and regulations;
- Tourism, cruise ship and land-based; cultural tourism
- Introduction of new species for harvest; economic effects and social impacts that invasive species can have, including on biodiversity and ecosystem services
- Wildlife and fisheries harvest allocation; wildlife management
- Research policy: framing research more in terms of ecosystem services, changing ways that research is presented; enhancing or restoring Arctic research agendas

#### Types of policies, tools and governance mechanisms identified

Reykjavik workshop participants concluded that this category can best be considered as part of the analysis of specific policy areas: for example, analysis of fiscal policies or circumpolar governance mechanisms considered in relation to oil and gas development, or strategic planning techniques considered in relation to industrial development on land.

- **Strategic planning:** land-use planning and management; marine spatial planning, including protected areas; industrial development and land-use strategies; conservation strategies

- **Participatory processes:** co-management; more local control in decision making; increased participation of Indigenous and local peoples of the Arctic in decision making; broad stakeholder involvement in decision making, including in ecosystem based management;
- **Resource rights issues,** restrictions and responsibilities in relation to ecosystem services; benefit sharing; indigenous community–industry joint ventures; prevention of negative impacts on traditional ways of life
- **Economic and fiscal policies;** allocation of funding; subsidies; natural capital accounting; transformation of conventional economics to account for nature
- **Circumpolar governance and cooperation**

Policy areas from the first two categories in the list were reviewed by the project team and steering group in relation to suitability for assessment using the TEEB approach, based on criteria developed at the Reykjavik workshop. Criteria considered governance, ecosystem services affected, impacts on services, costs and benefits and affected parties, potential for positive impact on Indigenous Peoples, and the degree and nature of uncertainty and applicability of precautionary approaches. Based on this review, three broad policy areas were selected as candidates for application of a TEEB approach with the understanding that aspects of several other policy areas (for example, food security) would be covered within the context of the selected topics, and that this selection of policy focus areas for further TEEB assessment would form part of the initial consultation stage of a TEEB Arctic study. Two of the three policy areas assessed as examples were developed for the scoping study. These were:

- Expansion of marine oil and gas activities and marine shipping.
- Mining, oil and gas, and infrastructure development in terrestrial ecosystems, with a focus on the North American Arctic.

These assessments are at a broad, scoping level and should be regarded as providing the groundwork for further studies to build on. Results will be summarized in annexes to the project report.

## Way forward

### Introduction: policy context and objective

Although it is often stated that ecosystems and food webs are simpler in the Arctic than in many other parts of the world, no one has ever said this about the Arctic policy environment. Policy regimes include those of eight diverse nations, many Indigenous Peoples, sub-national governance, as well as cross-sectorial and cross-scalar policy and governance arrangements among diverse parties (e.g., co-management systems and impacts and benefits agreements). At the international level, relevant policies and regulations are rooted in bi-lateral, Arctic regional and circumpolar agreements and institutions (including the Arctic Council), as well as in commitments and regulations under global-scale multi-



lateral agreements, notably those pertaining to Arctic Ocean areas beyond national jurisdiction. This means that there are many opportunities to introduce TEEB approaches into policies, but that care must be taken in identifying the types and levels of policy options that have the most potential for positive change.

At the circumpolar scale, the Arctic Council is the key forum for development of policy directions and for the development and dissemination of tools and methods for policy change. This is the primary policy context envisaged for a TEEB Arctic study and for studies that provide guidance for further refining TEEB methodology. National-level TEEB studies aim to develop specific, place-based policy options for consideration by decision-makers. Local or other grass roots efforts can develop, exemplify, and test policies that are relevant for TEEB. Critical needs and synergies for TEEB studies are linked to connecting policies across these scales. The TEEB Arctic study would provide vertical integration across these governance scales, as well as horizontal links, particularly among TEEB and ecosystem services initiatives in the eight Arctic countries.

The way forward options presented below aim at providing rationale, recommendations, supporting information, tools and methods that enable and encourage incorporation of the values of ecosystem services into decision making. The coordination for the study would be at the Arctic Council level. Stakeholder involvement and assessment of policy options would be at the scales of operation of specific policies, their impacts, risks, costs and benefits to priority ecosystem services and their beneficiaries.

As noted at the beginning of this report, this is a suite of options for follow up to the scoping study, including a full TEEB Arctic study. The overall objective of this suite of options is to reduce the pressures and threats on Arctic ecosystems by mainstreaming the many and diverse values of biodiversity and ecosystem services into decision making.

### Mapping stakeholder engagement

The scoping study includes a stakeholder analysis that identifies the major stakeholder groups for a TEEB Arctic study, and provides initial analysis on roles, expectations from engagement, and stakeholder priorities. Stakeholders can be divided into knowledge holders and potential users of the results of the study—and most of the Arctic stakeholder groups are both. The analysis points out the unique and central role of Arctic Council in creating the basis for mutual understanding.

