Arctic Biodiversity Principles

and their application in mainstreaming biodiversity

Phase 1: background and options paper

Environmental Protection Authority

April 2017
Acknowledgements

CAFF Designated Agencies:
- Norwegian Environment Agency, Trondheim, Norway
- Environment and Climate Change Canada, Ottawa, Canada
- Faroese Museum of Natural History, Tórshavn, Faroe Islands (Kingdom of Denmark)
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- Icelandic Institute of Natural History, Reykjavik, Iceland
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- United States Department of the Interior, Fish and Wildlife Service, Anchorage, Alaska

CAFF Permanent Participant Organizations:
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For more information please contact:
CAFF International Secretariat
Borgir, Nordurslod
600 Akureyri, Iceland
Phone: +354 462-3350
Fax: +354 462-3390
Email: caff@caff.is
Internet: www.caff.is

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Abstract

A draft set of Arctic biodiversity principles was developed, based on the findings and recommendations of the Arctic Biodiversity Assessment (ABA). Basing the principles on the ABA ensures they are well-grounded in science, in line with Arctic Council priorities and will provide a robust framework for mainstreaming applications. We sought advice from ten people with experience in biodiversity mainstreaming and conducted a literature and website review. Building on the interviews and review, three options for web-based application of the biodiversity principles in mainstreaming Arctic biodiversity are presented for consideration by CAFF. Results from the interviews and review are summarized and discussed.

Draft Arctic biodiversity principles (headlines)

1. Climate change: lowering the threat, managing the risk
2. Ecosystem-based management: taking a holistic approach
3. Mainstreaming biodiversity: changing the conversation
4. Vital spaces: safeguarding habitats
5. Collaboration: sustaining biodiversity across borders
6. Threats: addressing individual stressors
7. Knowledge: building capacity to adapt to change
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1. Introduction

1.1 Goals and objectives

This project follows up on recommendation #4 of the Arctic Biodiversity Assessment (ABA), which provides the project’s goal:

Require the incorporation of biodiversity objectives and provisions into all Arctic Council work and encourage the same for on-going and future international standards, agreements, plans, operations and/or other tools specific to development in the Arctic. This should include, but not be restricted to, oil and gas development, shipping, fishing, tourism and mining. (CAFF 2013)

Implementing this recommendation requires a clear framework that defines biodiversity principles in the Arctic context. It also entails developing an approach for incorporating biodiversity principles into Arctic Council work – and eventually for broader application, as specified in the recommendation.

The objectives of Phase 1 of this project are to 1) draft Arctic biodiversity principles and 2) present options for translating these principles into resources (including guidance and tools) that will be effective in promoting and supporting the integration of biodiversity objectives and provisions into decision making. The resources should be easy to use and effective in taking the principles from paper into practice. The CAFF project steering group has indicated a preference for an interactive web-based format as an outcome of the project.

This report provides background information, context and ideas based on review of reports, academic papers and related initiatives in the Arctic and elsewhere, augmented with comments and suggestions from interviews with practitioners and researchers in the field of mainstreaming biodiversity. It concludes with options for approaches to creating a web-based platform of resources for Arctic biodiversity mainstreaming. The report is supplemented with an annotated bibliography of selected reports, papers and websites, and a record of the interviews conducted.

Following review of Phase 1 by the CAFF Board and decisions on next steps, the project will proceed to Phase 2, which is envisaged to include a project report and development of web-based resources.

1.2 Arctic Council context

The importance of mainstreaming biodiversity is identified as one of three cross-cutting themes of the ABA in its report for policy makers (CAFF 2013). (The other two are the significance of climate change as the most serious driver of change and the necessity of taking an ecosystem-based approach to management.) The policy-makers’ report presents 17 recommendations based on the ABA key findings.

Mainstreaming means integrating or including actions related to conservation and sustainable use of biodiversity in strategies relating to production sectors, such as agriculture, fisheries, forestry, tourism and mining. …By mainstreaming biodiversity into sectoral strategies, plans and programmes, we recognize the crucial role that biodiversity has for human well-being. (UNEP 2007)

The ABA science and policy reports were welcomed and the recommendations approved by the Arctic Council Ministers through the Kiruna Declaration (Arctic Council 2013). This support was
affirmed by Arctic Council Ministers through the Iqaluit Declaration (Arctic Council 2015), which encourages decisive action to help sustain Arctic biodiversity through following up on the ABA recommendations.

The Iqaluit Declaration also supported the ABA implementation plan, which is a living plan that spans the years 2013 to 2021 (CAFF 2015a). The plan lays out actions for mainstreaming biodiversity over the short, medium and long terms, and includes provisions for reporting on progress and for plan revisions. Early implementation actions include the Arctic Biodiversity Congress, held in Trondheim, Norway, in 2014, which served as a forum for mainstreaming biodiversity and a means of engaging organizations and people across sectors for future work. Mainstreaming biodiversity is also the underlying theme of CAFF’s scoping report on integrating ecosystem services into decision making, which was published in 2015 as an early implementation action responding to the recommendation on mainstreaming, as well as to a specific recommendation on evaluation of ecosystem services (ABA recommendation # 12) (CAFF 2015b).

The Arctic Council context of the current project on incorporating biodiversity principles is summarized in the diagram below.

Arctic biodiversity principles: Arctic Council context

Points to note:
- The principles should clearly reflect the comprehensive, peer-reviewed ABA science assessment and the policy recommendations that are based on this work and are endorsed by Arctic Council Ministers. This provides a solid foundation for a guidance system.
- The principles should inform development of any resources, tools and guidelines to mainstream biodiversity – they will set directions, provide overall goals and help to set priorities.
• There are important feedback loops. Resources that are developed based on the biodiversity principles should contribute to ongoing development of the ABA Action Plan and should incorporate lessons learned and results from other implementation actions. The interactions with Arctic Council working groups and the broader Arctic community will be essential in developing, testing and tailoring any resources to be effective in mainstreaming Arctic biodiversity.

1.3 Related initiatives

Biodiversity mainstreaming is a priority for work under the Convention on Biological Diversity (CBD) and is the theme of the 2016 CBD Conference of the Parties (ongoing while this report was being completed). CBD work provides a wealth of resources that should continue to be accessed as this project develops. Other international work on mainstreaming includes initiatives through the Global Environment Fund (GEF), World Bank and European Union. National initiatives are also related, both those of Arctic Council states and those of other nations. Related initiatives are discussed further in Section 3.

2. Biodiversity principles

2.1 Review: The meaning and formulation of principles

Principles are statements that provide guidance in developing goals, objectives, and provisions or action items. They are sometimes called “guiding principles.”

What are principles?

- “Fundamental truth or proposition that serves as the foundation for a system of belief or behaviour or for a chain of reasoning” (Oxford Dictionary).
- Guiding principles reflect values or priorities – they are statements that are often important in planning and guiding decisions but do not directly address a measurable outcome (from a guidebook on performance-based planning (US DOT 2015)).
- “Principles define HOW we will go about ‘doing business’ – things we want to do, or avoid doing as we develop and implement the plan” (from a flood management planning process (California Dept. Water Res. 2009) – defined in contrast to goals and objectives, which define WHAT we are aiming for and want to achieve).

Principles are commonly expressed as a heading or a short statement, followed by further text to elaborate on the principle. The full expression of the principle may include a goal, or contain wording that implies a goal. Further levels of detail may include objectives and groups of action items that align with the principles.

Corporate and industry sector statements of biodiversity principles generally start with statements of commitment and broad goals, followed by objectives that are more specific to the sector’s area of activity (DuPont 2016, NEC Group 2016, VfU Forum 2011). Depending on the purpose of the framework, the principles may also be linked to ecological concepts. For example, a government report linking ecological principles to conservation action for British Columbia, Canada (Vold and Buffett 2008), starts with ecological concepts such as population viability/thresholds and levels of biological organization, and links these to six principles (for example, “Protection of species and species subdivisions will conserve genetic diversity”). Beneath each principle are sets of applications (for example, “Retain large contiguous or connected areas” and “Set objectives and targets for biodiversity in plans”). No matter how they are expressed and organized, the statements of
principles all serve as a framework that leads from high-level concepts, goals or expressions of understanding to objectives and actions.

Examples

**Aichi Targets** (CBD 2013). Headline approach. Each target has:
- A two-word headline phrased in the form of a result (“Awareness increased”)
- A sentence to make the result more specific (“By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.”)
- A paragraph that presents principles behind the targets and outlines actions needed to achieve the result (“Addressing the direct and underlying drivers of biodiversity loss will ultimately require behavioural change…”)

**COMMENT**: Targets, not principles – but they are a good model as biodiversity is the subject, and they are expressed in a clear and concise format.

**CBD 12 Ecosystem approach principles** (CBD 2016a). The formulation of each principle is a main sentence, followed by an explanatory paragraph – lots of “should” sentences: “Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.”

**COMMENT**: Standard prescriptive policy language that has lots of qualifying phrases to make statements inclusive (e.g. “actual and potential”), which leads to bureaucratic-sounding language that is hard to understand and inspires push-back. Recommend avoiding the use of “should” and equivalent phrasing, and minimizing the qualifying statements.

