Memorandum 1/11/2018

EBM6: Large herbivores as agents of ecosystem-based management in the circumpolar Arctic

This memo provides a summary of reports submitted on the session EBM6 organized at the Arctic Biodiversity Session in Rovaniemi, Finland on October 9 organized by the Arctic Centre, University of Lapland.

Attendance: 50

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

- Climate change
- Ecosystem-based Management
- Mainstreaming biodiversity

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

- Grazing and trampling of large herbivores are important in the management/maintenance of the rich grassland ecosystems in the Arctic. Without the large herbivores, trees and shrubs slowly take over and replace the grassland ecosystem.
- A secondary result of the presence of the large herbivores, is that the insulated snow cover is trampled, and the soils cool significantly during winter. This could decrease the permafrost temperatures and affect the melting of the permafrost directly. If the CO2 is released from the permafrost, it will exceed anthropogenic emissions, but it is not only due to changes in herbivory behaviour that has this greening effect.
- Warmer climate also affects the vegetation and the treeline is moving north, trees and shrubs, are becoming taller which may mean that large herbivores are going to have a smaller impact on the increasing cover of trees and shrubs, and the progression of the tree line. Which could mean increased snow, an insulating layer that increases soil temperatures. On average, grazing is constraining the greening of the arctic tundra by approx. 5% (greater in areas with dense herds).
- The reindeer population is decreasing in the Arctic. The large herbivores are also migrating further south, which has increased conflicts with local people in some areas of the Arctic. There has been a value shift, and the wild reindeer is now seen by some locals as a nuisance.
- Typical for the vegetation in the Arctic, is most of the biomass and the biodiversity is belowground. The role of physical disturbance is important e.g. trampling decreases soil faunal and fungal biomass and alters the food web.

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

- The management of large herbivores, up to a certain density per hectare, can be a valuable tool to secure Arctic grassland ecosystems in the warming climate. The grazing keeps the small shrubs in a browsing trap, independent of the summer temperatures.

Take home message from the session:

- Grazing reduces aboveground Arctic vegetation and keeps the soils significantly cooler during winter. This means less emission of GHG from the permafrost.
- The general pattern in the Arctic is “greening”, i.e. increased vegetation abundance and productivity incl. trees and shrubs. This underlines the importance of healthy ecosystems with the presence of large herbivores.