Categories of stakeholder groups identified in this scoping study are: the Arctic Council, national governments, indigenous organizations, NGOs, sub-national governance institutions, business, researchers, Indigenous Knowledge holders, regional governance institutions (e.g. for the Barents Sea or the European Arctic), local communities, and non-Arctic nations with involvement in the Arctic. Stakeholder groups would have different modes of engagement, including involvement in design and implementation, active participation in all or part of the study, and being kept informed, with an open invitation that

encourages feedback and participation as desired. In addition, UNEP, including through the TEEB office, would play an advisory role.

Input through the questionnaire and the workshop highlighted the critical, central role of engagement for a successful TEEB Arctic study. Policy-makers need to be consulted early on so that they can help to design the most effective approaches and opportunities for policy change. This includes policy makers at the international and national level, and includes those working on policy not directly related to environmental management, such as trade, business and fiscal policy. Engagement takes time, so contact and a two-way flow of information needs to be established with all stakeholder groups as an early step.

## Options for the way forward

The presentation of this suite of options is in two parts:

1. A TEEB Arctic study, or set of studies, based on two to five policy areas. The scoping study will first be reviewed before recommendations may be considered.
2. A number of additional options, some of which address fundamental issues and challenges to the application of the TEEB approach in the Arctic context. Some options would be done in collaboration with and enhance ongoing Arctic Council initiatives; all of them would complement the TEEB Arctic study. These options are aimed at increasing the visibility of the values of ecosystem services in policy through improving the knowledge base, raising awareness of the value of ecosystem services, and development of tools, guidance, methodologies and information products.

### Part I. TEEB Arctic Study

Policy is the starting point for a TEEB study. The section on Policy focus, above, provides a list of potential policy areas for assessment through a TEEB Arctic study, based on input received during the scoping study. Three policy areas were selected and two could be developed. Two broad policy areas were selected from this list for scoping-level TEEB assessment. Types of policy options considered for further assessment, based on these two examples, are presented in the box below.

#### Scoping of policy areas: examples of types of policies that could be assessed in a TEEB study

##### Policy Area I: Expansion of marine oil and gas activities and marine shipping

- Policy options to bring the interests and voice of local actors (indigenous groups, coastal communities) to complex multilateral governance arrangements
- Policy options that represent local actors in global and regional level decision and policymaking venues

- Policy options that shift the discussion of governance and policy to, first, securing Arctic biodiversity as the guiding principle and, second, managing the opportunities of shipping and oil and gas development.

**Policy Area 2: Development activity in terrestrial ecosystems, with a focus on mineral exploration and development, and cumulative effects (North American Arctic)**

- Policy options that make wider use of spatial planning and strategic assessment approaches
- Policy options that bring consideration of the entire spectrum of ecosystem services in Environmental Impact Assessment
- Policy options that improve participatory processes
- Policy options that make use of financial instruments that capture values of ecosystem services as possible, for example, financial mechanisms related to financing, subsidy reform, and ecosystem service off-setting for remediation

## Methodology

The TEEB methodology includes the use of policy scenario analysis to make the case for policy change. The use of scenarios promotes looking ahead: What are the consequences for ecosystem services and their beneficiaries if we continue along the path we are following (a “business as usual” policy scenario), and what difference would recognizing, demonstrating and/or capturing the values of nature in policy make (an alternative policy scenario)? The focus is on the economic concepts of ‘marginal change’: how much difference would the alternative policy make, and on ‘distributional impacts’: who would be the winners and who would be the losers?

These are the six steps recommended for a TEEB study:

1. Refine the objectives of a TEEB study by specifying and agreeing on the key policy issues with stakeholders
2. Identify the most relevant ecosystem services
3. Define information needs and select appropriate methods
4. Assess and value ecosystem services
5. Identify and outline the pros and cons of policy options
6. Review, refine and report

TEEB studies need input from a wide range of interests and disciplines. The approach is cross-sectorial and participatory, and can only work with active participation of, and consultation with, a broad range of experts and stakeholders. Institutional capacities and governance have to be taken into account to develop viable and realistic policy options. For the Arctic, with its multiple governance jurisdictions, this means that the relevant regions and scales of the policy areas being assessed are very important.

## Process and Governance

The TEEB scoping study methodology includes preliminary development of a project governance structure, work plan, and resource mobilization and communications strategies. This planning, presented in the project report, will need further refinement and scrutiny through the Arctic Council.

The study would be phased over a four-year period, from its approval to proceed, to its presentation at an Arctic Ministerial Meeting. The bulk of the analytical work, however, would take place over a two-year time period (years 2 and 3). Initial time is needed for start-up, including resource mobilization and engagement of stakeholders. Time is also needed in the latter phase of the study to allow for adequate time to synthesize and discuss results with stakeholders, and to develop and review policy recommendations through the Arctic Council.

## Part 2. Options for improving capacity to understand Arctic ecosystem services and their values, and to apply this knowledge to policy

These options are organized in categories, with examples of actions. The actions would be reviewed and refined through a collaborative process.

### I. Knowledge base

Adopting ecosystem-based approaches in policy and practice brings with it a set of knowledge needs. Some of these needs can be met with existing knowledge that is spread through the academic literature and through knowledge held by agencies and other places, often partially reported on in grey literature. Knowledge is also held within Indigenous organizations and documentation of Arctic Indigenous management schemes. Knowledge is rarely articulated as pertaining to ecosystem services, or as benefits of biodiversity and ecosystems to humans, or as relevant to ecosystem-services-based decision making.