**For application in a training module** (CBD Secretariat 2011), the ecosystem approach principles are turned into questions, e.g. Principle 2: “Management should be decentralized to the lowest appropriate level”, becomes “How do you ensure management is decentralized to the lowest appropriate level?”

**COMMENT**: This is a way to rephrase a principle for use in a check list.

**Agricultural biodiversity**, British Columbia, Canada (The Canada-British Columbia EFP Biodiversity Steering Committee 2010). This report/website uses principles as the entry point to information and recommendations for farmers and policy makers. It uses snappy, attention-grabbing headlines, then drills down to more detail. These are principles for managing agricultural biodiversity in one province, so they can be focused and specific. Principles are displayed in a circle. The report makes extensive use of graphics. The accompanying sentences are shown for two of the eight principles:

- Go native!
  
  *Native areas (wetlands, aquatic areas, riparian areas, forest/woodlands, and grasslands) provide the most important contribution to biodiversity.*

- Semi-natural is valuable!
- Location, location, location!
- You gotta have connections!
- Achieving new heights!
- Nature loves variety!
- Watch out for aliens!

  *Invasive alien species are generally detrimental to the conservation of biodiversity.*

**COMMENT**: The circular graphic for the principles is a good model. While the casual, catchy headlines are appealing, this approach would require attention to cross-language, cross-cultural meanings and idiom – it is harder to do snappy phrases in a multicultural setting.
2.2 Proposed Arctic biodiversity principles

The basis for development of a proposed set of Arctic biodiversity principles is shown in the table below. The table shows how each principle relates to the recommendations and key findings of the ABA.

Based on the goal of this project and the discussion above, the biodiversity principles were derived to:

- Be easily relatable to the outcomes of the ABA.
- Provide clear categories that will form a framework for developing resources for mainstreaming biodiversity.
- Provide guidance to anyone making decisions about programs, projects or policies that could have positive or negative impacts on Arctic biodiversity.
- Provide a framework that will help to identify potential problems and guide the decision-maker to options for solutions.
- Be accessible: restrict the number of principles, keep the headline language simple and the explanatory text short – more detail can be added at subsequent levels in the resources.

Following the table is a presentation of the draft proposed Arctic biodiversity principles, with one “headline” option selected for each. A graphic is included as an example of how the headline version could be displayed.
# Building the biodiversity principles on the foundation of the Arctic Biodiversity Assessment

<table>
<thead>
<tr>
<th>Principle: some headline options</th>
<th>Principle: draft text (with topic sentence bolded)</th>
<th>ABA Recommendations</th>
<th>ABA Key findings</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Climate change: lowering the threat, managing the risk</td>
<td><strong>Climate change is the most serious threat to Arctic biodiversity and exacerbates all other threats.</strong> Actions to reduce this threat include lowering greenhouse gas emissions from existing Arctic activities, minimizing emissions from new projects and actively supporting international work to reduce climate stressors. Actions to reduce risks to biodiversity from this threat include policy and planning measures that maintain or enhance the natural resilience of Arctic ecosystems and the capacity of organisms to adapt to climate change.</td>
<td>1. Actively support international efforts addressing climate change, both reducing stressors and implementing adaptation measures, as an urgent matter. 2. Incorporate resilience and adaptation of biodiversity to climate change into plans for development in the Arctic.</td>
<td>2. Climate change is by far the most serious threat to Arctic biodiversity and exacerbates all other threats.</td>
<td>The ABA recommendation addresses international action on climate change mitigation and adaptation, which is appropriate when addressing government. As this set of principles is geared to mainstreaming biodiversity, I added the applicability at the project/program/policy level (greenhouse gas reduction in the Arctic). I expanded on the resilience and adaptation wording as I think it is not easy to understand the way it is phrased in the recommendation. This is still difficult terminology.</td>
</tr>
<tr>
<td>2. Ecosystem-based management: taking a holistic approach</td>
<td><strong>Arctic biodiversity will benefit from the use of ecosystem-based management as a framework for cooperation, planning and development.</strong> Ecosystem-based management means thinking about all the functions, processes, interactions, and life stages that make up an ecosystem, not just individual species or resources, and planning for and adapting to both expected changes and unexpected events. Ecosystem-based approaches are holistic and consistent with the perspectives of Arctic Indigenous Peoples.</td>
<td>3. Advance and advocate ecosystem-based management efforts in the Arctic as a framework for cooperation, planning and development.</td>
<td></td>
<td>I added the last statement to strengthen this principle – it may be too much of a generalization.</td>
</tr>
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<tr>
<td>3. Mainstreaming biodiversity: changing the conversation</td>
<td><strong>Sustaining biodiversity means making it an integral part of every policy, planning and development process.</strong> Mainstreaming biodiversity involves adjusting decisions about development to address potential effects on biodiversity and the services it provides. Methods emphasize consultation, inclusion of the values, knowledge and traditions of Arctic Indigenous Peoples, and equitable distribution of costs and benefits from development. Mainstreaming is built on awareness of the importance and value of Arctic biodiversity and the changes it is undergoing. Increasing this awareness demands tools and methods to engage the public and decision-makers.</td>
<td>4. Require the incorporation of biodiversity objectives and provisions into all Arctic Council work and encourage the same for on-going and future international standards, agreements, plans, operations and/or other tools specific to development in the Arctic.</td>
<td>9. The challenges facing Arctic biodiversity are interconnected, requiring comprehensive solutions and international cooperation.</td>
<td>This combines the recommendation on mainstreaming with more specific recommendations that contribute to mainstreaming. A lesson learned from the literature review and interviews was to take a broad approach to mainstreaming and include public outreach.</td>
</tr>
</tbody>
</table>
**Principle: some headline options**

4. Vital spaces: safeguarding habitats
4. Identifying and safeguarding important areas for biodiversity
4. Protect and preserve

**Principle: draft text (with topic sentence bolded)**

Arctic biodiversity is being degraded, but decisive action taken now can help sustain vast, relatively undisturbed ecosystems of tundra, mountains, fresh water and seas and the valuable services they provide. Advancing the protection of large, ecologically important areas is an important measure for safeguarding habitats. Protected areas alone, however, are not enough to sustain Arctic biodiversity. Planning and policy development can incorporate guidelines and measures to reduce human disturbance in places outside protected areas but nevertheless critical to sensitive life stages of Arctic species.

**ABA Recommendations**

5. Advance the protection of large areas of ecologically important marine, terrestrial and freshwater habitats, taking into account ecological resilience in a changing climate.
6. Develop guidelines and implement appropriate spatial and temporal measures where necessary to reduce human disturbance to areas critical for sensitive life stages of Arctic species that are outside protected areas, for example along transportation corridors.
7. Develop and implement mechanisms that best safeguard Arctic biodiversity under changing environmental conditions, such as loss of sea ice, glaciers and permafrost.

**ABA Key findings**

1. Arctic biodiversity is being degraded, but decisive action taken now can help sustain vast, relatively undisturbed ecosystems of tundra, mountains, fresh water and seas and the valuable services they provide.
4. Disturbance and habitat degradation can diminish Arctic biodiversity and the opportunities for Arctic residents and visitors to enjoy the benefits of ecosystem services.

**Notes**

I left in the strong statement from the key findings and followed with an attempt to capture the protected areas and other habitat protection recommendations. I did not add the climate change recommendation, partly for space and partly because it is included in the first principle.
<table>
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</thead>
<tbody>
<tr>
<td>5. Collaboration: sustaining biodiversity across borders</td>
<td><strong>Arctic biodiversity is vulnerable to influences outside of the Arctic and across borders within the Arctic.</strong> Many Arctic migratory species are threatened by overharvest and habitat alteration in regions beyond the Arctic. In addition, some threats to Arctic biodiversity, such as contaminants and climate change, originate primarily beyond the Arctic. Within the Arctic, vulnerable ecosystems and species’ ranges cross national borders. Sustaining Arctic biodiversity requires international cooperation.</td>
<td>8. Reduce stressors on migratory species range-wide, including habitat degradation and overharvesting on wintering and staging areas and along flyways and other migration routes.</td>
<td>3. Many Arctic migratory species are threatened by overharvest and habitat alteration outside the Arctic, especially birds along the East Asian flyway</td>
<td>While the recommendation on migratory species was grouped with the others on individual stressors, it is a distinct idea. I have phrased it to include international cooperation on places and species (i.e., not just for migratory species, and within-Arctic cooperation as well) and added a point on influences from outside the Arctic.</td>
</tr>
</tbody>
</table>
### Principle: some headline options

