ECOSYSTEM SERVICES of boreal mires and peatlands

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Fig 1a and 1b (below). Recreation opportunities, timber and berries benefit local people. Pristine mires, such as Patvinsuo, are important carbon stores with global beneficiaries. Photos Petteri Vihervaara, Kaisu Aapala and Paula Horne.

Introduction

Ecosystem services are defined as benefits of ecosystems to humans (Millennium Ecosystem Assessment 2005). These services include goods provided by ecosystems and different functions they perform, both of which benefit directly or indirectly human well-being.

Mire ecosystems are well-known for their unique species and habitats of high conservation value. Peatlands and mires also provide several ecosystem services. They are a source of important natural resources: e.g. timber, berries, game and peat for fuel. They mitigate climate change by storing carbon and regulate the circulation and quality of water. Pristine mires provide also opportunities for recreation and tourism. (Fig 1)

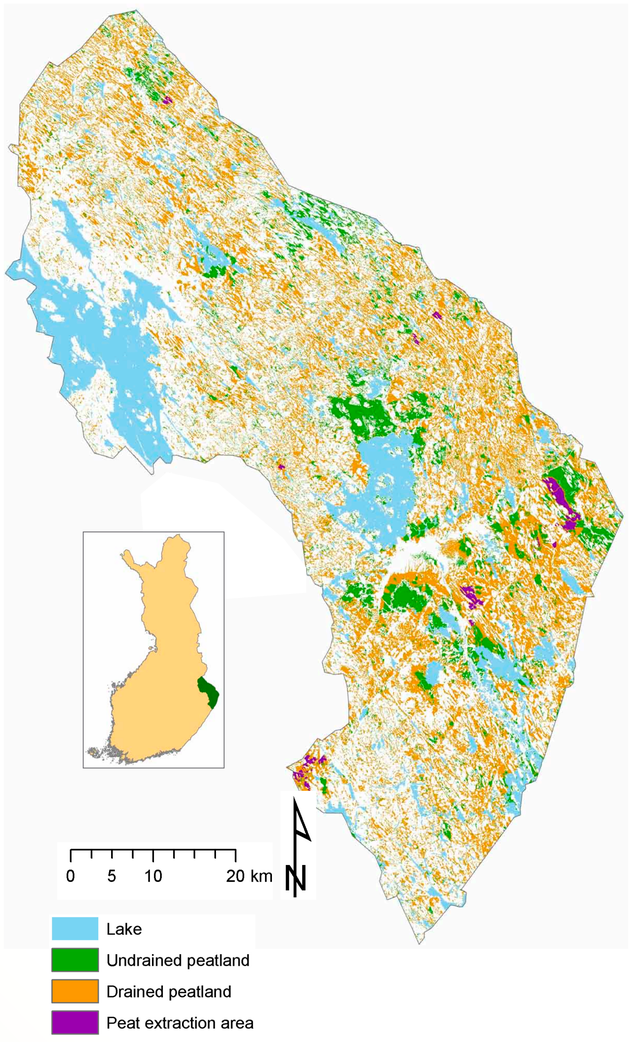


Fig 2. Distribution of peatlands in the North Karelia Biosphere Reserve, Eastern Finland. The total peatland area of the NKBR is 250 000 ha, with 25 % undrained, 75 % drained for forestry and 1% used as peat extraction areas.

The aim of our project is to identify and valuate ecosystem services provided by pristine mires and managed peatlands. The work will be based on a case study carried out in the North Karelia Biosphere Reserve (NKBR) in Eastern Finland (Fig 2).

Materials and methods

Identification of regional mire and peatland ecosystem services

Expert workshop (January 2012) was used to identify mire and peatland ecosystem services at the regional scale, i.e. in the whole NKBR. The participants represented a wide range of expertise and perspectives on North-Karelian mires and peatlands.

Information on identification and importance of mire and peatland ecosystem services in North-Karelia was collected by using a matrix with ecosystem services as rows and the current and future (next 10-20 years) importance of them as columns.

The economic and social importance of ecosystem services was evaluated by listing three most important non-market or market ecosystem services and the goods they provide. The valuation was made separately for pristine mires, for peatlands drained for forestry and for peat extraction areas.

Identification of local mire and peatland ecosystem services

Ecosystem services at a local scale were studied by conducting a stakeholder survey (semi-structured interviews) in a small village Pankakoski (Lieksa, North Karelia) (Silvennoinen 2012).

The local perception of different values and benefits related to mires and peatlands was assessed by comparing ecosystem services provided by two different areas: a protected Reposuo (pristine mire with some facilities and infrastructure for recreation) and Näräsensuo (a peatland drained for forestry).

