



CAFF, Trondheim Dec 2-4

Assessing and valuating ecosystem services in Fennoscandian mountain landscapes

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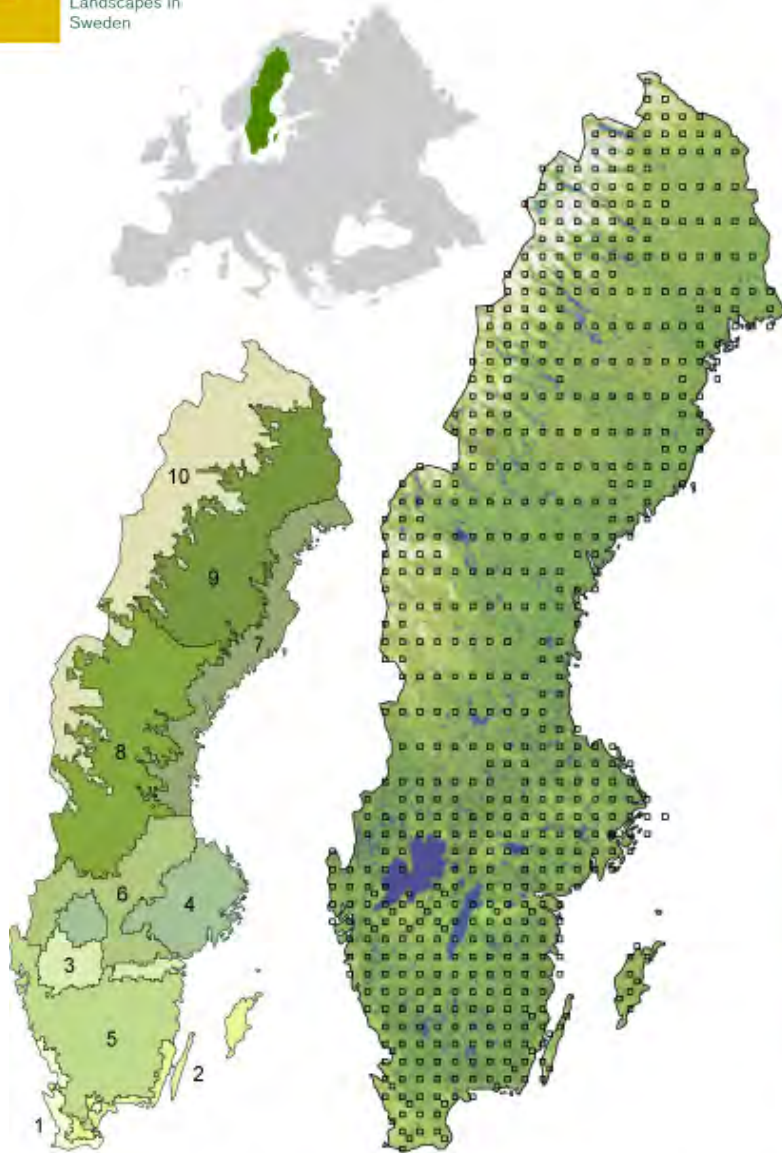
S. Adler, M. Blicharska, A. Esselin, M. Hedblom, H. Hedenås, G. Mikusiński, P. Sandström, S. Sandström, D. Wardle

National Monitoring for assessing and valuating ecosystem services in Fennoscandian alpine and boreal landscapes

Aims:

- To evaluate terrestrial ecosystem services in the mountain and the boreal forest landscapes using existing monitoring data and information
- To deliver information on and assessments of ecosystem services to be used in land use decision making