<table>
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<tbody>
<tr>
<td><strong>Arctic biodiversity faces and has faced risks from individual stressors, such as invasive species, unsustainable management practices, and pollutants.</strong> There are currently few invasive alien species in the Arctic, but more are expected, and early detection and action are important. While overharvest had a serious impact on many Arctic species in the past, sound management has largely addressed the problem, but continued attention to sustainable management is needed. Pollution from both long-range transport and local sources continues to threaten the health of Arctic species and ecosystems.</td>
<td>9. Reduce the threat of invasive alien/non-native species to the Arctic by developing and implementing common measures for early detection and reporting, identifying and blocking pathways of introduction, and sharing best practices and techniques for monitoring, eradication and control.</td>
<td>5. Pollution from both long-range transport and local sources threatens the health of Arctic species and ecosystems.</td>
</tr>
<tr>
<td>6. Addressing individual stressors on biodiversity</td>
<td>6. Reducing risks from current and emerging stressors</td>
<td>6. There are currently few invasive alien species in the Arctic, but more are expected with climate change and increased human activity.</td>
</tr>
<tr>
<td>7. Overharvest was historically the primary human impact on many Arctic species, but sound management has successfully addressed this problem in most, but not all, cases.</td>
<td>10. Promote the sustainable management of the Arctic’s living resources and their habitat.</td>
<td>7. Overharvest was historically the primary human impact on many Arctic species, but sound management has successfully addressed this problem in most, but not all, cases.</td>
</tr>
<tr>
<td>11. Reduce the threat of pollutants to Arctic biodiversity.</td>
<td></td>
<td>I grouped the three specific stressors identified – I think that this is a logical grouping and allows for change in the years to come.</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>7. Knowledge: building capacity to adapt to change</strong></td>
<td><strong>Increasing our understanding of Arctic biodiversity and Arctic ecosystems is key to sustaining them.</strong> Current knowledge of many species and ecosystems and how they react to threats is fragmentary. Improved long-term monitoring and sustained research efforts will increase our capacity to detect and interpret trends and emerging problems — essential information for adaptive management. Priority areas for improving our knowledge base and our capacity to apply knowledge to sustain Arctic biodiversity are: recognition of the value of traditional ecological knowledge and its incorporation in assessment, planning and management; work to maintain and enhance linguistic diversity; programs for training, education and knowledge-sharing; and community-based monitoring.</td>
<td>13. Increase and focus inventory, long-term monitoring and research efforts to address key gaps in scientific knowledge identified in this assessment to better facilitate the development and implementation of conservation and management strategies.</td>
</tr>
</tbody>
</table>
Arctic Biodiversity Principles

1. Climate change
   - Lowering the threat, managing the risk

2. Ecosystem-based management
   - Taking a holistic approach

3. Mainstreaming biodiversity
   - Changing the conversation

4. Vital spaces
   - Safeguarding habitats

5. Collaboration
   - Sustaining biodiversity across borders

6. Threats
   - Addressing individual stressors

7. Knowledge
   - Building capacity to adapt to change

Sustain Arctic biodiversity
Arctic Biodiversity Principles

1. Climate change: lowering the threat, managing the risk

Climate change is the most serious threat to Arctic biodiversity and exacerbates all other threats. Actions to reduce this threat include lowering greenhouse gas emissions from existing Arctic activities, minimizing emissions from new projects and actively supporting international work to reduce climate stressors. Actions to reduce risks to biodiversity from this threat include policy and planning measures that maintain or enhance the natural resilience of Arctic ecosystems and the capacity of organisms to adapt to climate change.

2. Ecosystem-based management: taking a holistic approach

Arctic biodiversity will benefit from the use of ecosystem-based management as a framework for cooperation, planning and development. Ecosystem-based management means thinking about all the functions, processes, interactions and life stages that make up an ecosystem, not just individual species or resources, and planning for and adapting to both expected changes and unexpected events. Ecosystem-based approaches are holistic and consistent with the perspectives of Arctic Indigenous Peoples.

3. Mainstreaming biodiversity: changing the conversation

Sustaining biodiversity means making it an integral part of every policy, planning and development process. Mainstreaming biodiversity involves adjusting decisions about development to address potential effects on biodiversity and the services it provides. Methods emphasize consultation, inclusion of the values, knowledge and traditions of Arctic Indigenous Peoples, and equitable distribution of costs and benefits from development. Mainstreaming is built on awareness of the importance and value of Arctic biodiversity and the changes it is undergoing. Increasing this awareness demands tools and methods to engage the public and decision-makers.

4. Vital spaces: safeguarding habitats

Arctic biodiversity is being degraded, but decisive action taken now can help sustain vast, relatively undisturbed ecosystems of tundra, mountains, fresh water and seas and the valuable services they provide. Advancing the protection of large, ecologically important areas is an important measure for safeguarding habitats. Protected areas alone, however, are not enough to sustain Arctic biodiversity. Planning and policy development can incorporate guidelines and measures to reduce human disturbance in places outside protected areas but nevertheless critical to sensitive life stages of Arctic species.

5. Collaboration: sustaining biodiversity across borders

Arctic biodiversity is vulnerable to influences outside of the Arctic and across borders within the Arctic. Many Arctic migratory species are threatened by overharvest and habitat alteration in regions beyond the Arctic. In addition, some threats to Arctic biodiversity, such as contaminants and climate change, originate primarily beyond the Arctic. Within the Arctic, vulnerable ecosystems and species ranges cross national borders. Sustaining Arctic biodiversity requires international cooperation.

6. Threats: addressing individual stressors

Arctic biodiversity faces and has faced risks from individual stressors, such as invasive species, unsustainable management practices, and pollutants. There are currently few invasive alien species in the Arctic, but more are expected, and early detection and action are important. While overharvest had a serious impact on many Arctic species in the past, sound management has largely addressed the problem, but continued attention to sustainable management is needed. Pollution from both long-range transport and local sources continues to threaten the health of Arctic species and ecosystems.

7. Knowledge: building capacity to adapt to change

Increasing our understanding of Arctic biodiversity and Arctic ecosystems is key to sustaining them. Current knowledge of many species and ecosystems and how they react to threats is fragmentary. Improved long-term monitoring and sustained research efforts will increase our capacity to detect and interpret trends and emerging problems – essential information for adaptive management. Priority areas for improving our knowledge base and our capacity to apply knowledge to sustain Arctic biodiversity are: recognition of the value of traditional ecological knowledge and its incorporation in assessment, planning and
management; work to maintain and enhance linguistic diversity; programs for training, education and knowledge-sharing; and community-based monitoring.

3. Application of the principles

3.1 Review of selected programs and tools for applying biodiversity principles to projects and public and private sector activities

This section is based on a literature/website review. It is supplemented with an annotated bibliography (Annex A) that is intended as a reference for work in Phase 2 of this project. It is not a comprehensive review, but rather selects examples of materials that may provide guidance for this project.

In reviewing initiatives, we focused on those that had a primary focus related to mainstreaming biodiversity, and did not include initiatives that were focused more directly on monitoring, assessment and research on biodiversity (and related topics such as ecosystem services, ecosystem-based management, resilience and adaptation). This is not a clear-cut division, as some reports and websites with a primary focus on one of these topics also address mainstreaming (though not necessarily using that term). We went off-topic in some cases to look at examples and methods, for example, of toolkits and guidelines.

This section reviews and provides some examples of guidance documents, mainstreaming literature reviews and assessments, programs and partnerships, Arctic region initiatives, success stories, tools and toolkits, and online platforms.

Guidance documents

Documents that start from the higher level of principles usually include a set of general guidelines organized around the principles. Products with sets of guidelines may use various names (including handbooks, diagnostics, guides, roadmaps and toolkits) – there is no sharp distinction among these products, and some are discussed in the sections below. Here we look at examples of guidance documents that focus on mainstreaming methodology and may be useful in the upfront analytical work for this project.

Incorporating biodiversity and ecosystem service values into NBSAPs: Guidance to support NBSAP practitioners (Chenery et al.) This guidance document is geared to implementation of National Biodiversity Strategies and Action Plans (NBSAPs). It includes a framework, background information, and guidelines. There is a focus on ecosystem services and incorporation using biodiversity values as a vehicle for mainstreaming. (Chenery et al. 2013) is a companion document – a roadmap – which is a more concise and usable format.

Environmental mainstreaming diagnostic (Dalal-Clayton and Bass 2011): This document is broader than biodiversity – it is for environmental mainstreaming (EM). It uses a format of issues and questions to “understand what progress has been made to mainstream environment in a particular context; map and analyse the EM approach(es) of a country, institution or project; assess how institutional structures and procedures support or inhibit EM; examine EM performance…; identify areas for change and improvement.” It distinguishes two levels of mainstreaming: organizational and project-level. This might be a useful division in a web application for the current project. The diagnostic has two levels of questions (for both organizational and project applications): generic questions for guiding discussion and more targeted questions for assessing effectiveness of mainstreaming.
Ten steps to biodiversity mainstreaming (IIED 2013): This guide is the outcome of an international meeting on mainstreaming and development. It outlines ten steps, then provides discussion and some useful tools for each of the steps. For example, under step 6, “Identify and engage stakeholders who might support or undermine progress towards desired outcomes,” a mapping matrix helps set priorities for engagement efforts. The last step is to develop a monitoring and evaluation system for biodiversity mainstreaming.

