Project information

Participants

    Per Fauchald, Norwegian Institute for Nature Research (**NINA**),

    Else Grete Broderstad; Center for Sami Studies, **UiT**.

    Sigrid Engen and Lorena Munoz PhD students**, UIT.**

    Christopher Monz **Utah State University**
    Greg Brown **California Polytechnic State University.**

    Ashley D'Antonio, **Oregon State University** (previously Utah State University)

Summary of Results

 The main purpose of ES Arctic, and the NFR project CultEs, is to develop methods for monitoring socio-ecological systems and ecosystem services taking into account both spatial heterogeneity and differences in peoples' use, values and perception of climatic-related risks.

In the first year, we have primarily focused on the spatial heterogeneity in values, use and priorities. We have compared non- digital and digital PPGIS to map important areas for local communities. The validity of spatial value transfer from one site to another using digital PPGIS have not previously been tested. By using Corine land cover maps (100m) to transfer values between south (Jotunheimen) and north (Nordland), we found low degree of regionalization- and sampling error, which means that the software used for web mapping is reliable for monitoring values and peoples' priorities. The use of land cover may however, be too crude for monitoring on a more detailed level, relevant for management. We have therefore also analyzed the data using maximum entropy (MAXENT) modelling with vegetation layers, accessibility, land tenure, and protected areas as explanatory variables. Using these models, we found than accessibility and protected areas are more influential on the mapped values than land cover. The explanatory factors had approximately the same relative importance for the spatial value heterogeneity in south and north, which again indicates that the digital PPGIS is a reliability tool for monitoring.

We have finished a study that compare values among locals, domestic- and international visitors. Both locals and visitors mapped undisturbed nature and recreation, but apparently for different reasons since they combined undisturbed nature with different values. Local participants associate undisturbed nature and recreation with harvest and cultural identity, whereas visitors

emphasized typical park values such as scenic, biodiversity, clean water and spiritual values.

Users have complained not being able to draw polygons. We developed a software at UiT where participants first draw the polygons and then attach values in the next step. We received complaints that it takes too long time for people to map using this software, so we need to figure out ways of simplifying the mapping.

We have also analyzed the non-digital PPGIS data from Varanger. Non-digital PPGIS provides much richer information about the importance locals ascribe to places, and their priorities for adaptive management in relation to climate-related risks. We are able to explain the spatial heterogeneity to a much larger extent than with digital PPGIS, but on the other hand it is demanding to use non-digital tools for precise monitoring. The best approach is probably a mixed methods approach as the digital PPGIS monitoring allows identification of spatial heterogeneity at a broad scale, but non-digital PPGIS could identify why values and priorities are distributed as such, and to follow up on user groups that participate to lesser extent through such monitoring tools.

We have designed and implemented a field study on the Varanger peninsula for assessing heterogeneity in spatial extent, intensity, and type of ecosystem services. We have taken 2150 photos, and will with one more field season next year, have sufficient amount of pictures to model the supply of ecosystem services for the whole Varanger peninsula. We will not be able to analyze all pictures in 2016.

Master and PhD-students involved in the project

Lorena Munoz (PhD)

Sigrid Engen (PhD)

For the Management

We evaluate different monitoring techniques using digital and non-digital PPGIS. Our results show that our tools could reliable monitor the values and priorities of a large number of people at the landscape scale. The tool is thus a cost-effective way to collect data on local and tourists values and preferences. The resulting maps cover large areas and will be made available for the relevant users.

Published Results/Planned Publications

Brown, Greg; Pullar, David; Hausner, Vera Helene. An empirical evaluation of spatial value transfer methods for identifying cultural ecosystem services. Ecological Indicators 2016; Volum 69. ISSN 1470-160X.s 1 - 11.s doi: 10.1016/j.ecolind.2016.03.053.

Engen, S., Runge, C., Hausner, V.H., Fauchald, P., & Brown, G. Social acceptability of conservation through small-scale consumptive use: Results from web-based Public Participatory GIS surveys in Norway. Ms. To be submitted in December.

Muñoz, L., Hausner, V. H., Brown, G., Runge, C., Fauchald, P. Web-based public participatory GIS as a tool for analyzing conflicting landscape values in protected areas. Ms about to be submitted in

December.

Hausner, V. H., Fauchald, P., Broderstad, E.G. Identifying sociocultural values in the Norwegian Arctic using PPGIS. To be submitted in January.

Monz et al., also plan one publication. An abstract will be submitted to ISSRM 2017.

Communicated Results

Hausner, Vera Helene; Engen, Sigrid; Munoz, Lorena. 2016. Assessing spatially explicit cultural ecosystem services for adaptive management in the alpine north. Guest lecture at USU (Utah State University) 2016-04-18 - 2016.

Engen, S. 2016. What factors are important in determining the distribution of ecosystem values in Norwegian Alpine areas? European Ecosystem Service Conference, 19.-22 september, Antwerpen.

Muñoz, L., Hausner, V. H., Brown, G., Runge, C., Fauchald, P. 2016. Web-based public participatory GIS as a tool for analyzing conflicting landscape values in protected areas, 2nd prize poster session, European Ecosystem Service Conference, 19.-22 september, Antwerpen.

Inhouse presentation of PhD work by Lorena Munoz and Sigrid Engen at UiT

Interdisciplinary Cooperation

The team build on competences in ecology, geography, political sciences and sustainability sciences. Our work is interdisciplinary as we need social science for mapping the social values and preferences of people using PPGIS, but we couple this data with ecology to identify ecosystem services of importance to local people. This project is also including the knowledge of locals, through community meetings in Varanger and by dialogue with park managers, the advisory councils and local boards.

Budget in accordance to results

The funding has been used as planned, but the software we were going to use for implementing a monitoring tool need further improvement. Since we also need to trial this software before using it, we need to wait until 2018 to implement PPGIS in Varanger.

Could results from the project be subject for any commercial utilization
        No
Conclusions

ES Arctic main goal is to develop monitoring schemes that include spatial heterogeneity in ecosystem services and differences in values and risk perception among different user groups. We have found that digital PPGIS could be used as a reliable monitoring tool for capturing broad patterns in what people consider as important sites and what kind of development they desire in the landscape. Non-digital PPGIS is more resource demanding, but provides richer and more contextual data which could to a larger extent explain why people think certain values are more important than others, and how it related to their willingness to consider climate-related risks. Next year we will link these data to spatial analyses of ecosystem services supply using modelling and the sample point approach.