10 geographical strata

631 sample units

Sample unit
25 km² square

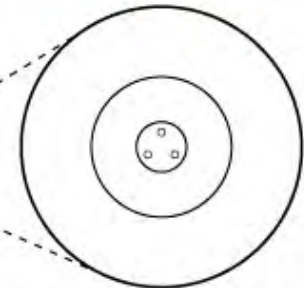


Field inventory
1 km² square
- Circular sample plots
- Sample lines

Aerial photo interpretation

1 km² square

- Polygons
- Lines
- Points



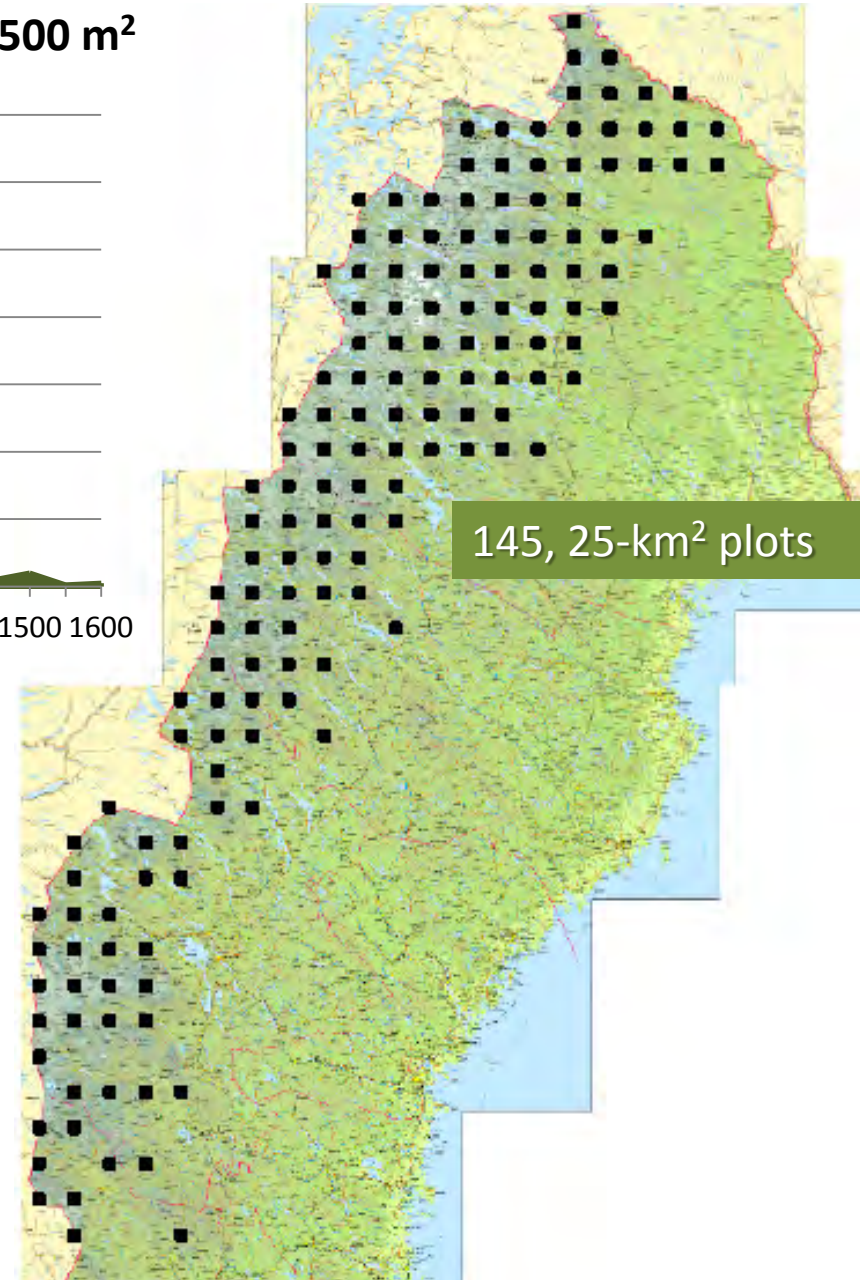
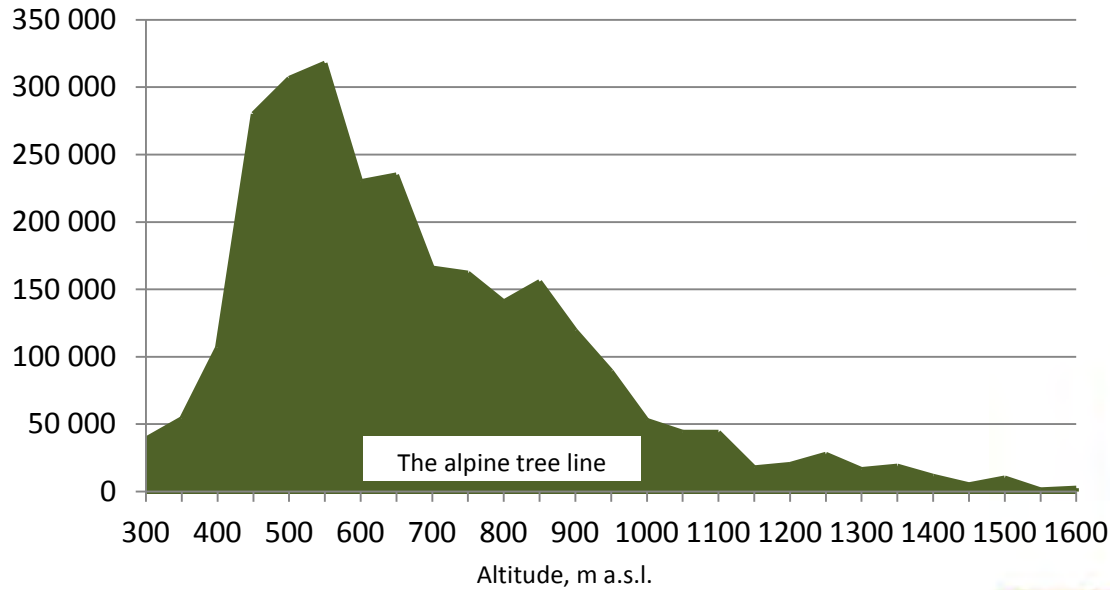
Circular sample plots