Mainstreaming literature reviews and assessments

A general conclusion in the mainstreaming literature is that there has been insufficient attention to documenting and analysing methods and results of mainstreaming programs, despite the increasing emphasis on and recognition of the need for such programs. There are, nonetheless, some useful reviews and assessments of mainstreaming work over the past decade. In addition to these more general reviews, some reviews deal with specific aspects of mainstreaming – such as mainstreaming of biodiversity data (Hoffmann et al. 2014).

Some key reviews of the status of mainstreaming

Mainstreaming biodiversity in practice: a STAP advisory document (Huntley and Redford 2014): This report contains discussion and conclusions from the most comprehensive literature review undertaken of biodiversity mainstreaming, supplemented with material from a 2013 workshop. One of the coauthors (Kent Redford) provided comments for this project through an interview (see Section 3.2). The impetus for the report was to review progress after ten years of investment by the Global Environment Facility in biodiversity mainstreaming. It contains many useful insights and lessons that will provide good guidance for CAFF’s mainstreaming work.

The report concludes that biodiversity mainstreaming work (over the previous ten years) provided significant results and established an informal global community of practice. However, more has been written about how and why mainstreaming should be carried out than about what has been learned from mainstreaming practice. More attention should go to design and assessment of mainstreaming projects and to develop learning networks at different scales. Some main lessons are that strong and detailed science data and knowledge at appropriate spatial scales have underpinned all successful mainstreaming interventions, and that communicating the right message to the right audience at the right time is of paramount importance. The report points out that mainstreaming requires skills that lie outside the expertise of many of the people who are leading the work – indicating the need for working in partnership with the private sector and for using successful business models for marketing.

Biodiversity and development mainstreaming. A state of knowledge review: Discussion paper (IIED and WCMC 2013): The report is based on literature review and input from experts, and,
though the main focus is mainstreaming in relation to poverty reduction in developing countries, it contains good analyses of factors that help and hinder mainstreaming interventions.

*Convention on Biological Diversity: A review of national challenges and opportunities for implementation* (Chandra and Idrisova 2011): This journal article emphasizes the need to consider mainstreaming as encompassing a wide range of activities, including capacity-building, analysis of policies and institutions, outreach, and overcoming institutional barriers. The article reviews the national challenges and opportunities in meeting requirements of the CBD by analysing twenty Third National Reports (TNRs).

*Mainstreaming biodiversity: Conservation for the twenty-first century* (Redford et al. 2015): This journal paper makes the point that, while mainstreaming is a major push through the CBD and a field with major investment, the methods and results have not well-documented and not critically analysed. The field is growing in importance. The lesson for the current project is that there is not a set of tried and true methods to copy – it is important to be critical and analytical about approaches, maintain flexibility, and continue to learn from research and practice in this field.

**Programs and partnerships**

Programs of relevance to biodiversity mainstreaming include industry-led initiatives to reduce impacts on biodiversity from industrial activity (Holthus 2014, Mining Association of Canada 2016, Shell Global 2016) and international or national programs to provide financing, methodology and resources for mainstreaming biodiversity or ecosystem services (for example, work undertaken through or for the CBD, the Global Environment Facility, the World Bank, the UN Development Programme, the UN Environment Programme and the European Commission). This review focuses on selected products from these programs, rather than the programs themselves.

**Two big-scale industry-led initiatives that aim to mainstream biodiversity into decision making**

*Biodiversity in good company* (Business and Biodiversity Initiative): This initiative came out of the CBD COP 9 (Bonn, 2008). It includes a guide: *Corporate biodiversity management handbook* (2012), published by the Government of Germany. Public funding ran out in 2011 and the initiative was realigned as a company-driven registered association, based in Germany. Companies can join for a fee, and they are required to report on their progress on biodiversity conservation through a structured reporting system. However, the initiative does not appear to be active.

*Cross sector biodiversity initiative (CSBI)* (IPIECA et al. 2014): This international biodiversity initiative, an industry forum led by the oil and gas and mining sectors, was established to develop and share good practices and practical tools to apply the International Finance Corporation’s (IFC) Performance Standard 6 on Biodiversity Conservation. Goals are to share experiences and to create a culture of learning. The CSBI industry leaders will engage with non-industry groups to further these goals. The website includes guidance documents.

**Arctic region**

CAFF and Circumpolar Biodiversity Monitoring Program (CBMP) ongoing and planned work provide much of the raw materials for developing tools and resources for mainstreaming. For example, *The Arctic Biodiversity Data Service* (http://www.abds.is/), CAFF’s biodiversity data service (under development), provides access to data products that can be featured in any applications of the biodiversity principles.

The Arctic Biodiversity Congress presentations and discussion on mainstreaming (http://arcticbiodiversity.is/congress) provide a basis for developing and furthering partnerships and collaborative work, and provide some pointers on how to approach mainstreaming. A congress summary (IISD 2014) includes a synopsis on discussion about the ABA recommendations that points to the need to move beyond general statements to resources and guidance that are specific to
situations or can be adapted to be specific. In the discussion on mainstreaming, participants linked education and outreach to mainstreaming, recommending “increased efforts to demonstrate why biodiversity is important for people, including through outreach and education;” and “improving knowledge-based communication and support for better biodiversity policy.”

The presentation by P. Holthus (2014) from the World Ocean Council (WOC), as an example of outcomes from the Congress signalling collaboration potential with industry, provides ideas and describes ongoing work of the WOC related to biodiversity. The next step would be to look at how the Arctic biodiversity principles could be used to help guide this industry association’s work, or to tailor some of their initiatives to the Arctic circumstances. He emphasized the benefits of cross-industry collaboration and taking an issue-based approach (e.g., marine sound; invasive species) and identified, as one priority, circumpolar best practices for sustainability.

Two of the people interviewed for the current project discussed Arctic initiatives that are at scoping or early development stages (see the summary of interview results, Section 3.2). Both initiatives have the potential for synergies with work on application of Arctic principles. They are:

- An Arctic Regulatory Navigator Tool (being scoped out by a consultant for the Arctic Economic Council)
- A project on Arctic development investment (at an early stage of development by WWF’s Global Arctic Programme)

Two examples of tools that provide specific, up-to-date information for industry operators

**SnowDens-3D decision support tool** (ALCC 2016): The decision-support software uses topographic and weather data (snow and wind conditions for the fall and early winter) and produces maps of high-probability den locations for the current year (based on modeling). The software and a user guide are downloadable from the website. The tool is developed through a partnership under government leadership.

**Hudson Strait mariner’s guide** (WWF 2016a): A place-specific (Hudson Strait, Canada) and sector-specific (shipping industry) tool. This tool is in the format of a poster with winter and summer maps showing areas of significance to marine mammals (including polar bear denning areas and polynyas in winter) and Inuit harvest areas, in relation to main shipping routes, as well as contacts for communities and Hunters and Trappers Organizations. (Note that two people involved with this project were interviewed, Andrew Dumbrille and Barney Aggark – see Section 3.2).
The guide is accompanied by *Marine mammals of Hudson Strait* (WWF 2016b), an education and guidance tool with information on marine mammal species and guidelines for mariners presented as an infographic (shown below). The biodiversity information is tailored to the needs of mariners – describing species' appearance, behaviour and habitat over the seasons.

**Success stories**

This is a variant of a case studies approach, and was raised as a suggestion during the interviews. We found one example of this approach:
**Success stories** (sections on the IUCN and Birdlife International websites) (IUCN and Birdlife International 2016). This project documents, through a series of downloadable plain language factsheets, how mainstreaming biodiversity can be successfully put into practice. “These factsheets complement the existing literature on this subject, that has remained, so far, mostly on theoretical grounds.” The preamble identifies that successful outcomes have certain things in common – among these are triggers or motivation to make mainstreaming efforts possible, and the presence of a leader/champion who initiates the work. This example shows how the success stories are presented:

<table>
<thead>
<tr>
<th>Tools and toolkits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vulture Safe Zones</strong></td>
</tr>
<tr>
<td>A leading mining group joining forces with conservation NGOs to help prevent the extinction of vultures is an unusual scenario. Yet this is what happened in the central Indian state of Madhya Pradesh in 2014 after conservation experts discovered the birds were ingesting a drug found in their prey. Find out more in our factsheet.</td>
</tr>
<tr>
<td><strong>Factsheet 5</strong></td>
</tr>
</tbody>
</table>

An example of a tool to mainstream biodiversity into development projects

**Timeline tool: A tool for aligning timelines for project execution, biodiversity management and financing** (CSBI 2013): This tool was designed for mainstreaming biodiversity across the lifespan of extractive industry projects. It is a planning tool that helps align project development, biodiversity impact management, and financial timelines and milestones. The goal is to raise awareness of the operational challenges associated with biodiversity impact mitigation. The tool is not interactive.

The starting point of the CSBI Timeline tool roadmap
**Self-assessment tools**

A category of “tools” is the self-assessment, which leads the user through a structured set of questions, based on principles and frameworks. Some of these tools take a programmed learning approach with questions and guidance to steer the user. An example is the *Rapid diagnostic tool for integrating biodiversity, development and poverty reduction* (IIED et al. 2012). The tool sets out a framework of questions to evaluate progress in mainstreaming, assess the approaches taken and identify areas for improvement. The tool is a set of questions with guidance geared to policymakers – it is not interactive (and looks like a homework assignment).

