

Memorandum 2/11/2018

MB1: Promoting of ecosystem services of Arctic wetlands for sustainable development

This memo provides a summary of reports submitted on the session EBM2 organized at the Arctic Biodiversity Session in Rovaniemi, Finland, October 9-12 organized by the Swedish University of Agricultural Sciences, Environment and Climate Change Canada and CBMP.

Attendance: 55

Arctic Biodiversity Assessment recommendation themes most prominently addressed in the session:

- Climate change
- Addressing stressors
- Improving knowledge and public awareness

Key points raised in the session that were important to note:

- A comprehensive assessment of Arctic freshwater biodiversity yielded distinct patterns in alpha and beta freshwater biodiversity and also resulted in the rescue of large amounts of data that was found in grey literature, etc but now in the ABDS. For instance plankton diversity decreases with latitude. These patterns can be used to give some insights into a future Arctic freshwater biodiversity with potential vulnerabilities for invasive species introductions becoming well established. Patterns of alpha and beta diversity varied both by latitude and Arctic region.
- While the amount of data is limited, this group was able to take innovative approaches to establishing long-term data records using lake sediment sampling to look at things like lake diatom assemblages in pre-industrial era.
- The monitoring coverage for freshwater biodiversity varies widely across the Arctic with different taxonomic emphases between countries and regions. There is a big opportunity to use the existing network to rapidly deploy new sampling techniques and thus, expand coverage to better monitor status and trends in Arctic freshwater biodiversity.
- Benthic macroinvertebrates are good indicators of general physical and biogeochemical health and can help us identify the patterns of key drivers.
- What is the response to the suggestion that climate change will have a positive effect on biodiversity in the Arctic? - in Antarctic, this is likely true as they are temperature limited but in the Arctic this might be more complex as a warming Arctic might benefit in terms of increased biodiversity but there is an increased risk of invasive species, however this is a value laden question as while the overall diversity might increase, certain habitats may disappear and it is also highly dependent on the region. In some ways, the answer can be characterized in a similar way to eutrophication where increased eutrophication can increase productivity to some extent but after a threshold is reached it has a negative impact. Also the rate of warming might mismatch the ability for a species to shift.
- How do we design monitoring plants to best detect changes in ecosystem services and biodiversity? - need to implement ecosystem level long-term monitoring with more extensive measures.

- Much of freshwater biodiversity monitoring in Europe is structured around the EU Water Directive which is not necessarily focused on understanding biodiversity patterns, drivers and change.

Recommendations/actions identified for how to deal with the issues raised in the session:

- The work to develop the SAFBR represents a massive effort that is able to yield a number of important results and advances including:
- prioritizing new, standardized or harmonized monitoring protocols across the Arctic, latitudes and environmental gradients
- The work is recognized globally with it inspiring GEO BON's Freshwater Biodiversity Observation Networks' approach to establishing global sampling protocols and establishing assessments of alpha and beta diversity at a global and regional scale.
- The patterns determined by this assessment can allow us to predict Arctic FW biodiversity under a warming climate by using latitudinal gradients as proxies.
- The baseline data can help determine the most efficient opportunities for repeated, harmonized monitoring across the Arctic.
- There is a need to focus also on ecosystem level long-term monitoring that includes measurements of ecosystem function.
- There is a need for more harmonized measures for the identification across taxa
- There should be a focus on identifying a minimum set of measures that can be feasibly deployed but also followed inter and intra annually. These measures should include local communities to implement some of the monitoring.
- The resources for long-term monitoring should be secured, additional monitoring campaigns are needed in order to fill the gaps in knowledge.
- National monitoring methods, indicators used and data practices should be harmonized.

Take home message from the session:

- The Arctic Freshwater Biodiversity Monitoring group has established a foundational baseline from which future priorities for harmonized biodiversity monitoring can be set as well as be used to assess potential changes and patterns of change in freshwater biodiversity from drivers such as climate change. This work is being recognized globally and is influencing the design of a global harmonized approach to sampling benthic invertebrates.
- Sufficient, reliable and comparable monitoring data is essential prerequisite for effective decision-making in local, national and international level.