



GEM Session report submitted to CAFF, 15 October 2018

GEM Session on Arctic Biodiversity Congress 2018

Building long-term ecosystem monitoring programs to feed Arctic and international biodiversity assessments

Date: Wednesday October 10, 2018

Location: Erottaja, ELY

Time: 8:30-10:00

Session chairs: Torben R. Christensen and Elmer Topp-Jørgensen, Greenland Ecosystem Monitoring (GEM) programme

Arctic Council working groups put substantial effort into identifying and harmonizing data sets for Arctic and international assessments. The Circumpolar Biodiversity Monitoring Program (CBMP) has developed monitoring plans for marine, coastal, freshwater and terrestrial ecosystems and are in the process of identifying gaps in required biodiversity data. This session will explore how long-term ecosystem-based monitoring programs are designed, the considerations they must take, and how such programs can contribute to a circum-Arctic monitoring program. Presentations include examples of a long-standing and ongoing ecosystem-based monitoring program in Greenland, and the development of a new long-term monitoring program in Canada. Focus will be on how national programmes are developed to bring biodiversity related data to the CBMP and what CBMP does to streamline data collection and dissemination in Arctic and international assessments.

<https://www.arcticbiodiversity.is/index.php/ebm10-building-long-term-ecosystem-monitoring-programs-to-feed-arctic-and-international-biodiversity-assessments>

Presentation abstracts:

Greenland Ecosystem Monitoring Program

Torben R. Christensen, Aarhus University; Elmer Topp-Jørgensen, Aarhus University

The Greenland Ecosystem Monitoring (GEM) Program is an interdisciplinary long-term monitoring program run by Greenlandic and Danish research institutions. GEM has over the past two decades established itself firmly as an internationally leading climate change related environmental barometer measuring climate change and its impact on Arctic ecosystems. The GEM program is designed to study entire ecosystems to identify change and understand ecosystem processes and linkages from the land ice to the near coastal sea. The Program is made up of five disciplinary sub-programmes (ClimateBasis, GeoBasis, BioBasis, MarineBasis

and GlacioBasis) and an overarching remote sensing component. Since its early days, GEM has been associated with Arctic Council working groups, AMAP and CAFF, and are thus at the forefront in developing and adopting plans and protocols and contributing to assessments. The long time series of biotic and abiotic parameters allow scientists to track changes in biodiversity patterns and ecosystem functioning and relating these various drivers of change. This presentation will provide an example of the development of an integrated approach to monitoring and how it links to arctic and international networks and organisations.

Zackenberg BioBasisProgram and linkages to CBMP

Niels Martin Schmidt, Aarhus University and member of CBMP Terrestrial Expert Group

The GEM BioBasis program is the biodiversity component of the GEM program. The program studies key species and processes across plant and animal populations and their interactions within the terrestrial and limnic ecosystem compartments in Kobbefjord/Nuuk (low arctic) and Zackenberg (high arctic), Greenland. The main focus of BioBasis is on biodiversity in general, and abundance and community composition in particular, of important flora and fauna components in the tundra biome. Central to the program is the monitoring of status and trends of selected focal species, phenology of their life history events and rates of reproduction and predation. Through these monitoring activities, BioBasis documents the intra- and inter-annual variation in central parameters, their resilience towards biotic and abiotic perturbations, as well as their long-term trends. BioBasis has strong linkages to Arctic Council's Circumpolar Biodiversity Monitoring Program (CBMP). The long time series and the interdisciplinary approach of GEM provides in depth knowledge of ecosystem structure and function, and the status of key biodiversity elements in a changing Arctic. This presentation will provide an example of a biodiversity monitoring program developed over a couple of decades with close ties to the CAFF's Circumpolar Biodiversity Monitoring Program (CBMP), including participation in CBMP expert groups, development and adoption of plans and protocols, and how data feeds into arctic and international assessments.

Establishing CHARS as an Arctic Flagship Research and Monitoring Site – Design and Implementation of the CHARS Terrestrial Monitoring Program

Donald McLennan, Polar Knowledge Canada - Canadian High Arctic Research Station

Polar Knowledge Canada's Canadian High Arctic Research Station (CHARS) in Cambridge Bay, Nunavut, has a mission to develop the CHARS Experimental and Reference Area (CHARS ERA) as a Flagship Arctic monitoring and research site conducting and supporting world class environmental science by CHARS science staff, and by visiting Canadian and international scientists. The CHARS Monitoring Plan describes a broad, whole-of-ecosystem approach that includes long-term experiment-based monitoring of terrestrial, freshwater and coastal-marine ecosystems, and their interactions, all within a social-ecological context in the CHARS ERA. This presentation describes the terrestrial component of the Plan, which will follow the approaches and Focal Ecosystem Components laid out in the CAFF CBMP Terrestrial Monitoring Plan. Baseline inventories and studies, and piloted monitoring programs have been initiated since 2014 and will be accelerating now that the first CHARS science staff is located full time at the station in Cambridge Bay. Engagement of Kitikmeot communities and residents is another important component of proposed work in the CHARS ERA, and evolving plans for that engagement will be presented. The approach is to also engage regional governments, industry, academia, and NGOs in the development and delivery of the monitoring program. To implement the CHARS monitoring program we are proposing for discussion the creation of 'communities of practice' around key subject areas, e.g., cryosphere, birds, small mammals, soil processes, ungulates, C flux, vegetation, to engage interested science teams to cooperatively develop and demonstrate best practices in the CHARS ERA in the various fields. This presentation will summarize the work that has been completed to date by CHARS staff and co-investigators, will outline the monitoring and