**Excerpt from the Rapid diagnostic tool**
More recent tools of this type tend to provide the user with feedback, or have some interactive components and more visual appeal. An example is the Cool Farm Tool for Biodiversity from the UK (Cool Farm Alliance 2016). This tool provides a quantitative measure of how well farm management supports biodiversity. Scores are allocated along four dimensions and eleven species groups. “Farmers can see which species groups are benefiting from their practices and how they might increase and expand these benefits…. The tool boils complexity into series of multiple choice questions, scored according to latest research and expert judgement.”

**Opening screen of the Cool Farm Tool for Biodiversity**
Example of a mapping and indicator visualization tool

**Biodiversity Indicators Dashboard** (NatureServe 2016): This tool uses dynamic mapping to display, for any part of the world, trends in indicators that are linked to the Aichi targets. This type of tool has utility for policy and outreach. The technique could be adapted to different scales and uses.

A portion of the input screen to the Dashboard

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**Toolkits**

Toolkits (collections of tools) appear to be more common for ecosystem service assessment than for biodiversity – several are presented on websites or are under development (for example WBCSD 2013 and a Canadian ecosystem services toolkit [under development]). A toolkit to support decision-makers in mainstreaming ecosystem services and natural capital into sectoral policies is under development through the International Institute for Environment and Development (as noted by Marianne Kettunen in the interviews, Section 3.2).

**TESSA (Toolkit for Ecosystem Service Site-based Assessment)** (Peh et al. 2013, Birdlife International 2015), developed (or under development) by a partnership led by Birdlife International, would be worth looking at in more detail. It is considered suitable for use by a range of audiences, including the private sector, is accessible to non-experts, uses real data at the local scale, and can be scaled up. The toolkit includes a range of tools offering, for example, decision trees and alternative methods for deriving qualitative and quantitative values.

**Online platforms**

Online platforms have several components, often focused around commercial applications or social interactions. They often use a marketplace metaphor – offering up goods or services, and with space for news, feedback and discussion. We looked at three very different biodiversity-related platforms.
Global Platform on Business and Biodiversity (CBD 2016b): This platform supports the business engagement activities of the CBD Secretariat, including the Global Partnership for Business and Biodiversity. Sections include standard information-focused web pages (e.g., an overview of the business case for biodiversity), searchable databases of tools and guidelines, meeting agendas and documentation, and news, links and related topics.

UNEP Live (UNEP 2016): This is a platform for mainstreaming biodiversity data (primarily metadata in the form of links to sources), and has a similar purpose to CAFF’s Arctic Biodiversity Data Service. It can be filtered by predefined regions, of which the Arctic is one.

Oppla (European Commission 2016): “Oppla is a new knowledge marketplace; a place where the latest thinking on ecosystem services, natural capital and nature-based solutions is brought together.” It is a free, open platform that requires registration. It is designed for diverse needs and interests, including public and private sectors. Includes a crowd-sourced enquiry service (members of the community help answer each other’s questions) and a marketplace (a “knowledge supermarket”). This is a collaborative project with EU FP7 Programme Funding. Oppla has recently been launched and is still in beta version. It is focused strongly on knowledge sharing and is user-driven. For example, users can post and reply to questions, upload and download resources and connect with other users. The site also has news and events sections.

Part of the home page of Oppla

3.2 Themes and take-away messages from the interviews

This summary presents some of the recurring themes and insightful points and ideas, grouped under headings (considerations and pitfalls; upfront and ongoing work; audience focus; terminology, values and goals; contents; recommendations on resources; and suggested references).

The people interviewed have a range of experience and research interests in biodiversity mainstreaming and experience at different spatial scales. We included some people familiar with CAFF’s initiatives and the Arctic Council setting and others with experience in other regions.

The numbers in parentheses refer to the interview numbers – the key is at the end of this section.

Overall summary
The interviews provided a wealth of advice and some useful pointers to resources and related work under development. Some important themes, each raised by many or all of the people interviewed:

- The importance of upfront work: consultation, and analysis of the needs of potential users and the types of tools or resources that will be effective
- The need to consider long-term support and maintenance, and ongoing engagement with the many user groups
- The need to synchronize with or collaborate with related initiatives
- The importance of methods of communication, in terms of language, ease of use and sensitivity to differences in values and goals of the different audience groups
- Emphasis on an ecosystem-based approach
- Emphasis on providing up-to-date, detailed information in a way that is easy to access
- Variance – one size does not fit all, in terms of target audience groups, sectors and regions

Considerations and pitfalls

“Given that there are so many decisions being made at so many levels and scales, I'm not sure how well a platform can accommodate all of them. But if it can give decision-makers a sense of what they should be considering, and guide them to help in taking those considerations into account, that would be a good start. The key will be delivering useful, reliable information in a reasonable amount of time and at the right level of detail and sophistication, recognizing that most decision-makers are intelligent generalists who are very busy and won't have much time to spend learning all the ins-and-outs of biodiversity.” (6)

Any tool or platform might have to be experimental and flexible, ready to adapt to what works. And avoid being prescriptive. Talk more about the decision than the tools. The tools are just what you use; the decision is the important part. (8)

“People always want to get to the highest impact, but I don’t think you’re going to do that, especially with the Arctic Council and especially with the culture within the shipping industry….. I think you have to be more collaborative and co-operative, and softer at the beginning, rather than something regulatory.” (3)

“Web-based platforms are probably the most commonly used. However, the key issue with web-based platforms is how to ensure it is taken up. And for that, a proper investment in “marketing” is required. Also, a key issue is how to ensure it keeps on being updated in the future. Will Arctic Council have resources for ongoing management after the set-up phase?” (7)

Pitfalls (7)

- Creating something so complicated that it cannot be managed in the long term.
- Creating something too simple that does not stand out and gain traction among users.

Pitfalls (4)

- Designing an online platform without initial and continual input from the clients that you anticipate using it—don’t assume you know what decision/policy-makers want;
- Not identifying the decision-making pathways of key Arctic sectors considered to be the most likely to negatively impact Arctic biodiversity;
- Not considering how the online platform would/could be used by key sectors operating outside of the Arctic but likely to have a large impact on Arctic biodiversity (e.g., sub-Arctic aquaculture);
- Presenting information layers in a way that does not allow for future scenarios development or cumulative impacts assessment (not easy but most drivers of biodiversity change in the Arctic are cumulative in nature).
There is no single answer or ideal approach to mainstreaming biodiversity: “If you go to individual practitioners, they may tell you, that's what works, but it actually only works because of the circumstances of where they’re working, and they may not even be aware of those…. Certainly one of the things that we’ve found is that there is no magic pill. It matters a lot about the circumstances, governance systems, the availability of data, but also leadership and political moment. This is basically the conclusions of GEF report and IIED documents.” (9)

**Upfront and ongoing work needed**

Everyone stressed the need to engage in **consultation and analysis** of what will work best before starting development of resources for mainstreaming. People stressed the need for consultation to make sure that whatever is developed works for industry, for local and indigenous communities, and for all involved.

- Important to start with consultation to clearly identify user needs and barriers to access and meaningful use of biodiversity data in decision-making. (4) “A web-based platform that integrates current biodiversity data in user-friendly forms would be one solution, but likely not the entire solution. The web-based platform would need to be developed in consultation with the clients anticipated to use it (e.g., develop a focus group of potential users to inform its development).” (4)
- Communities are so much more welcoming if you start from scratch with them. If you come in with a plan, it provokes resistance because they’ve seen too much of that over the years. “I go in with a blank paper, rather than something I think they should know.” (1)
- Consider how to fit any new online platform developed into the jungle of different programs, funding mechanisms and guidelines and not compete with other tools and platforms. “To make the tool successful, it is essential to establish the benefits the use of this tool provides. Seen with the eyes of business, you need to clearly establish and market why the tool should be used and how it benefits business operations in the Arctic.” (5)
- When introducing new concepts, we should be aware that it might not be a new concept. Maybe what we want people to do is heighten their investment in something they’re already engaged in. (2)
- There is value in taking a phased approach to build confidence, starting with dialogue, focusing on awareness and education. (3)

**Promotion** of the product, and ongoing, active engagement with the users, are important.

- Ongoing, constant engagement is very important (3). It will have to be a continuing process, not just “Here’s a document, just follow it.” (2)
- “Whatever tools are chosen, ease of use and low threshold to use are keys. In addition, the tool should be easily available so that all users find it in the myriad of different tools.” (5)

Include “investigation into where and when biodiversity information is needed in the decision-making process is critical – so ‘mapping’ decision-making process in Arctic states would be a useful exercise to identify key decision points where biodiversity info is needed.” … “Arctic Council states would need to explore opportunities to improve the policy- and decision-making process to make it easier to utilize biodiversity information to inform decisions.” (4)

