Lake Radujavri at 68°N in Sweden

Partners of the project:

Swedish University of Agricultural Sciences (SLU), Uppsala, SWEDEN

University of Alaska, Anchorage, USA

University of Copenhagen, GREENLAND, DENMARK

University of Oslo, NORWAY

Wilfrid Laurier University, Waterloo, CANADA

Insitut National de Recherche Scientifique (INRS), Québec, CANADA

Duration:
12-2018 to 03-2022

Total grant:
€ 1,314,391

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ARCTIC-BIODIVER – Scenarios of freshwater biodiversity and ecosystem services in a changing Arctic

Context

ARCTIC-BIODIVER is an interdisciplinary, international research program focused on filling gaps in Arctic freshwater biodiversity knowledge, and developing biodiversity scenarios at national and circumpolar scales. The project considers both structural and functional biodiversity. Field testing of the projected climate change impacts on Arctic freshwater food web dynamics will allow estimating uncertainty in biodiversity scenarios. Moreover, the use of space-for-time analyses of shifts in biodiversity and basal resources will help propose indicators for early warning of the ecological impacts of climate change. ARCTIC-BIODIVER is further focused on the development of bio-economic models to integrate scenarios of biodiversity across trophic levels considering the socio-economics of ecosystem services provided by fish in the Arctic.

Main objectives

ARCTIC-BIODIVER will:

1. Evaluate biodiversity and functional trait patterns in relation to environmental drivers, including climate, nutrient enrichment, and terrestrial land use change;
2. Identify biodiversity hotspots and food web changes in lakes and rivers across latitudinal gradients in the Arctic;
3. Provide insight into how direct and indirect drivers related to climate change impact the biodiversity and trait composition of aquatic food webs, and ultimately fish production;
4. Use bio-economic models to evaluate socio-economic trade-offs and potential shifts in ecosystem services in Arctic lakes and rivers associated with climate change, nutrient enrichment, and resource exploitation;
5. Develop assessment criteria that better quantify the ecological change in Arctic freshwaters and provide strategies for the early detection of new and/or invasive species;
6. Inform policy makers, NGO's, people who live in the Arctic, and the global community about the ongoing change in Arctic freshwater ecosystems.

Main activities

ARCTIC-BIODIVER includes circumpolar lakes and rivers evaluation using an extensive monitoring database, and the collection of additional data along Arctic latitudinal gradients. Sample locations build upon prior monitoring activities and support stakeholders' interest in the assessment of biodiversity status and trends.

The project will evaluate multiple dimensions of biodiversity by using physical-chemical climate-change models to develop biodiversity scenarios, by quantifying changes to basal food resources that affect food webs, and by predicting consequences to ecosystem services at regional and circumpolar scales. It will elucidate socio-economic trade-offs and potential shifts in freshwater ecosystem services associated with climate change.

ARCTIC-BIODIVER will work closely with and support the goals of the Circumpolar Biodiversity Monitoring Program (CBMP) of Conservation of Arctic Flora and Fauna (CAFF). In particular, the project will address several of the policy recommendations outlined in the Arctic Biodiversity Assessment Report for Policy Makers, which is currently a high priority for CAFF and the Arctic Council. Project findings will feed directly into the work by CAFF and the Arctic Council. Other activities include formation of a stakeholder reference group, and the organization of several stakeholder engagement workshops.