research framework that is described in the CHARS Monitoring Plan, and will describe work to be conducted in the 2018 field season. This work meets several of the ABC goals, in particular, the implementation of ABA policy recommendations around monitoring, the inclusion of global monitoring programs, facilitation of interdisciplinary discussions and the inclusion of governments, NGOs and industry, and by increasing the visibility of CAFF and the Arctic Council as a leading voice of Arctic biodiversity research and monitoring.

CBMP strategic plan and data considerations

Sara Longan, North Slope Science Initiative and co-Chair of CBMP

The Circumpolar Biodiversity Monitoring Program (CBMP) is the biodiversity monitoring program of the Conservation of Arctic Flora and Fauna (CAFF), the biodiversity Working Group of the Arctic Council. The CBMP coordinates, collects and synthesizes existing monitoring data from the Arctic States and are thus receiver of data generated by programmes such as GEM and CHARS ERA. CBMP consists of four ecosystem domain groups (terrestrial, freshwater, coastal and marine) that all develop monitoring plans to detect and understand changes. These Arctic Biodiversity Monitoring Plans are developed by steering committees with input from various expert networks and includes standardizing and coordinating monitoring as well as synthesizing essential data.

Discussion:

KEY POINTS

Implementation of CBMP plans: What is being done to implement CBMP monitoring plans and to ensure an optimal geographical coverage?

- Harmonization vs standardization: Importance of long time series and different sampling methodologies makes it difficult to implement standards across existing sites. Harmonization of data and (potential) transition to standard methodologies should be pursued. It is, however, considered important to keep benefits of the bottom up approach and find the right balance between harmonization and standardization. Calibration campaigns was also mentioned as important to reduce instrumental bias.
- Wider geographical implementation of CBMP plans: An implementation mechanism is lacking. There is a need to communicate implementation priorities to achieve the aims of CBMP plans and maybe to develop national reporting mechanism within the Arctic Council that commit national member states to report to CBMP (and thus ensure sufficient funding for implementation). This could be facilitated by utilizing synergies and harmonize reportings with regional or global conventions with reporting obligations (e.g. RAMSAR, CBD, Paris Agreement).

National coordination: How did presenting stations become involved in CBMP and what is done to ensure good geographical coverage and that all relevant data sources contribute to CBMP/ABDS?

- In the CBMP Expert Groups national representatives are appointed via relevant government agencies. In the Freshwater Expert Group, these national representatives have the responsibility to develop national networks to ensure best possible coverage and use of all relevant data sources, while there are no national networks in the terrestrial group. This may be due to the bottom up development of the monitoring programmes where all expert groups have developed their own organization and cooperation models. Without a mechanism to ensure wide geographical coverage, it may be a challenge to ensure inclusion of all relevant data, especially in larger territories or where there are many scientists from different institutions. There is a need to discuss this in CBMP expert groups.

Data and linkages to global organisations/assessments: How are data flowing into the ABDS repository and to what extent are the Focal Ecosystem Components (applied by CBMP) relevant to global indicators of e.g. CBD, IPBES, RAMSAR, GEOBON)?

- The use of ABDS is expanding and data for state of the arctic biodiversity reports and from some of the CAFF initiatives are already in the repository. The ABDS should be further developed to receive data described in the monitoring plans, both as data are produced (continuous submission of data) or when data are collected for specific assessments.
- CBMP is to a large extent cooperating with relevant global organisations and commenting on assessments with relevant arctic components. Alignment of indicators and institutionalized linkages to relevant global organisations and repositories need to be developed.

Recommendations

- Develop funding mechanism and/or organization of the expert groups that ensure optimal implementation/geographical coverage of the monitoring plans.
- Discuss harmonization and move to standardization without losing historical data.
- Streamline indicators to make these relevant for international organisations/assessments.
- Make ABDS a central node for Arctic biodiversity monitoring data and linkages to global initiatives.

Take home message

Continued focus on implementation of plans and ensure organizational setup that ensures optimal geographical coverage of monitoring efforts, continuous data flow through ABDS to CBMP initiatives and global organisations, repositories and assessments.