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ABSTRACT: BIODIVERSITY AND ECOSYSTEM SERVICES

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Wetlands - key Arctic ecosystems: vulnerability to climate change and adaptation options

The recent scientific findings of dramatic changes in Arctic biodiversity due to climate change and anthropogenic impacts has stimulated further cooperation of the existing Arctic networks to stop ecosystem degradation processes. Especially active during the last five years are the Arctic Council (CAFF, AMAP and related initiatives) and EuroBarents groups (Barents Habitat Forum etc.). However, there is a significant gap related to arctic wetlands, which are also poorly addressed by international conventions related to biodiversity.

Wetlands are widely distributed in the Arctic covering 60% of the total Arctic ecosystem area. They are present as permafrost peatlands (polygonal, shallow peat tundra, palsa mires), shallow lakes, rivers and deltas, coastal marshes, and shallow sea waters, which make up the greater part of wetland types defined by Ramsar Convention wetlands types.

Arctic wetlands are extremely fragile. Permafrost is the main ecosystem factor of Arctic wetlands determining their genesis and function. At the same time permafrost is most vulnerable to climate change.

Arctic ecosystems are characterised by low species, ecosystem, and population diversity. Species in the Arctic are, however, as a rule very specialised and highly dependent on specific habitats. Arctic wetlands support habitats for many migrating species, and are often referred to as the 'source of all flyways'. Through migration routes the biodiversity status of the entire world is linked to the status of Arctic habitats.

The typically low rate of productivity of Arctic organisms, populations and ecosystems is responsible for their limited ecological niche capacity, low resistance and restricted restoration potential.

Climate change could seriously affect wetland hydrology, with permafrost melting and disappearance, changes in river flood regime and hydrochemistry, discharge of dissolved and particulate matter that will impact on the permanent ice in the ocean.

Transformations of wetlands by climate change will have a feedback on climate by the release of methane, the volume of which (both modern and relict) is comparable to the current fluxes of industrial origin. This will have global impact.

Land use practice in the Arctic in the recent past has largely been in harmony and integrated with natural ecosystem capacity. New technologies provide ways to overcome the challenges of the harsh Arctic environment and lead to widespread and rapid industrial development, such as the oil and gas industry. Even traditional land uses such as reindeer herding are being industrialised. The growing interest in Arctic resources could cause unsustainable development which ignores environmental constraints.

Recommendations:

- Available information on Arctic wetlands is not sufficient for adequate planning of land use and wetlands conservation. More data is needed on the natural functions of wetlands, and potential threats caused by changes in climate and land use.
- Our experience in regional wetlands conservation proves that good knowledge of wetland ecosystem features, natural processes and mechanisms, combined with precise evaluation of the socio-economic situation, could be background for successful wise-use strategies for wetlands conservation even in the complicated conditions of the Arctic. The activities that still need to be organised are wetlands monitoring, a specific approach to EIA, good geographical analyses aimed combination of protected areas and wise use. There is large field for expert cooperation and exchange.