

Statement to the Arctic Observing Summit (AOS) on the Circumpolar Biodiversity Monitoring Programme (CBMP) State of Arctic Biodiversity Reports

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The Circumpolar Biodiversity Monitoring Program is the biodiversity monitoring program of the Conservation of Arctic Flora and Fauna (CAFF), the biodiversity working group of the Arctic Council. The CBMP, created in 2010, is an international network of scientists, States, Indigenous organizations, and conservation groups working to harmonize and integrate efforts to monitor Arctic biodiversity using an ecosystem-based approach.

Development of the State of the Arctic Biodiversity Reports

To date, CBMP has completed assessments of the status of Arctic marine (2017), freshwater (2019), and terrestrial biodiversity (2022). Together, they describe changes in biodiversity in and on sea ice, the oceans, within rivers, lakes, and associated wetlands; and across both vegetated and ice-covered lands. While all three reports also emphasize widespread gaps in available scientific data, together they present a current picture or benchmark of ecosystems undergoing significant and rapid change.

CBMP products are developed by experts nominated by Arctic states, Permanent Participants, and Observers, who collaborate to develop a circumpolar understanding based on biodiversity monitoring at the state, regional, or programmatic level. Through monitoring plans developed for each ecosystem (CITES), specific species or focal ecosystem components are identified along with recommended monitoring methods. These plans then guide the work of the circumpolar groups focused on the Marine, Freshwater, Terrestrial, and Coastal environments. (The Coastal group, the newest of the four, is implementing a co-production of knowledge approach at the circumpolar level and has not developed a State of the Arctic report to date.)

Key Findings

Key findings are highlighted in each group, drawing from extensive analysis that is described within each report.

The State of the Arctic Marine Biodiversity Report (CAFF 2017) provides the overall observation that Arctic marine species and ecosystems are undergoing pressure from cumulative changes in their physical, chemical, and biological environment. This includes a loss of food for many Arctic marine species and a loss of habitat for those that depend on sea ice for reproduction, resting, or foraging. At the same time that southern sub-Arctic species are moving into Arctic waters, some Arctic species are shifting their ranges northwards to seek more favourable conditions as the Arctic warms. This northward movement is easier for more mobile, open-water species, such as polar cod, than for marine species that are linked to shelf regions. Finally, an increase in the frequency of contagious diseases in Arctic marine species is noted (CAFF 2017). Some of these same observations were echoed again in short updates released on Seabirds (CAFF 2021b) and Marine Mammals (CAFF 2021c).

The Freshwater report concludes that Arctic freshwater ecosystems (e.g., lakes, rivers, and associated wetlands) are highly threatened by climate change and human development, which can alter the distribution and abundance of species and affect biodiversity and the ecosystem services on which many Arctic peoples depend. Patterns of biodiversity vary across the Arctic, but ecoregions that have historically warmer temperatures and connection to the mainland generally have higher biodiversity than those with cold temperatures (high latitude or altitude) or on islands far from continental mainland. Temperature is the overriding and predominant driver for most focal ecosystem components (FECs), but climate, geographical connectivity, geology, and smaller-scale environmental parameters such as water chemistry are all important drivers of Arctic freshwater biodiversity. Long-term monitoring data show that shifts in species composition are less dramatic in areas where temperatures have been more stable (CAFF 2019).

In the Terrestrial report, key findings emphasize the impact of changing frequency, intensity, and timing of extreme and unusual weather events due to climate change on some species (although population effects are unknown at this time). The report states, "Although some trends have been observed, natural variability in Arctic terrestrial environments and large information gaps make it difficult to assess and summarize global trends for Arctic terrestrial biodiversity. Species from southern ecosystems are moving into the Arctic and are expected to push Arctic species northwards, create an 'Arctic squeeze,' and changing species' interactions... The range and complexity of drivers affecting Arctic terrestrial biodiversity signals the need for comprehensive, integrated, ecosystem-based monitoring programs, coupled with targeted research projects to help decipher causal patterns of change." Finally, the Terrestrial report concludes that changes to culturally important food resources have implications on the food security and cultures of Indigenous Peoples and Arctic residents (CAFF 2021).

Advice for Monitoring National to Pan Arctic

None of the three groups developing State of the Arctic reports was able to report on all of the desirable ecosystem components throughout the Arctic that they had identified in their monitoring plans. Data availability varied greatly around the region, as well as across specific population stocks, species, and other ecosystem components.

Each of the groups emphasizes the need for more monitoring and better coordination and harmonization of monitoring efforts. This also included calls for increased use of emerging technologies, such as remote sensing and eDNA. Finally, all three reports also recognize the need for better engagement with local and Indigenous communities to bring other sources of knowledge into the effort to build a circumpolar understanding of biodiversity around the Arctic.

Further information:

- www.cbmp.is
- Strategic Plan 2021-2025: <https://caff.is/monitoring-series/all-monitoring-documents/545-circumpolar-biodiversity-monitoring-program-strategic-plan-2021-2025>