- 20 m radius
- 10 m radius
- 3,5 m radius
- 0,28 m radius

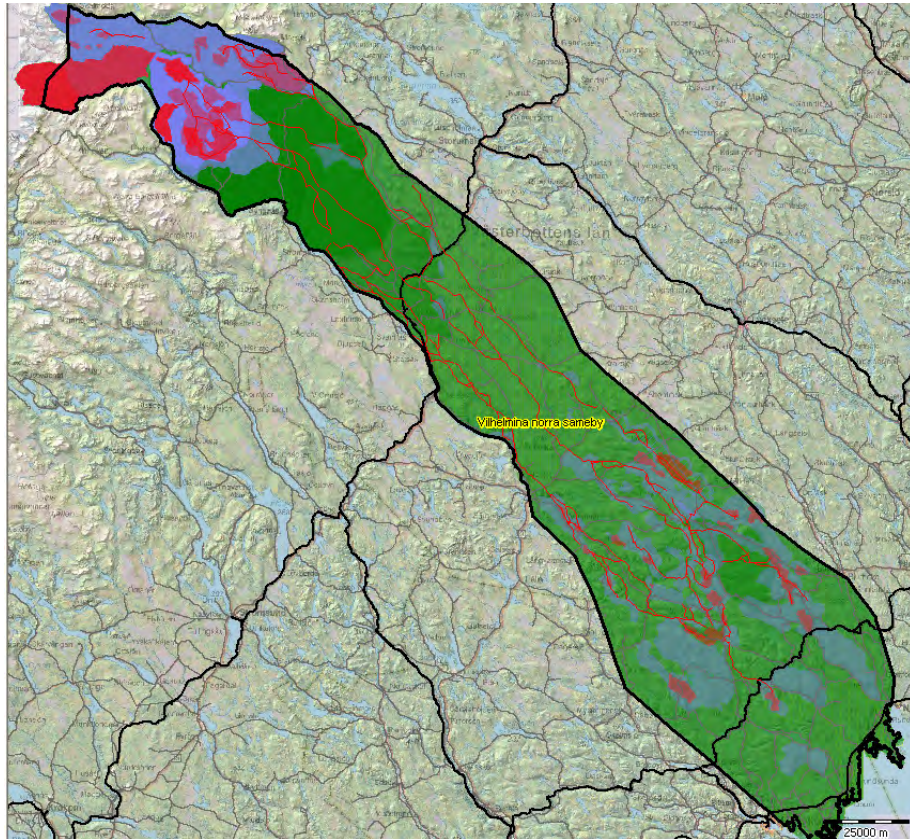
NILS in the Swedish Mountain Range

m² circular sample plots

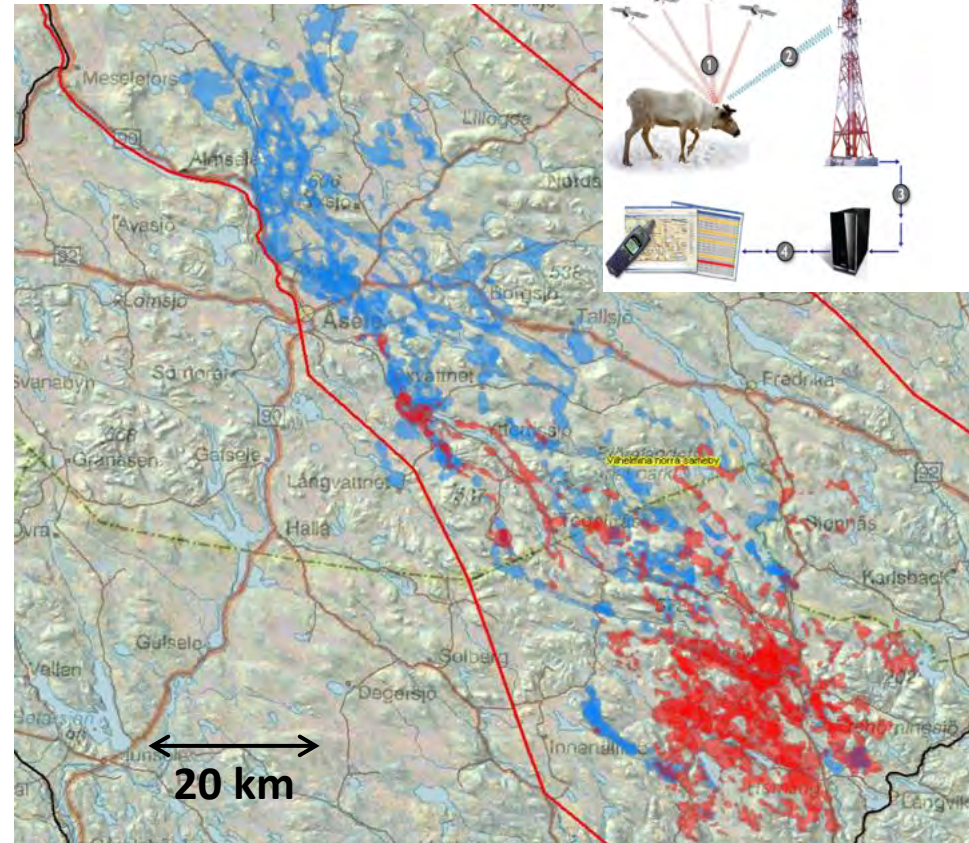
Field inventory data on in total **2 171 500 m²**