**Audience focus**

**Different needs** for different decision-makers:

“…depends really on who the audience is and what you want them to gain from using the platform. High-level decision-makers may gain from a pretty simple display of what biodiversity it, why it matters, and how it can be taken into consideration. Worker bees are likely to need something more detailed, that can provide defensible approaches to considering biodiversity, along with some output on the consequences of ignoring it or what the key needs are for better understanding the biodiversity considerations of a particular situation. “(6)

**Tailoring** to meet the needs of different groups:
Avoid the temptation of a single solution: There's a lot of ways of mainstreaming biodiversity but we get into a bit of trouble with a lot of things because we're trying a one-size-fits-all approach. That might not be the most effective way to accomplish anybody's goals. Mainstreaming biodiversity for industry might look every different from mainstreaming biodiversity for government agencies. That could be good; if we have different responsibilities and are working at different scales, we might have to take different approaches. “It might be good that one size doesn’t fit all. It's much more reflective of our actual environment, especially with the fluctuations and continuous changes that are occurring.” (2)

Terminology, values and goals

Defining terms and being aware of differences in meanings in relation to values:

- Important to agree on the meaning of terms at the beginning. For example, “A lot of people use the term biodiversity, but they use it in different ways, not necessarily the way we understand it in science or in indigenous knowledge.” It is also important to understand different goals and values – for example, is the goal maintaining biodiversity for a particular service from the environment? For health of the whole ecosystem? To meet regulatory requirements? (2)
- It’s important to recognize that people value biodiversity in different ways, some of them hard to measure in common evaluation systems such as money. The same applies to acceptable risks. A tool for mainstreaming biodiversity might focus the questions more than answer them. “A fisherman trying to feed his family may be willing to take on a higher risk of overfishing than a conservationist who has the luxury of taking a longer-term, and perhaps spatially larger, view. In this sense, a biodiversity tool is unlikely to provide answers that satisfy everyone, but it could at least help identify where the big divergences are in the ways different people think about the matter at hand, allowing everyone to focus their efforts and discussions on those divergences rather than on the many other things that are likely less controversial.” (6)

Use plain language and avoid terms that inspire pushback

- It’s very important to avoid catch phrases – possibly even “ecosystem services” and “biodiversity.” Use common language that explains the concepts. (8)
- Watch for terminology that inspires pushback – e.g., ecosystem services, natural capital. (8, 10)

Contents (of the principles and the resources/tools for mainstreaming)

Several people discussed the value of providing access to data and that, to make it viable, the tool needs to contain updated information.

- The Arctic Biodiversity Data Service could be expanded and transformed to better deliver policy support tools. (4)

The discussion about contents in some interviews reflected views on what approach to take to biodiversity. Several people emphasized the need to put a strong focus on ecosystem processes and ecosystem-based management. Discussion on ecosystem services approaches was warier and usually included warnings not to focus only on economic values.

- Need to concentrate on relationships between components and processes, but a lot of people are still talking in terms of individual species or organisms. We should be much more concentrated on processes – this reflects both the indigenous view and the view of scientists with training in ecology. Include all of the processes at all scales. Plus, it’s not possible to focus on the biota without the abiotic. Any kind of mainstreaming of biodiversity must really highlight the abiotic systems and how they’re connected to the biotic systems. (2)
• “We have to do better in communicating about biodiversity in a way that’s true and in a way that appeals to what people care about.” That means talking about ecosystem services (carefully) and talking about nature in way that’s not purely functional, but in a way that people will take seriously, not just roll their eyes at. (8)

• Looking at ecosystem services is not necessarily a problem – but it is a problem if people look at biodiversity only through that view (2).

Including a focus on the incorporation of traditional knowledge was raised in some interviews, including guidance on meaningful (not token) incorporation of TEK.

• Include a focus on inclusion of traditional knowledge in the front-end of decision making. The Arctic Economic Council is developing a framework for being good business partners in the Arctic with indigenous residents and communities (end of 2017). (5)

• “Documenting traditional knowledge and referring to it in decision-making is not sufficient, and not really what I think indigenous leaders have been asking for for decades. Instead, they want to have a role in the actual decision-making process, not just the knowledge that a report or two about traditional knowledge were read by someone in the decision-making process.” (6)

Some further suggestions on content:

• Communication methods are extremely important – not just writing, but marketing in new ways. Need the kind of approaches taken by Apple people and Google people, for example. “We can’t just preach at people.” (8)

• Include guidelines, developed and adapted to meet Arctic needs. Example: International Maritime Organization (IMO) underwater noise guidelines – can be adapted to provide specific information for Arctic – “Those IMO guidelines need to be fleshed out, interpreted, understood in regional context.” (3)

• “User case scenarios that investigate how biodiversity data has been used in the past to successfully inform decisions would be helpful in order to identify the critical attributes that allowed this to be successful.” (4)

• Approaches (structure of the resources): You could take a hierarchical decision-tree approach. It would get the user to think about basic questions: What are you going to do? How do you think biodiversity is affected by what you’re planning? Then you can unfold the different areas of concern or policy aspects. … Could move from very general questions that everyone starting to consider biodiversity can ask themselves, and then lead into more specific problems and issues. Alternatively, you could introduce a priority approach, where you say these are the policy fields that are most urgent to mainstream biodiversity into. Rather than a decision tree, you could just make a prioritization in terms of a threat and opportunity analysis. (10)

• “Policy and decision-makers, particularly in sectors outside of environment ministries, need easy access to decision-support tools that can directly and easily inform decision-making.” However, even if one produces highly useful policy support outputs, it is rarely enough. Decision-making processes need to be altered in order to compel decision-makers in various sectors (transport, tourism, extractive industries) to access and utilize this information to inform their decisions. As such, beyond better policy support tools, we need improved policy-making mechanisms as well as improved structures to make it easy for various sectors to access useful and relevant data. (4)

Points on presentation style:

• Avoid overemphasis of uncertainty and unknowns – it can undermine confidence. Avoid a focus on the most recent findings, ensuring that information disseminated is well backed up – and recent findings are presented as such. (6)
• Avoid presenting too much detail too soon (i.e., at the top levels, before drilling down to it), “You need to know the audience and work very closely with them to make sure you are delivering what they can understand and use.” (6)

• “The main thing is that people hate being told how they should consider biodiversity because you can consider it in so many different ways.” (8)

Recommendations on resources and linkages from the people interviewed

• CBD Conference of the Parties (COP) 13, Mexico, December 2016, pointed out by several people as being useful, as its theme is mainstreaming. Ciara Raudsepp-Hearne was in the process of developing a roadmap for biodiversity mainstreaming for the COP at the time of the interview. This and other resources that will be useful to this project will be available as outcomes of COP side events.

• Mainstreaming is a huge area of investment for the Global Environment Facility (GEF) and a major program area for the International Institute for Environment and Development (IIED) – these two institutions have resources and ongoing work in the field. The World Bank also has ongoing major work in this field, in relation to financing mechanisms. (9)
  o Guidance documents produced by Institute for European Environmental Policy on budget-proofing for biodiversity (mainstreaming into European policy) such as: http://www.ieep.eu/assets/1421/cfbp_general_guidance.pdf (7)

• Online platforms and initiatives under development that have similarities/potential synergy
  o Opplas (http://oppla.eu): European Commission: Knowledge marketplace, focus on financial mechanisms for mainstreaming biodiversity (7)
  o Arctic Economic Council’s Arctic Regulatory Navigator Tool (at the scoping stage) (5)
  o WWF’s project on Arctic development investment, which will use natural capital approaches (at the scoping stage). This could be a parallel development or could be linked or accommodated. (10)
  o IIEP work on integrating biodiversity principles into policy, including a toolkit they are developing to support decision-makers to mainstream ecosystem services and natural capital into sectoral policies. (7)
  o UNEP Live (https://uneplive.unep.org/), a UN Environment Program platform for data access (primarily links to sources) as an example of a related platform. It can be filtered by regions – and Arctic is one of the regions (4)

• Sectors/examples
  o Hudson Strait Mariners’ Guide (an example/case study) (3 and 1)
  o Arctic Shipping Best Practices Information Forum (Arctic Council). This forum will influence the implementation of the Polar Code. (3)
  o The insurance industry (3)

Reference list of people interviewed

(1) Barney Aggark, Chesterfield Inlet (hamlet council and Hunters & Trappers Association), Nunavut, Canada
(2) Carolina Behe, Inuit Circumpolar Council Alaska, USA
(3) Andrew Dumbrille, WWF Canada (Sustainable Shipping), Quebec, Canada
(4) Mike Gill, Government of Canada (Polar Knowledge Canada / Indigenous and Northern Affairs Canada), Nova Scotia, Canada
(5) Anu Fredrikson, Arctic Economic Council Secretariat, Norway
(6) Henry Huntington, Pew Charitable Trusts (Arctic Ocean projects), Alaska, USA
(7) Marianne Kettunen, Institute for European Environmental Policy, UK (and Finland)
(8) Ciara Raudsepp-Hearne, Centre for Biodiversity Science, Quebec, Canada
(9) Kent Redford, Archipelago Consulting, Maine, USA
(10) Martin Sommerkorn, WWF Global Arctic Programme, Norway
3.3 Discussion

The review of literature and websites and the summary of the interviews demonstrate that the field of mainstreaming biodiversity is in a state of flux. Over the past decade, numerous initiatives have been undertaken to raise awareness about threats to biodiversity and to influence decisions that are affecting biodiversity. Much general material has been written on the subject. However, there are no tried-and-true methods that have been rigorously assessed. There is a lack of research in general on effectiveness of approaches. It will be important to take a consultative, iterative and analytical approach to developing resources for mainstreaming Arctic biodiversity, and it also will be important to build in monitoring for effectiveness and enough flexibility to change course. As the field is developing so quickly, much will be learned through involvement with work undertaken by the leaders in mainstreaming, such as CBD and GEF, and also from involvement with similar initiatives still at the scoping or development stage – such as the European Commission’s Oppla platform.