Results

Ecosystem services at regional level

Mires and peatlands in the NKBR offer a wide range of ecosystem services. Among the most important services today were identified e.g. biodiversity maintenance, carbon sequestration and long-term storage and recreation (Fig 3a). Their importance was estimated even to increase in the future (Fig 3b). The importance of peat energy, cereals, bioenergy (other than wood) and timber were estimated to decrease most in the future (Fig 3b).

The state of the peatland (pristine, drained for forestry, peat extraction area) has a clear impact on the economic and social importance of the ecosystem services (Fig 4).

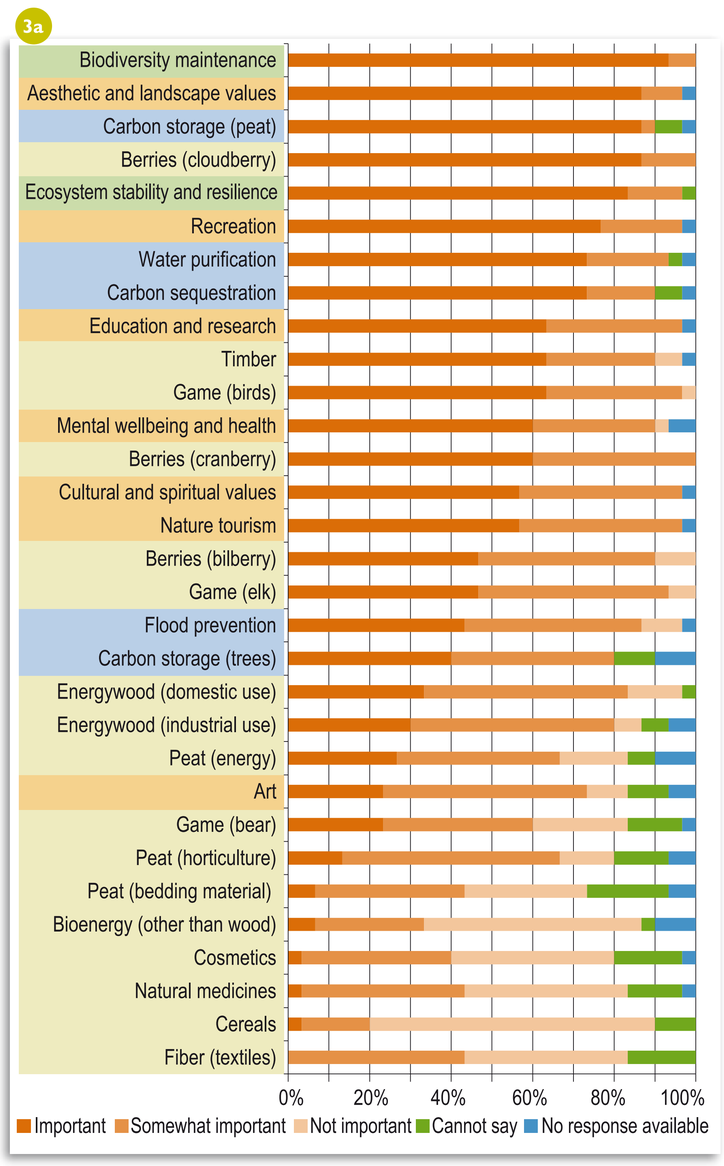
Ecosystem services at local level

Cultural (e.g. recreation) and provisioning services (e.g. berries) were identified as important local benefits of the pristine Reposuo. The infrastructure (duckboards, camp-fire places) provided in Reposuo seems to be an important factor in utilization of its cultural ecosystem services.

As benefits derived locally from drained Näräsensuo mainly provisioning services were mentioned (berries, mushrooms, game and firewood).

Conclusions

Both at the regional and local scale a wider range of ecosystem services were associated with pristine mires than drained peatlands. The state of the peatland has a clear effect on the ecosystem services it provides. Increased understanding of the ecosystem goods and services as well as the trade-offs and synergies between different services can help to maintain a wider range of values and services, benefitting both conservation and a variety of stakeholders.



