"For us, so-called subsistence activity is far more than subsistence. Hunting is more than food on the table. It is a fundamental part of who we are."

Introduction

The Arctic plays host to a vast array of biodiversity, including many globally significant populations [1]. Included among these are more than half of the world’s shorebird species [2], 80% of the global goose populations [3], several million reindeer and caribou, and many unique mammals, such as the polar bear. During the short summer breeding season, 279 species of birds arrive from as far away as South Africa, Australia, New Zealand, and South America to take advantage of the long days and intense period of productivity. Several species of marine mammals, including grey and humpback whales, and harp and hooded seals, also migrate annually to the Arctic (Figure I).

In 2001, the Arctic Council’s Conservation of Arctic Flora and Fauna (CAFF) Working Group published the report *Arctic Flora and Fauna: Status and Conservation* [7], the first truly circumpolar overview of Arctic biodiversity. The report provided, “a clear understanding of the importance of the Earth’s largest ecoregion and its status in the face of a rapidly changing world”. The report observed that while much of the Arctic was in its
natural state and that the impacts of human activity were relatively minor, individuals, species, and ecosystems throughout the Arctic faced threats from many causes, and that the long-term consequences of human impacts were unknown. It particularly noted that the information necessary to determine status and trends of Arctic fauna was fragmentary, and almost entirely non-existent for flora.

Since the publication of *Arctic Flora and Fauna*, the Arctic has entered into a cycle of intensive pressure and change involving a new set of challenges and stressors, with climate change at the forefront (Figure II).

In the past 100 years, average Arctic temperatures have increased at almost twice the average global rate [8]. Over the past thirty years, seasonal minimal sea ice extent in the Arctic has decreased by 45,000 km$^2$/year [9]. Along with earlier break-up and freeze-up, the extent of terrestrial snow cover in the Northern Hemisphere has decreased and is expected to continue to do so [9].

The magnitude of these changes will exert major influences on biological dynamics in the Arctic. Some of the most rapid ecological changes associated with warming have occurred in marine and freshwater environments. Species most affected are those with limited distributions or with specialized feeding habits that depend on ice foraging. Other predicted effects of climate change, and other stressors, such as industrial development and resource exploitation, on Arctic biodiversity include:

- changes in the distribution, geographical ranges, and abundances of species (including invasive alien species) and habitats of endemic Arctic species; and
- changes in genetic diversity; and
- changes in the behavior of migratory species.

Figure II: Arctic biodiversity is being affected by numerous local and global pressures.
Arctic warming, with its many and increasing impacts on flora, fauna, and habitats, has heightened the need to identify and fill the knowledge gaps on various aspects of Arctic biodiversity and monitoring. This need was clearly identified in the 2005 Arctic Climate Impact Assessment (ACIA) which recommended that long-term Arctic biodiversity monitoring be expanded and enhanced [1]. The CAFF Working Group responded to this recommendation with the implementation of the Circumpolar Biodiversity Monitoring Program (CBMP, www.cbmp.is).

Following the establishment of the CBMP, the CAFF Working Group agreed that it was necessary to provide policy makers and conservation managers with a synthesis of the best available scientific and traditional ecological knowledge (TEK) on Arctic biodiversity. This initiative, the Arctic Biodiversity Assessment (ABA, www.caff.is/aba), was endorsed by the Arctic Council in 2006. The aims of the ABA are to provide a much needed description of the current state of the Arctic’s ecosystems and biodiversity, create a baseline for use in global and regional assessments of biodiversity, and provide a basis to inform and guide future Arctic Council work. In addition, it will provide up-to-date scientific and traditional ecological knowledge, identify gaps in the data record, identify key mechanisms driving change, and produce policy recommendations regarding Arctic biodiversity. The first deliverable of the ABA is the overview report, Arctic Biodiversity Trends 2010: Selected Indicators of Change which presents a preliminary assessment of status and trends in Arctic biodiversity and is based on the suite of indicators developed by the CBMP [11].

For this report, twenty-two indicators were selected to provide a snapshot of the trends being observed in Arctic biodiversity today. The indicators were selected to cover major species groups with wide distributions across Arctic ecosystems. Special consideration was given to indicators closely associated with biodiversity use by indigenous and local communities, as well as those with relevance to decision-makers. Indicators were also selected on the basis of what was achievable in terms of existing data and in the timeframe available. Each indicator chapter provides an overview of the status and trends of a given indicator, information on stressors, and concerns for the future. The geographic area covered by the ABA is shown in Figure III.

Traditional ecological knowledge is vital to form a more complete picture of the status and trends in Arctic biodiversity. TEK is actively being sought out and incorporated into the larger ABA scientific report, scheduled for 2013. The scientific report will further develop and elaborate on the findings of the Arctic Biodiversity Trends 2010 report, including different approaches to natural resource management.

1. Traditional ecological knowledge, or TEK has been defined as the knowledge and values which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another. (Definition of TEK in GNWT policy statement, as quoted in [7]).
The ABA is also the Arctic Council’s response to global conservation needs. While there is a clear concern for the future of Arctic nature, this applies even more to global biodiversity. In 2002, the Conference of the Parties to the Convention on Biological Diversity (CBD) established a target, “to achieve, by 2010, a significant reduction of the current rate of biodiversity loss at the global, regional, and national levels as a contribution to poverty alleviation and to the benefit of all life on Earth”. Subsequently, the 2010 Biodiversity Target was endorsed by the World Summit on Sustainable Development (2002) [13] and the United Nations General Assembly [14]. The recent Arctic Council Ministerial meeting [15] noted that the Arctic Biodiversity Trends 2010 report will be an Arctic Council contribution to the United Nations International Year of Biodiversity in 2010 and at the same time a contribution to the CBD’s 3rd Global Biodiversity Outlook to measure progress towards the 2010 Biodiversity Target.

2. For separation between the high Arctic and low Arctic, the division between subzones C and D are those defined in the Circumpolar Arctic Vegetation Map. The southern limit of the sub-Arctic is “loose”, as work on the boreal vegetation map is pending. Contrary to the Arctic zones on land, the boundaries at sea are tentative. Here they just indicate a general perception of the different zones [12].