Innovation in tools and resources for mainstreaming appears to be most advanced in the ecosystem services and financing/budgeting areas, as well as for online mapping and data modelling and visualization. These highly varied products provide useful guidance on the range of possibilities. It is also worth looking at the techniques used in tools designed for purposes such as measuring progress towards biodiversity targets. The nature of the resources needed for biodiversity mainstreaming varies greatly, depending on the ecological setting of their intended use, and on a whole array of variability linked to scales, audiences and values. A one-size-fits-all approach will not work.

It is evident from reviewing online resources and tools that the past five to ten years has seen a shift from resource repositories to networks and platforms that take advantage of new web technology and social media. Roadmaps, guidelines and handbooks are being replaced with interactive tools that are more specific to sectors and regions and are more geared to solving problems.

4. References


CAFF. 2015b. The Economics of Ecosystems and Biodiversity (TEEB) scoping study for the Arctic. Akureyri, Iceland: Conservation of Arctic Flora and Fauna.


IIED, and WCMC. 2013. Biodiversity and development mainstreaming. A state of knowledge review: Discussion paper. International Institute for Environment and Development (IIED) and UNEP World Conservation


Annex A. Annotated bibliography

Eamer Science & Policy
December, 2016

This annotated bibliography is input to the Conservation of Flora and Fauna (CAFF) group’s work on mainstreaming biodiversity into decision making in the Arctic. This document is a supplement to *Arctic biodiversity principles and their application in mainstreaming biodiversity: Background and options paper*. It contains selected references from a survey of literature and web sites. These entries were selected as being relevant to the project and potentially useful in evaluating options and for reference in the next phase of this project.


This decision-support tool is based on a polar bear snowdrift den habitat mapping tool. The decision-support software uses topographic and weather data (snow and wind conditions for the fall and early winter) and produces maps of high-probability den locations for the current year (based on modeling). The software and a user guide are downloadable from the website. The tool is developed through a partnership under government leadership.

This tool was built as part of the BESAFE FP7 project. It may have been or is being incorporated into Oppla, the knowledge marketplace. “The general aim of BESAFE is to improve our understanding of the alternative ways in which concepts for the ‘value of biodiversity’ can be used to improve biodiversity policy making and governance at local, national and European to global scales.”


“The Toolkit for Ecosystem Service Site-based Assessment (TESSA) has been developed through a collaboration of six institutions with input generously provided by scientists and practitioners from multiple disciplines. The toolkit provides accessible guidance on low-cost methods for how to evaluate the benefits people receive from nature at particular sites in order to generate information that can be used to influence decision making….TESSA focuses on the site scale (predominantly gathering real field measurements, rather than relying on theoretical scenarios or extrapolations from global models) to respond to the need to generate information on ecosystem service values using locally gathered information at particular protected areas, sites of biodiversity importance or project locations. This makes it relevant for local decision-making and, when scaled up, for wider communication.” The toolkit is accessible to non-experts and contains a range of tools offering, for example, alternative methods for deriving qualitative and quantitative values, guidance and decision trees.


This initiative came out of the CBD COP 9 (Bonn, 2008). Includes a guide: Corporate biodiversity management handbook (2012), published by the Government of Germany. Public funding ran out in 2011 and the initiative was realigned as a company-driven registered association, based in Germany. Companies can join for a fee, and they are required to report. However, the initiative does not appear to be active.


This initiative seems to have been started under this name, with preliminary development of a toolkit for assessing ecosystem services, and then the toolkit continued as TESSA through BirdLife International.


“The Global Platform for Business and Biodiversity is the website designed to support the business engagement activities of the Secretariat of the Convention on Biological Diversity including the Global Partnership for Business and Biodiversity.”

CBD. 2013. Quick guides to the Aichi Biodiversity Targets. Convention on Biological Diversity. Available at: [https://www.cbd.int/nbsap/training/quick-guides/]

Although these are targets, not principles, there are similarities in the way they are presented. They have a general-to-detail structure, and provide guidance. “The guides provide an overview of the main issues addressed under each target. They aim to provide Parties and other stakeholders with an introduction to each of the Aichi Biodiversity Targets by quickly introducing key terms, highlighting some of the implications for national target setting.
providing guiding questions for consideration as part of national target setting exercises, providing ideas for preliminary national actions, identifying possible indicators to monitor progress and identifying further resources.”


Each principle is stated with a prescriptive sentence, e.g. Principle 2: “Management should be decentralized to the lowest appropriate level” followed by a paragraph that provides rationale and elaborates on the actions needed. e.g. “Decentralized systems may lead to greater efficiency, effectiveness and equity. Management should involve all stakeholders and balance local interests with the wider public interest. The closer management is to the ecosystem, the greater the responsibility, ownership, accountability, participation, and use of local knowledge.”


“The ecosystem approach provides a framework of 12 principles that can be used to guide planning processes at national and sub-national levels to ensure that policies, plans and programs consider biodiversity alongside economic and social objectives.” Principles are presented as 12 guiding questions. For example, Principle 2: “Management should be decentralized to the lowest appropriate level”, becomes “How do you ensure management is decentralized to the lowest appropriate level?”


“This article reviews the national challenges and opportunities in meeting requirements of the CBD by analysing twenty Third National Reports (TNRs), covering five different CBD regional clusters from the three global economic groups. While there is a plethora of challenges, the predominant ones discussed in this study include: institutional and capacity, knowledge and accessible information, economic policy and financial resources, cooperation and stakeholder involvement, and mainstreaming and integration of biodiversity.”

Chenery, A., H. Booth, C. Secades, L. Mazza, C. Brown, and P. ten Brink. 2013. *Incorporating biodiversity and ecosystem service values into NBSAPS: Roadmap to support NBSAP practitioners*. United Nations Environment Programme-World Conservation Monitoring Centre (UNEP-WCMC) and Institute for European Environmental Policy (IEEP). Available at: [http://www.ieep.eu/assets/1199/Roadmap_A5_FINAL.pdf](http://www.ieep.eu/assets/1199/Roadmap_A5_FINAL.pdf)

A companion document to the full report on this subject, this roadmap is a more concise and usable format.


“This guidance document has been prepared to support National Biodiversity Strategies and Action Plans (NBSAPs) practitioners in producing updated NBSAPs which are compliant with Aichi Biodiversity Targets 1 and 2 through the incorporation of biodiversity and ecosystem
service values.” It includes a framework, background information, and guidelines. There is a focus on ecosystem services and incorporation using biodiversity values as a vehicle for mainstreaming.


“The Cool Farm Biodiversity metric quantifies how well farm management supports biodiversity…Biodiversity assessments provide scores along four dimensions and eleven species groups. Farmers can see which species groups are benefiting from their practices and how they might increase and expand these benefits…. The tool boils complexity into series of multiple choice questions, scored according to latest research and expert judgement.”


This timeline tool has been designed for extractive industry projects. It is a planning tool that helps align project development, biodiversity impact management, and financial timelines and milestones. It provides a roadmap with key milestones and interdependencies between project development and financing timelines and actions. Its goal is to raise awareness of the operational challenges associated with biodiversity impact mitigation, and it can be used to build capacity and for communication.


“This diagnostic sets out a framework of issues and questions which can be used to: Understand what progress has been made to mainstream environment in a particular context; Map and analyse the EM approach(es) of a country, institution or project; assess how institutional structures and procedures support or inhibit EM; Examine EM performance – internally (within the institution) and ‘on-the-ground’ (in terms of outcomes); Identify areas for change and improvement.”


This is in the form of a policy statement, headed by the principles “Biodiversity and ecosystem services matter for all” and “Biodiversity and associated ecosystem services must be integrated into development cooperation.” The division into topics is through a list of priorities, so they are action statements: Integrate..., Invest in..., Support...


The format is a general statement (principle) about the importance of protecting biodiversity and linking this to corporate commitments. “Protection of the world's biodiversity is an important societal need, as well as a critical requirement for developing new products. As part of our corporate commitment to sustainable growth, DuPont seeks to conserve and protect natural resource biodiversity; consider concerns of local communities in the selection, design,
production, and introduction of our products; and publicly advocate positions consistent with this commitment.” This is followed by a list of types of actions: (Excel in the efficient use of fossil fuels and feedstocks...; inform and engage local communities...).


