Arctic Flora and Fauna

ARCTIC FLORA AND FAUNA

STATUS AND CONSERVATION

EDITA • HELSINKI

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Financial and other support: Nordic Council of Ministers; National Science Foundation (U.S.); Ministry of the Environment Finland; Canadian Wildlife Service – Environment Canada, Fisheries and Oceans Canada, Indian and Northern Affairs Canada; Ministry of Foreign Affairs Iceland; Swedish Environmental Protection Agency; Greenland Homerule Government; Directorate for Nature Management, Norway.

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Back cover photo: Roseroot, *Rhodiola rosea.* Gilg & Sabard/GREA.

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Printing and binding: Edita Plc

ISBN 9979-9476-5-9

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PREFACE

It is with great pleasure that we present *Arctic Flora and Fauna: Status and Conservation*. This report draws on the diversity of projects that the Program for the Conservation of Arctic Flora and Fauna (CAFF) has undertaken in its first decade, underscoring the need to address conservation on a circumpolar basis. We thus find it highly appropriate that its publication coincides with the tenth anniversary of circumpolar Arctic environmental cooperation, initiated in Rovaniemi, Finland, with the creation of the Arctic Environmental Protection Strategy, now a central part of the Arctic Council.

The Arctic Council, at its meeting in Iqaluit, Canada, in 1998, requested that CAFF prepare an overview of Arctic ecosystems, habitats, and species. The resulting report is not a comprehensive scientific document, but a scientifically-based overview of the main features of the Arctic ecoregion, its ecology, and the status of its flora and fauna. Written for the non-specialist, the report highlights the importance of Arctic resources and processes for Arctic residents and for the world as a whole. General conclusions address the current status of Arctic biodiversity and the main conservation challenges that face us. This report is a major step in CAFF's efforts to look at conservation issues from a circumpolar perspective. We will use it as the basis for developing, in the months and years to come, specific assessments, recommendations, and actions to conserve the unique natural heritage of the Arctic region.

This report is a collective product of the member countries, permanent participants, and observers of the CAFF Program. Without their commitment and support, the project could not have been undertaken, much less successfully completed. In addition, we thank all those who provided material for the report, reviewed drafts, and contributed in other ways. In particular, however, we commend the Editorial team for the admirable job it has done.

Projects of this kind do not happen solely as a result of good intentions and hard work. They also require financial and other support. We are grateful to the Nordic Council of Ministers, the U.S. National Science Foundation, WWF-Arctic Programme, and the governments of the eight Arctic nations, all of which have provided funding support for the report.

It is our sincere hope that readers of this report will learn more about a fascinating region of the planet, better understand its conservation challenges, and renew their commitment to meeting those challenges so that future generations will continue to enjoy Arctic flora and fauna.

Sune Sohlberg Chair of CAFF
Esko Jaakkola National Representative of Finland


GILG & SABARD/GREA

Gyrfalcon, ***Falco rusticolus***

Elevation and Bathymetry

Figure 1. The Arctic.

1. Introduction

The Report

What is the overall state of the Arctic's natural environment? The aim of this report is to answer the many aspects of this seemingly straightforward question. Although several national and international efforts have looked at parts of the Arctic, this is the first attempt to assess the state of Arctic flora and fauna as a whole. Clearly, a brief report cannot cover all the relevant aspects and areas of the Arctic in detail. The chief criterion used to determine what to include has been international interest or significance. While much has of necessity been left out, we hope that the report nonetheless gives a thoughtful and compelling reply to our opening question.

Many volumes have been written, and will continue to be written, about the ecology, conservation, indigenous peoples, environmental threats, economics, oceanography, politics, and other aspects of the Arctic region. Adding this report has a threefold purpose:

- To summarize, in one place, the information required to assess the state of the Arctic's natural environment today, providing a marker from which to measure progress in conservation
- To provide a useful reference to a wide audience of policy makers, Arctic residents, researchers, and others active in the conservation of Arctic flora and fauna
- To point the way to improving our collective understanding and facilitating the international cooperative action required to conserve the Arctic's natural environment

The report is structured to strike a balance between covering many aspects of the Arctic in general terms and covering a few in more detail. This Introduction gives an overview of the Arctic region and its boundaries. Chapter 2 describes the characteristics of the Arctic and basic principles of ecology and biodiversity as they apply to the Arctic. Chapter 3 outlines the history and role of humans in the Arctic environment. Chapter 4 reviews the various approaches to conservation as they have been applied in the Arctic. Chapters 5 through 8 give an overview of the major biological regions of the Arctic. Chapter 9 reports on the status and trends of certain species and groups. Chapter 10 offers brief conclusions. Throughout, graphics and boxes examine specific topics in detail to illuminate the general points made in the main text.