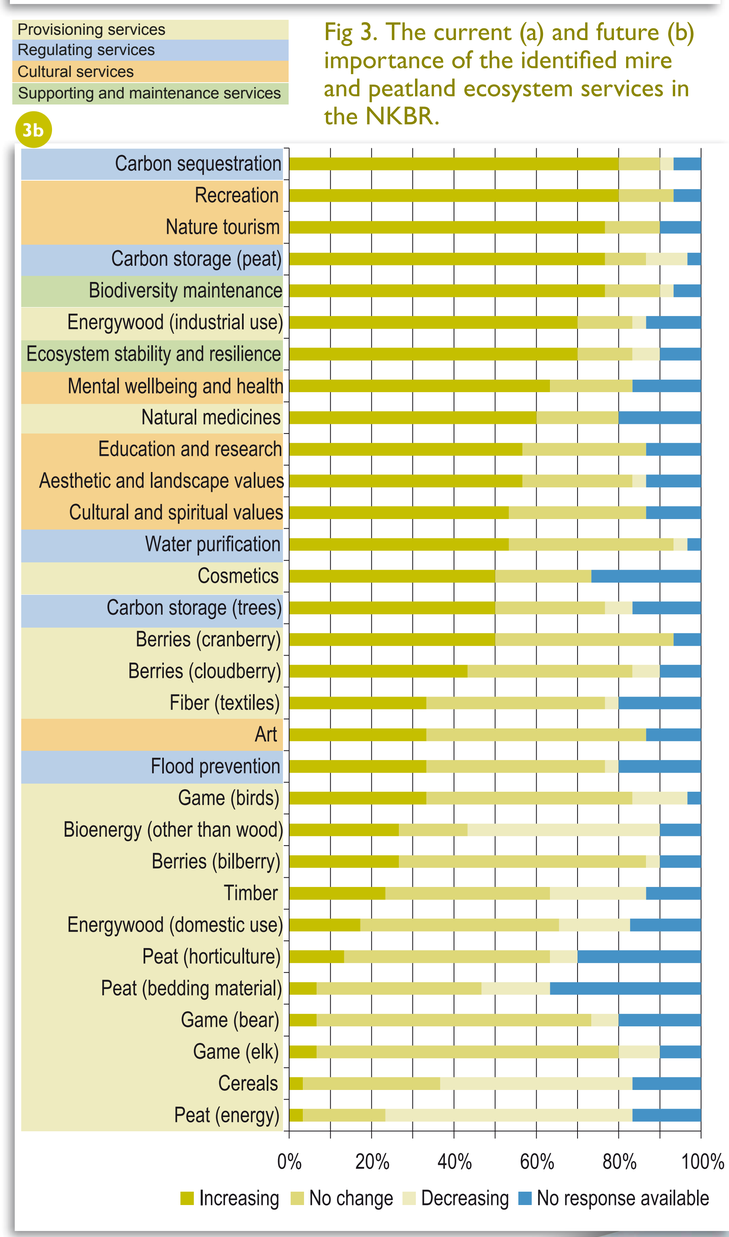


Fig 3. The current (a) and future (b) importance of the identified mire and peatland ecosystem services in the NKBR.

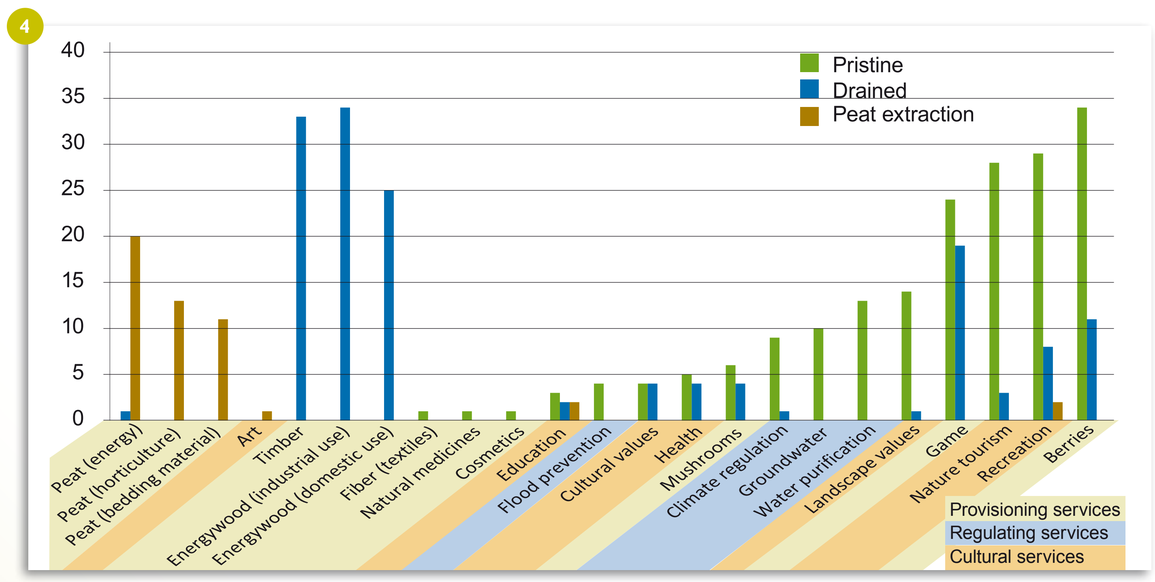


Fig 4. The number of "hits" of each ecosystem service when listing the three most important non-market or market ecosystem services and goods in pristine mires, peatlands drained for forestry and peat extraction areas.

Acknowledgements

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