“Oppla is a new knowledge marketplace; a place where the latest thinking on ecosystem services, natural capital and nature-based solutions is brought together.” It is a free, open platform that you register to. Designed for diverse needs and interests - including public and private sectors. Includes a crowd-sourced enquiry service (members of the community help answer each other’s questions) and a marketplace (a “knowledge supermarket”) Collaborative project with EU FP7 Programme Funding.


This article has a focus on mainstreaming biodiversity data – in terms of collection, data access and use in policy.


This presentation provides ideas for further collaborative work, likely much of which is ongoing. The next step is to look at how the biodiversity principles can be used to help structure and guide their work and to strengthen partnerships. The author also points out that benefits of cross-industry collaboration and taking an issue-based approach (e.g. marine sound; invasive species).


This report contains discussion and conclusions from a comprehensive literature review of biodiversity mainstreaming and from a 2013 workshop. The impetus for the report is review of the subject after ten years of investment by the Global Environment Facility in mainstreaming. It contains many useful insights and lessons that will provide good guidance for CAFF’s mainstreaming work.


“The IBAT is a web-enabled data visualization application. IBAT converts critical conservation data into synthesized information (e.g. maps), thus providing decision makers such as businesses, governments and those funding their operations access to critical biodiversity information at the site level to inform risk assessment procedures for existing and potential developments.”

“This guide is designed to help companies operating in emerging markets better understand their relationship to biodiversity issues and how they can effectively manage those issues to improve business performance and benefit from biodiversity.” This is a web version of a report, without a downloadable pdf option. It is very general, and is not easy to locate or read (for example, figures are in pdf format as links). The sections include: understanding biodiversity, addressing biodiversity, sector-specific biodiversity management, and lessons from experience. There are many links to other documents, or short IFC fact sheets.


This guide to mainstreaming is the outcome of an international meeting on mainstreaming and development. It outlines 10 steps, then provides discussion and some useful tools for each of the steps.


“The Tool sets out a framework of issues and questions that can be used to: · Understand what progress has been made to mainstream biodiversity to date; · Map and analyse the mainstreaming approaches that have been adopted; · Assess how institutional structures and procedures support or inhibit biodiversity mainstreaming; · Examine performance — internally (within the institution) and ‘on-the-ground’ (in terms of outcomes and impacts); and · Identify areas for change and improvement.”


“This report presents a review of the current state of knowledge on biodiversity and development mainstreaming globally. The report is intended to support biodiversity-development mainstreaming efforts by synthesising experience to date and highlighting lessons learned that can help make a strong business case for integrating biodiversity in policy, planning and budgetary processes.” The report is based on literature review and input from experts, and, though the main focus is mainstreaming in relation to poverty reduction, it contains good analyses of factors that help and hinder mainstreaming interventions.


“Some participants felt that the recommendations were too generic, particularly those on mainstreaming biodiversity and improving knowledge and public awareness.” This is from the synopsis on discussion about the ABA recommendations, and points to the need to move beyond general statements to resources and guidance that is specific to situations or can be adapted to be specific. From discussion on mainstreaming, participants recommended: “increased efforts to demonstrate why biodiversity is important for people, including through outreach and education;” and “improving knowledge-based communication and support for better biodiversity policy.”

“The initiative was created to develop and share good practices and practical tools to apply the new International Finance Corporation’s (IFC) Performance Standard 6 on Biodiversity Conservation. IFC’s Performance Standards have become globally recognized as a benchmark for environmental and social risk management in the private sector.” “CSBI aims to share experiences and to create a culture of learning and continuous improvement. Although the CSBI is an industry forum, the group will engage with non-industry groups who have interest and experience in offsets and the biodiversity mitigation hierarchy included in IFC performance standard 6.” This website contains guidance documents for incorporation of Performance Standard 6.


“This project, led by IUCN and BirdLife International, aims to document -through a series of simple factsheets- how mainstreaming biodiversity can be successfully put into practice. These factsheets complement the existing literature on this subject, that has remained, so far, mostly on theoretical grounds.”


This guidance document is part of initiatives to mainstream biodiversity into EU budget processes. The end goal is “to avoid measures taken under EU sectoral policies having negative impacts biodiversity and nature objectives, and highlight measures that are designed to directly enhancing or preserving biodiversity and ecosystems.”


“The Biodiversity Conservation Management protocol consists of three indicators that set out expectations for mining companies with respect to conserving biodiversity. The protocol seeks to confirm that mining facilities have made formal commitments to manage biodiversity at their sites, that action plans for significant biodiversity aspects are implemented, and that biodiversity conservation reporting systems are in place to inform decision-making and to communicate their performance publicly.”


“NatureServe’s Biodiversity Indicators Dashboard is an interactive, user-friendly tool that visualizes the health and trends of biodiversity, and tracks conservation performance at regional, national, basin, and site scales. The Dashboard monitors the status of key biodiversity indicators, signaling both where and what conservation action is needed. The tool’s dynamic
map allows users to view indicator trends for any part of the world. Indicators are linked to the Aichi target they address, and are supported by comprehensive metadata.”


“The Ecosystem-Based Management Tools Network (EBM Tools Network) is a voluntary alliance of tool users, developers, and training providers to promote awareness, development, and effective use of technology tools for EBM in coastal and marine environments and the watersheds which affect them. The Network includes members from universities, research institutes, governments, conservation groups, foundations, independent consultants, and for-profit tool providers.” A main use of the tools is “Help incorporate a wide array of ecosystem and human considerations into decision making.”


This statement of principles for a UK-based venue and event management company (NEC Group) has a general statement on corporate commitment and values, followed by three “essential principles”: “Deepen people’s understanding of biodiversity”; “Act in such a way as to conserve biodiversity”; “Use our business operations to help conserve biodiversity.” Five action guidelines follow the principles. This is a business that operates in urban environments. Its actions focus on the relationship of biodiversity to product lifecycle supply chains, as well as on employee awareness and community outreach.


“The practice of mainstreaming is tied to implementation of the Convention on Biological Diversity and is practiced with billions of dollars of investment by development agencies, national government agencies, and the Global Environment Facility (GEF) and its implementing organizations as well as other donors. It is essential for the long-term survival of biodiversity inside and outside protected areas. However, it is virtually unheard of in the main conservation science field. This must change so as to bring careful documentation, analysis, monitoring, publishing, and improvement of practices—all things that conservation science should provide as partners to practitioners of biodiversity mainstreaming. The situation is ripe for informed coordination and consolidation and creation of a science-driven field of biodiversity mainstreaming.”


“The Target Crosslinking Tool (TCT) for the 2020 biodiversity targets is a self-standing working tool developed by the European Environment Agency for the BISE-CHM network of Europe (http://biodiversity.europa.eu/chm-network) but that can be used by any Party and CBD. The TCT enables cross-linkages between biodiversity-related targets from the national to the EU and the global levels, in order to support national and regional assessment of progress and facilitate related reporting obligations.”

British Columbia EFP Biodiversity Steering Committee. BC Agricultural Research Development Corporation (ARDCorp) - BC Agriculture Council
Sets out eight principles, using snappy headlines and drill-down to further detail. The document makes extensive use of graphics.

A UN Environment Programme platform for data access (primarily metadata in the form of links to sources), this is an example of a related platform. It can be filtered by predefined regions - of which the Arctic is one.

This report starts with sections that lay the framework for the financial sector, for example, context on biodiversity and ecosystem services, risks and opportunities for the financial sector. The six principles they present (for example, “The goal is to alleviate negative effects on biodiversity caused by business operations” and “Business decisions are conducive to the conservation and equitable use of biodiversity and ecosystem services.” Somewhat more specific guidelines follow (e.g. “Staff members must be informed about the issue of biodiversity”).

This is a British Columbia government report that links ecological principles to conservation action. Its highest level is ecological concepts, (such as population viability/thresholds; levels of biological organization). This is followed by a set of six principles that are at a more fundamental ecological science level than the ones we have recommended. They are presented as a sentence (a proposition) and text of one to three paragraphs. Examples of the principles: Protection of species and species’ subdivisions will conserve genetic diversity.” “All things are connected by the nature and strength of those connections vary.” This is followed by a set of applications, such as “retain large contiguous or connected areas” and “Set objectives and targets for biodiversity in plans”.

This is an interactive pdf report. It was released as a first version in 2013 and there do not appear to be updates or any later material derived from it.

WWF. 2016. Hudson Strait mariner’s guide. WWF Canada
A place-specific and sector-specific tool. This tool is in the format of a poster with winter and maps showing areas of significance to marine mammals (including polar denning areas and polynyas in winter) and Inuit harvest areas, in relation to main shipping routes, as well as 23 contacts for communities and Hunters and Trappers Organizations.

WWF. 2016. Marine mammals of Hudson Strait. WWF Canada
Education and guidance tool to accompany the mariner’s guide, with information on marine mammal species and on guidelines for mariners presented as an infographic.