Defining the Arctic

The word Arctic comes from the Greek word for bear, *arktos*, after the constellations Ursa major and Ursa minor that are visible year round in the northern night sky. Astronomically, the boundary of the Arctic is the latitude at which the sun does not set on the summer solstice, about 66°33' N, known as the Arctic or Polar Circle. This definition has been used for many things, among them identifying the eight Arctic nations that comprise the Arctic Council. Nonetheless, in biological terms, the Arctic Circle is merely an abstraction.

One botanical feature used to delineate the Arctic is the treeline. This marker is attractive because it seems easy to define, but in practice the exact location of the

BOX 1. THE MISSION OF CAFF

▶ The Program for the Conservation of Arctic Flora and Fauna is a distinct forum to discuss and address Arctic conservation issues. As one of the working groups of the Arctic Council, its primary role is to advise the Arctic governments on conservation matters of international significance and common concern.

Since its first meeting in 1992, CAFF has sponsored a variety of research projects and analyses and launched several circumpolar conservation strategies:

- CAFF's conservation strategies and action plans for murres (guillemots) and the four eider species inhabiting the Arctic are being implemented and have greatly improved the conservation status of these seabirds.
- CAFF has created the unique Circumpolar Protected Areas Network, which aims to maintain in perpetuity the diverse habitats and biodiversity of the circumpolar Arctic.
- A CAFF/Inuit Circumpolar Conference project on traditional ecological knowledge of the beluga whale has paved the way for using indigenous knowledge in conservation work.
- The Atlas of Rare Endemic Vascular Plants is a major step in protecting a vital class of species unique to the Arctic.
- The Circumpolar Vegetation Map, soon to be finished, represents a step towards a harmonized habitat classification system for the circumpolar region on which to base future monitoring activities and assessments.

Several major new initiatives are underway:

- CAFF is developing a program to monitor circumpolar biodiversity. Expert networks have already been established to harmonize monitoring of several key species and species groups, including reindeer/caribou, Arctic char, ringed seals, seabirds, polar bears, waders/shorebirds, geese, and vascular plants.
- In cooperation with its sister working group AMAP, CAFF is involved in the Arctic Climate Impact Assessment, which will deliver in 2004 a major scientific assessment of the impacts of climate variability and change and UV-B radiation on ecosystems and societies in the circumpolar region.
- Together with the Russian Association of Indigenous Peoples of the North (RAIPON), CAFF is assessing the conservation value and status of sacred sites of indigenous people in two regions of Arctic Russia as preparation for a nationwide assessment.
- In collaboration with the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF), CAFF is working to reduce disturbance and fragmentation of Russia's extensive undisturbed tundra and taiga ecosystems.

In the 10 years of its existence, CAFF has made significant progress. Perhaps CAFF's greatest achievement has been to create working links among Arctic scientists, managers, and indigenous peoples who share similar challenges and interests. These links have changed the face of conservation work in the Arctic. They represent the seeds from which future successes will grow.

treeline is harder to pin down. For instance, in northern Russia, the transition zone from boreal forest to open tundra covers up to 300 kilometers. On the other hand, in mountainous terrain, altitude can be the main factor in determining where trees grow, and indeed Arctic-like conditions are found on mountaintops far to the south. Furthermore, isolated stands of trees exist well to the north of the transition zone. For general purposes, however, and at regional or circumpolar scales, the treeline is a good practical boundary.

In terms of climate, a commonly used boundary is the line at which the average temperature in the warmest month is 10°C, known as the 10°C summer isotherm. This line corresponds roughly to the treeline, though they may diverge by 100 km or more in some areas. Both the treeline and the 10°C summer isotherm diverge from the Arctic Circle. In northern Norway, both lines extend near or beyond 70°N, while in the area around Hudson Bay, Canada, they extend as far south as 55°N. The area north of the treeline is also typically underlain by permafrost-ground that remains frozen all year.

