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**Climate Change  
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## **KEYNOTE ABSTRACT: Biodiversity and ecosystem services**

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### **Arctic biodiversity and ecosystem services: How the Conservation of Arctic Flora and Fauna (CAFF) program can help**

The Arctic covers 14.8 million km<sup>2</sup> of land and 13 million km<sup>2</sup> of ocean, including vast wilderness areas. Together with the Antarctic the Arctic holds the largest freshwater reserves on the globe but has also globally significant array of biodiversity and unique, diverse indigenous cultures. The Arctic ecosystems are critical to the biological, chemical and physical balance of the globe.

The natural resources in the Arctic are and have been used for millennia for hunting, grazing, fishing, and other resource use, more recently for commercial fisheries and tourism. Dramatic changes in biodiversity and ecosystem services are underway. For the economy of the region these changes can be both negative and positive. Changes generate threats to resilience and sustainability, and can have global repercussions for the planet's biodiversity.

Various pressures or stressors are taking place or are imminent. Climate change is predicted to cause greater warming in the Arctic than elsewhere, and this will be twice as severe over oceans than over land. Resource development is on the increase, such as oil and gas explorations, with increasing infrastructure, increased shipping and air traffic, leading to more extensive habitat destruction and fragmentation. Invasive species are a threat to indigenous biota, and potential overexploitation is a continuing challenge.

The Arctic Climate Impact Assessment (ACIA) report (2005) predicted rapid warming with worldwide implications. As a result there will be geographical and numerical shifts in Arctic biota. Coastal communities will experience increasing physical exposure, and

increased transport and resource access will result from less sea ice. Thawing disrupts infrastructure, and shifts will occur in important feeding areas for mammals and birds. These changes will have economic and cultural impacts for indigenous peoples, and elevated UV radiation will affect people and biota. Climate change, increased resource development, and other stressors will place greater pressure on Arctic biodiversity in the future. The results are multiple interactions impacting people and ecosystems. Increased challenges for Arctic people are inevitable as a result, both general relationship with and the economic use of the environment.

The Conservation of Arctic Flora and Fauna (CAFF) program is designed to establish more coordinated effort to conservation of Arctic biodiversity. CAFF is one of six working groups of the Arctic Council, with a focus on biodiversity conservation. Board members come from eight Arctic countries and six indigenous organisations. Observers are from international organisations and non-Arctic states. The CAFF mandate is *inter alia*:

- *to address the conservation of Arctic biodiversity, and to communicate the findings to the governments and residents of the Arctic, helping to promote practices which ensure the sustainability of the Arctic's living resources ...*
- *to monitor, assess, report on and protect biodiversity in the Circumpolar Arctic*

What is urgently needed now for conservation of Arctic biodiversity is evaluation of status and trends, establishment of baseline data, and improving and enhancing capacity to monitor and understand changes. We need a more integrated approach to biodiversity monitoring on a circumpolar rather than a national scale. Such an approach allows for more coordinated gap analyses.

How is CAFF responding to these needs? CAFF uses several approaches of which there are two main but related programmes, the Circumpolar Biodiversity Monitoring Programme (CBMP) and the Arctic Biodiversity Assessment (ABA). Besides expert groups on seabirds, flora and protected areas, there are individual projects, e.g. ECORA which is an integrated ecosystem approach to conserve biodiversity and minimize habitat fragmentation in the Russian Arctic. CAFF furthermore endorses Arctic projects of others, which are considered important to Arctic biodiversity conservation.

The purpose of ABA is:

- *to synthesize and assess the status and trends of biological diversity in the Arctic*

Baseline information is gathered from the most recent scientific data and Traditional Ecological Knowledge (TEK) research, alongside identifying gaps in data records, main stressors and key mechanisms driving change, and producing recommendations. Co-leads are Greenland/Denmark, Finland and the US. ABA has three components; Arctic Biodiversity Highlights Report (2010), Scientific Report (2013), and lastly Overview & Policy Recommendations (2013). The Highlights Report is looked upon as an Arctic Council contribution to the UN International Biodiversity Year 2010, and measure of progress towards the 2010 CBD target ... *to reduce the rate of biodiversity loss*. It will form a baseline for future assessments of Arctic biodiversity.