Options for actions to address knowledge gaps related to Arctic ecosystem services:

#### I.1. Complete and maintain the Arctic Ecosystem Services Inventory

A draft ecosystem services inventory was prepared as part of the scoping study (as discussed in the Ecosystem services section above). The inventory is a start on a structured and synthesized literature review of Arctic ecosystem services, the ecosystems they are derived from, their associated benefits, status, trends, threats, uncertainty, knowledge gaps, and what work has been done on valuation. To be a useful source of synthesized information, and a basis for further information tools, the inventory requires further work. It could serve the following three functions:

- a) To provide a ready resource for information and overviews of available information on ecosystem services and what is known about them in relation

to beneficiaries, threats, trends, and valuation, both to raise awareness and to provide an entry point for policy-related assessment work;

- b) As a metadata centre/service – through CAFF’s Arctic Biodiversity Data Service (ABDS); and
- c) As input to research and monitoring plans and agendas, and potentially also to industry monitoring and research planning.

**1.2.** Take steps to capture or present new research results in ways that make them useful to ecosystem-services-based policy development. This could be awareness raising through research meetings of the need to make this connection, increased expert networking, such as through a community of practice on ecosystem services, and/or through changes to funding mechanisms for research.

**1.3.** Clearly identify knowledge gaps (both at the broad underpinning and methodological scale, and for specific geographic scales) and develop mechanisms to bring them into discussion of research agendas.

**1.4.** Facilitate and coordinate monitoring of the social and economic importance of ecosystems (through the Circumpolar Biodiversity Monitoring Program).

## 2. Guidance, methods, tools and information to support policy

**2.1.** Raise awareness of the roles and value of ecosystem services among Arctic communities with the aim of empowering communities, grass roots organizations and local administrations for better discussions/negotiations with sub-national/federal governments and corporations on policy related to Arctic development.

**2.2.** Through collaborative processes, raise awareness of the ways that Arctic Indigenous Peoples value nature. For example, facilitate discussions between Indigenous Peoples and economists, aimed at informing ways to accommodate indigenous values in economic policies and practices.

**2.3.** Make the role of natural capital and ecosystem services explicit in relation to adaptation and adaptive capacity. This is best done through bringing results from this scoping study into, and working in collaboration with, Arctic Council initiatives, for example, by:

- a) considering adaptation options for policy makers that include the economic aspects of biodiversity, through the Adaptation Actions for a Changing Arctic (AACCA); and
- b) creating resilience indicators that would encompass ecosystem processes (building on the human development indicators) through the Arctic Resilience Report.

**2.4.** Make visible (in economies) the wider value of Arctic biodiversity conservation and sustainable biodiversity use schemes, and identify financing opportunities for such schemes that are based on recognizing ecosystem services.

- 2.5.** Develop economic tools to deploy in Arctic macro- and micro-economic contexts that are capable of:
- a) accommodating the multiple value systems underpinning mixed and livelihood economies in the Arctic, such as reindeer herding and community economies based, or partly based, on subsistence hunting, fishing and gathering;
  - b) capturing Arctic social and ecological resilience in economic information and valuation; and
  - c) facilitating investment in the insurance value of Arctic natural capital.

### 3. Synthesis, analysis and information products

- 3.1.** Analyse linkages over scale, time and actors that affect when, where and to whom the costs and benefits of industrial development in the Arctic on biodiversity and ecosystems occur, considering also current and future use and spatial subsidies, to demonstrate the value and help frame the distributive impacts of decisions.
- 3.2.** Prepare ecosystem services inventories with regular status reporting. Include valuation of ecosystem services at the level of LMEs and national scales, but also initiate a regular review and assessment process at the pan-Arctic scale. Review and assessment would be in collaboration with existing Arctic Council processes, including the framework for assessment of biodiversity status and trends established through the CBMP.
- 3.3.** Develop indicators to help describe the status of Arctic biodiversity and ecosystems. Include indicators that convey the proximity to potential thresholds or tipping points and attach confidence metrics to all indicators reflecting the level of knowledge and understanding. Development of such indicators needs to be done through co-production of knowledge based on a collaboration of Indigenous Knowledge holders and scientists. (Indicator development is underway through the Circumpolar Biodiversity Monitoring Program.)
- 3.4.** Develop resilience indicators that make explicit the role of natural capital and ecosystem services in building of adaptive capacity. These would have similar use for policy making but be more encompassing of ecosystem processes than human development indicators.
- 3.5.** Develop and test tools to evaluate Arctic ecosystem services in local and sub-national EBM, marine spatial planning, land-use planning and management, and in co-management schemes where they can directly contribute to co-producing knowledge and adaptive governance.
- 3.6.** Explore role of ecosystem services analysis and mainstreaming biodiversity for downscaling elements of work on achieving post-2015 sustainable development goals (once approved) to regional and national level in the Arctic.