BOX 2. THE ARCTIC COUNCIL

▶ The Arctic Council was established in 1996 as a high level intergovernmental forum for addressing the common concerns and challenges faced by the Arctic governments and the people of the Arctic. Priorities of the Council are protection of the Arctic environment and the promotion of sustainable development as a means of improving the economic, social, and cultural well-being of Arctic residents.

The members of the Council are Canada, Denmark, Finland, Iceland, Norway, the Russian Federation, Sweden, and the United States of America. The Russian Association of Indigenous Peoples of the North (RAIPON), the Inuit Circumpolar Conference (ICC), the Saami Council, the Aleutian International Association (AIA), the Arctic Athabaskan Council, and the Gwich'in Council International are Permanent Participants in the Council.

Several non-Arctic states, inter-governmental and interparliamentary organizations, and non-governmental organizations are Observers to the Council.

The Council meets biennially at the ministerial level. The Chair and Secretariat of the Council rotate every two years among the eight Arctic States. Canada served first from 1996-1998, followed by the United States from 1998-2000. Finland has assumed the Chair for 2000-2002.

The environmental protection work of the Arctic Council builds on the Arctic Environmental Protection Strategy (AEPS) which was adopted by the Arctic States through a Ministerial Declaration at Rovaniemi, Finland in 1991.

The Council has currently five working groups to address its priorities. The first four mentioned below were established as a part of the AEPS and later incorporated into the Arctic Council:

- AMAP (Arctic Monitoring and Assessment Programme) provides reliable and sufficient information on the status of, and threats to, the Arctic environment from contaminants. It also provides scientific advice on actions to be taken in order to support Arctic governments in their efforts to take remedial and preventive actions relating to contaminants.
- CAFF (Conservation of Arctic Flora and Fauna) addresses and provides advice on the needs of Arctic species and their habitats. It is a forum for scientists, conservation managers and groups, and indigenous peoples of the North to tackle a wide range of Arctic conservation and sustainable use issues at the circumpolar level.
- EPPR (Emergency Prevention, Preparedness and Response) evaluates the adequacy of existing emergency and prevention arrangements in the Arctic, to improve cooperation for mutual aid in case of accidents, and to recommend necessary cooperative mechanisms.
- PAME (Protection of the Arctic Marine Environment) addresses policy and non-emergency pollution prevention and control measures related to the protection of the Arctic marine environment from both land- and sea-based activities. These include coordinated action programs and guidelines complementing existing legal arrangements.
- SDWG (Working Group on Sustainable Development) was established at the Second Arctic Council meeting in 1998 to oversee programs and projects aimed at protecting and enhancing the economies, culture, and health of the inhabitants of the Arctic, in an environmentally sustainable manner.

Other recently adopted major programs of the Arctic Council are:

- RPA (Regional Programme of Action for the Protection of the Arctic Marine Environment from Land-Based Activities), adopted in 1998 to strengthen regional cooperation and capacity building, particularly in relation to addressing regional priority pollution sources found in the Russian Federation.
- ACAP (Arctic Council Action Plan to Eliminate Pollution of the Arctic) adopted in 2000 to strengthen and support mechanisms that will encourage national actions to reduce emissions and other releases of pollutants.
- ACIA (Arctic Climate Impact Assessment), adopted in 2000 to evaluate and synthesize knowledge on climatic variability, climate change, and increased ultraviolet radiation and their consequences for Arctic ecosystems and societies.

In the marine environment, the Arctic boundary is also problematic. An oceanographic definition is the meeting point of the relatively warm, salty water from the Atlantic and Pacific Oceans and the colder, less salty waters of the Arctic Ocean. Like the treeline, the latitude of the ocean boundary varies greatly, from about 63°N in the Canadian Archipelago to 80°N near Svalbard. The subarctic marine environment can be defined as the area of mixed Arctic and Atlantic or Pacific water, extending as far south as 44°N off New-

