Project information

Project title

TundrES: Uncovering ecosystem service bundles and adaptive strategies on the Norwegian tundra

Year

2013/2014

Project leader

Vera Hausner, UiT

Participants

- Project leader: Vera Hausner, Northern Populations and Ecosystems, Department of Arctic and Marine Ecology, University of Tromsø

Project participants:

- Per Fauchald and Hans Tømmervik, **Norwegian Institute for Nature Research**, Fram Centre, Tromsø
- Alma Thuestad, **Norwegian Institute for Cultural Heritage Research**, Fram Centre, Tromsø
- Dorothee Ehrich, **Northern Populations and Ecosystems**, Department of Arctic and Marine Ecology, University of Tromsø
- Else Grete Broderstad, **Centre for Sámi Studies**, University of Tromsø

Flagship

Terrestrial, Theme: Adaptive management of ecosystem services

Funding Source

Fram Centre, NRC

Summary of Results

Question 1 and 2 Social preferences for ecosystem services in Arctic Norway

Interviews and PPGIS show the following top rank of spatial explicit ecosystem services on Varanger.:

1. Cloudberry, 2. Salmon, 3 Freshwater fishes (trout and char), 4. Blueberry, 5. Grouse.

Together with grouse, arctic fox is also mentioned as an important ecosystem service and as much as 80% would like to increase the population of these species. Scavangers/invading species such as raven, crows, mink and red fox could be regarded as a disservice for many of the informants as 40% would like to reduce their abundance.

As much as 63% have a cabin 20-50 km from their home, and the recreational and harvesting activities are typically in these areas. Despite the reduced importance of ecosystem services for subsistence, we also show that there is a high degree of cultural dependence of ecosystem services, which is expressed by many as the reasons for living in the North.

We have developed three measures (intensiveness, extensiveness and distance travelled) for further ranking of ecosystem services among interviewees. These measures will be related to age, gender, NGOs, education, user group and length of residency through multi factorial analysis which will be used for predicting distribution of use/ecosystem services.

Question 3 and 4 Relationship between ecosystem services, landcover/vegetation and disturbance

We encountered some problems with radiometric correction by merging the SPOT images on Varangerhalvøya (nadir/off-nadir viewing). NINA recently solved the problem, and the vegetation/EVI/landcover map will be finished by December 2013. We also realize that we have to map disturbances manually as the quality of aerial images varies too much for automatic detection for the whole peninsula. A sampling design for field mapping of traces and ecosystem services is best for validation, as too much effort is needed to map the whole peninsula.

Question 5 and 6

Spatial modeling, focus group interviews and the workshop are all dependent on the previous steps in TundrES and will therefore not finish until Autumn 2014.

For the Management

The most important resources for locals are berries, salmon, freshwater fishes and grouse, which are typically harvested near the settlements or the cabins, which do not overlap too much with reindeer pastures. Our results also point to some disservices which people would like to reduce. More detailed analyses are necessary to conclude about dog sledding, ecoutourism, sheep husbandry and other local development projects. The model, focus groups and the workshop will also identify the management options associated with the social preferences uncovered in the first stage of TundrEs.

Published Results/Planned Publications

- **Hausner, Vera Helene; Bludd, Ellen Kathrine; Haider, Wolfgang; Yoccoz, Nigel.** Managing human activities and ecosystem services in alpine protected areas in Norway and British Columbia, Canada. 26th International Congress for Conservation Biology; 2013-07-21 - 2013-07-25
- **Munoz, Lorena; Hausner, Vera Helene.** Monitoring human disturbances in protected areas using distance sampling methods. 26th International Congress for Conservation Biology; 2013-07-21 - 2013-07-25
- **Thuestad, Alma Elisabeth; Tømmervik, Hans; Fauchald, Per; Ehrich, Dorothee; Hausner, Vera Helene.** Mapping land use and land cover in circumpolar tundra regions – a large scale comparative remote sensing study. 5th Nordic Geographers' Meeting, 11-14 June 2013, Reykjavik, Iceland; 2013-06-11 - 2013-06-14
- **Tømmervik et al.** Landcover map for the Varanger Peninsula, December 2013

Communicated Results

- TUNDRA Drivkrefter for miljøendringer i sirkumpolare tundraområder (2013), FRAm dagen, 8. November 2013
- Arctic Ecosystem Services_Interviews from Norway, Russia, Alaska and Canada. Thematic day on ecosystem services at the Fram Centre; 2013-10-31
- Broderstad, Else Grete; Hausner, Vera Helene. Derfor bor vi her.. SESAM seminar; 2013-02-09
- Broderstad, Else Grete 2013 Presentation of WP2 in Finnmarklandskap i Endring for FeFo, 21.november, Ivalo

Interdisciplinary Cooperation

The ecosystem service concept is per definition interdisciplinary in character, and requires input on both social preferences and, in our case, spatial ecological features associated with such preferences. Both UiT and NINA have competence on interdisciplinary work associated with ecosystem services. The competence in indigenous people governance at the Centre for Sami studies is crucial for developing interview guides that captures the differences in social preferences among indigenous and local people. Through the work on cultural heritage, NIKU provides valuable input on the methods for mapping physical traces from the aerial photos. The collaboration between these disciplines to answer the overall questions are ensured through the stepwise design.

UiT – Interdiciplinary environmental research and ecology (Vera Hausner, Lorena Munoz and Dorothee Ehrich)

Centre for Sami studies – Political sciences

NIKU – Archeology

NINA – remote sensing and spatial ecology

Budget in accordance to results

TundrEs is strengthening the Norwegian part of TUNDRA and provides results relevant for COAT. It will also be an integrated part funding of another NRC project CultEs - Assessing spatially explicit cultural ecosystem services for adaptive management in the Alpine North (6 mill, 2014-2016), which add two more sites in Troms and Nordland in addition to the one on Varanger in Finnmark.

TundrEs allow us to bring in more fine scale data, perform integrated spatial modeling of ecosystem services, strengthen participation of users, and to couple our results in TUNDRA to climate change and adaptive strategies.

We also realize that full analysis of ecosystem services, vegetation/landcover and disturbances will require more resources that TundrEs, but an internal PhD will continue to work with these data together with the TUNDRA team.

Could results from the project be subject for any commercial utilization

No

Conclusions

a) We find the coupling of social preferences and spatial explicit ecological features to be fruitful for analyzing ecosystem services, and we will continue to develop this approach in the framework of the new Research Council project, CultEs. The methodological problems encountered to map vegetation and disturbances will not result in a delay of the final integrated analyses of bundles of ecosystem services which we will finish by the end of 2014.

b) We have developed comparative methods for analyzing use/dependency/preference for ecosystem service (intensiveness, extensiveness), but further development is needed to sufficiently incorporate areas which are culturally important. The methodological challenges with mapping vegetation, land cover and disturbances is mainly related to image quality, which also provide some barriers to further development of methods in the frame of TundrEs.