The CBMP has a direct link to the ACIA recommendation to:

- *expand & enhance long-term Arctic biodiversity monitoring.*

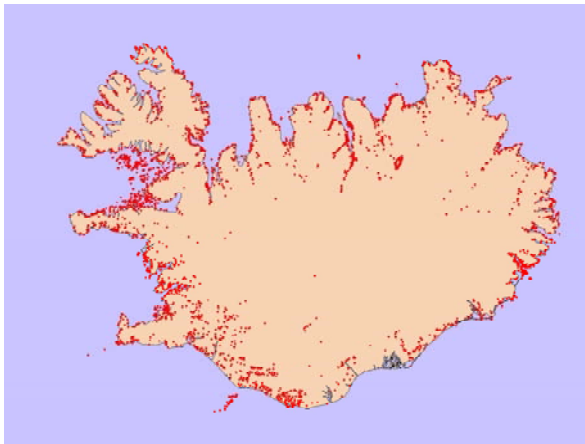
It is an international network to improve detection, to understand and to report on

biodiversity trends. It is looked upon as the biodiversity component of the Sustained Arctic Observing Network (SAON), if this is formed by the Arctic Council. The CBMP uses a ecosystem based management approach, currently with over 60 global partners, 33 of which are Arctic networks. CBMP is led by Canada, with current funding from Canada, US, Finland, Sweden, Norway, and the EU. It is a coordinating body of monitoring networks. Further details on the CBMP will be provided by Mike Gill, Chair of the CBMP, at the Monaco meeting.

One example of CAFF activity in focus, or a case study, is given on seabirds. The Seabird Expert Group (CBird) has main thrusts as follows:

- Identify principal conservation issues
- Develop conservation strategies and action plans
- Develop and implement an Arctic monitoring network
- Map seabird sites and analyse population trends
- Compile identified conservation issues and reporting
- Bi- or multilateral research on identified issues
- Contribute to other AC projects, e.g. oil and gas assessment

CBird has so far developed three conservation strategies, i.e. on eiders, murre, and Ivory Gull. The group attends to new, urgent conservation issues which arise and compiles reports on various issues, such as seabird harvest, bycatch, and disturbance. The status of individual species is currently under scrutiny (Glaucous Gulls, Arctic Terns). As part of seabird work breeding colonies are constantly being mapped (see figure) and Arctic data compiled for trend analyses in relation to stressors, e.g. climate change.



*Figure 1: Distribution of Icelandic seabird*

*colonies*

CBird has developed a framework for an Arctic Seabird Monitoring Network, with the following main components:

- Colony monitoring
- At-sea surveys
- Harvest statistics
- Breeders/non-breeders lists
- Red lists

Physical and biological data needed for interpretation of results will be sought from other sources and partners outside CAFF.



Figure 2: Ivory Gull. Photo: Maria Gavriilo

One example relating to population trends includes the Ivory Gull (see figure 2), which is an entirely High-Arctic breeding species for which the Arctic countries have special responsibility. Its distribution is linked with Polar Bears, and the species is red-listed nationally and by the International Union for Conservation of Nature (IUCN). Dramatic decline has been observed in Canada (see figure 3) while Russia holds the bulk of the world population.

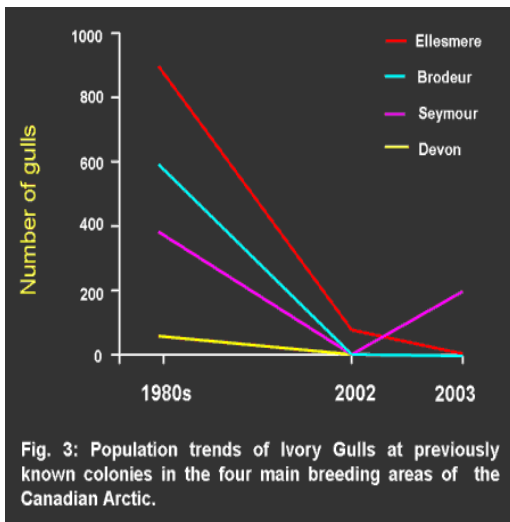


Figure 3: Population trends of Ivory Gulls in Canada

The Ivory Gull is a CAFF-priority species and an International Conservation Strategy and Action Plan has been developed for its conservation.

CAFF faces a number of challenges in its work. Perhaps the main ones are to ensure sustained funding, Arctic-wide participation and access to scientific and TEK information. Management and dissemination of data to stakeholders are also challenging, as well as continued political commitment. Identification and filling of obvious gaps in knowledge is an integral part of the work. Lastly, evaluation of the effects of stressors on biodiversity is ongoing and the research needed for interpretation of monitoring results.

**Recommendations:**

- Acknowledge challenges to biodiversity from climate change and other stressors

- Realising dependence of Arctic Peoples on biodiversity, and importance of Traditional Ecological Knowledge (TEK)
- Endorse Arctic Biodiversity Assessment (ABA) Highlights Report as a contribution to the UN International Year of Biodiversity 2010
- Endorse Arctic biodiversity monitoring through CBMP
- Recognise CBMP as a component of the Sustaining Arctic Observing System (SAON) and IPY legacy