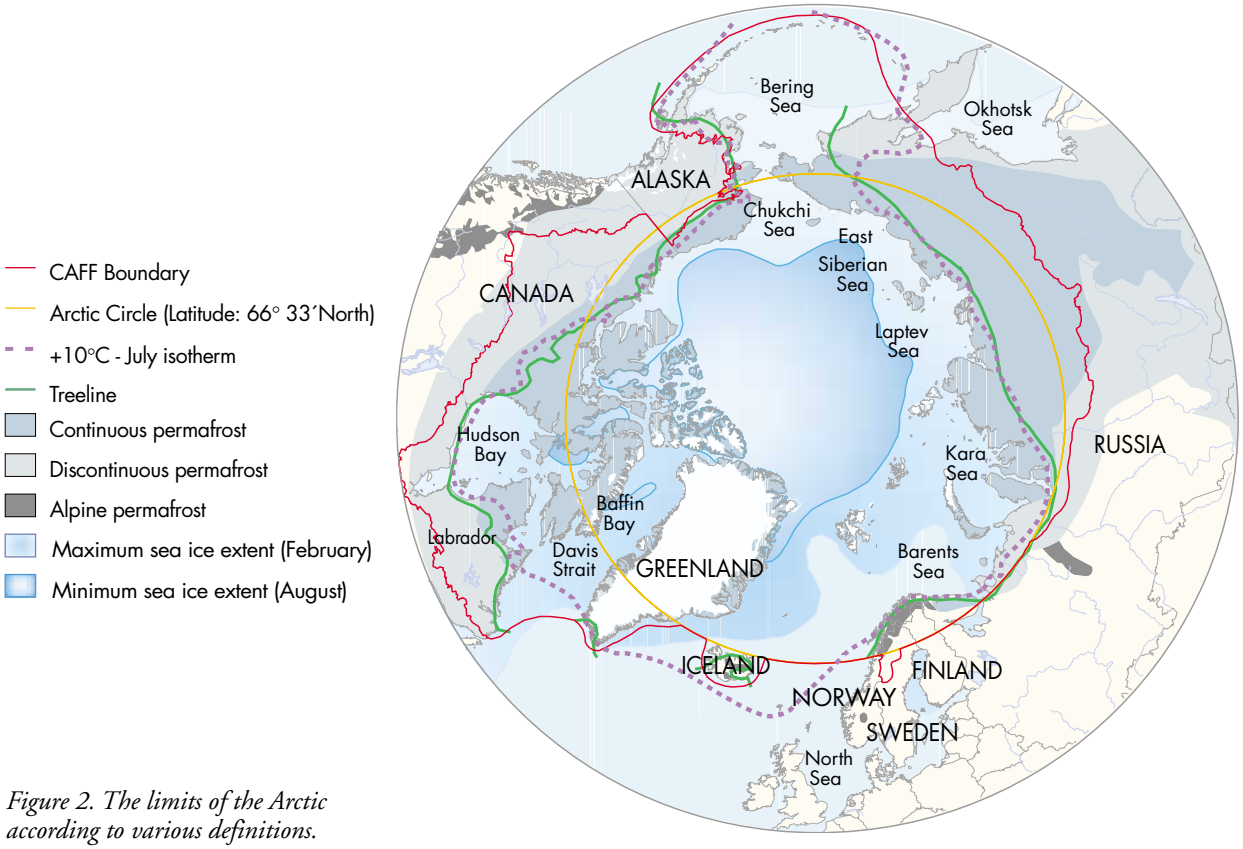

Figure 2. The limits of the Arctic according to various definitions.

foundland, Canada, and as far north as 68°N off Norway.

Finding or choosing one definition of the Arctic to satisfy all purposes is nearly impossible. Finland and Sweden both extend north of the Arctic Circle, but lie south of the treeline and the 10°C summer isotherm. Administrative districts relevant to conservation measures – provinces, territories, national parks, management units – rarely follow consistent biogeographic boundaries. Migratory species travel well outside the Arctic, and water and air currents carry substances from across the globe that affect plants and animals that reside exclusively in the Arctic. For the purpose of this report, we consider the species and issues found from the forest-tundra transition zone northwards on land, and in the marine area north of the CAFF boundary.

While a practical definition of the Arctic is necessary, if only to determine what physical and ecological processes should be covered by this report, the Arctic is intimately linked with the rest of the world. Ocean water circulates to and from the Arctic Ocean. Air masses move north and south. There is virtually no place on the earth that is not connected to the Arctic by migratory species. The Arctic is a distinctive region of the planet, and as such is worthy of a dedicated review of its environment, but its conservation and its future are tied to what happens throughout the world.

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