Reindeer husbandry plans and GPS on reindeer



Vilhelmina North Sámi district, 15 000 km²; core areas (red), key areas (blue) and reindeer movement paths (red lines).



Reindeer GPS positions for two winters; December to April 2006-07 (red) and 2008-09 (blue).

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Case studies:

1. Sámi reindeer husbandry as a land use system and as a provider of ecosystem services
2. Ecosystem services as indicators in the Magnificent Mountain Landscape environmental objective

Stakeholders and decision support:

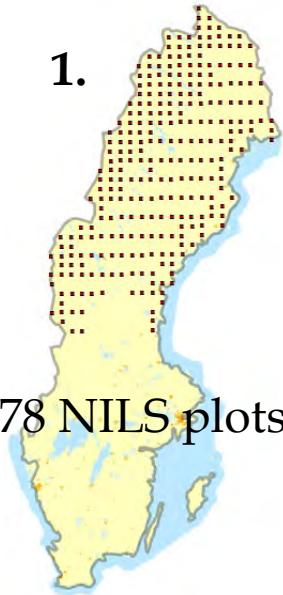
Reindeer husbandry plans for territorial planning and reindeer GIS-system as a tool for land use consultation processes

County Administration Boards with the regional environmental monitoring programs

The mountain landscape should be maintained open and pastoral

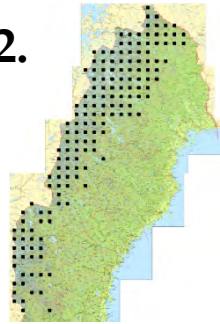
Case studies:

1.

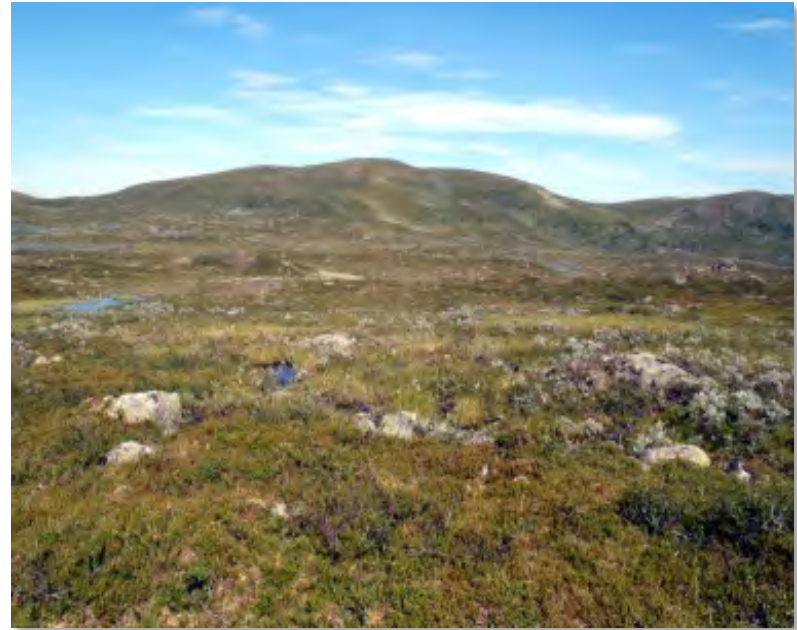


278 NILS plots

2.



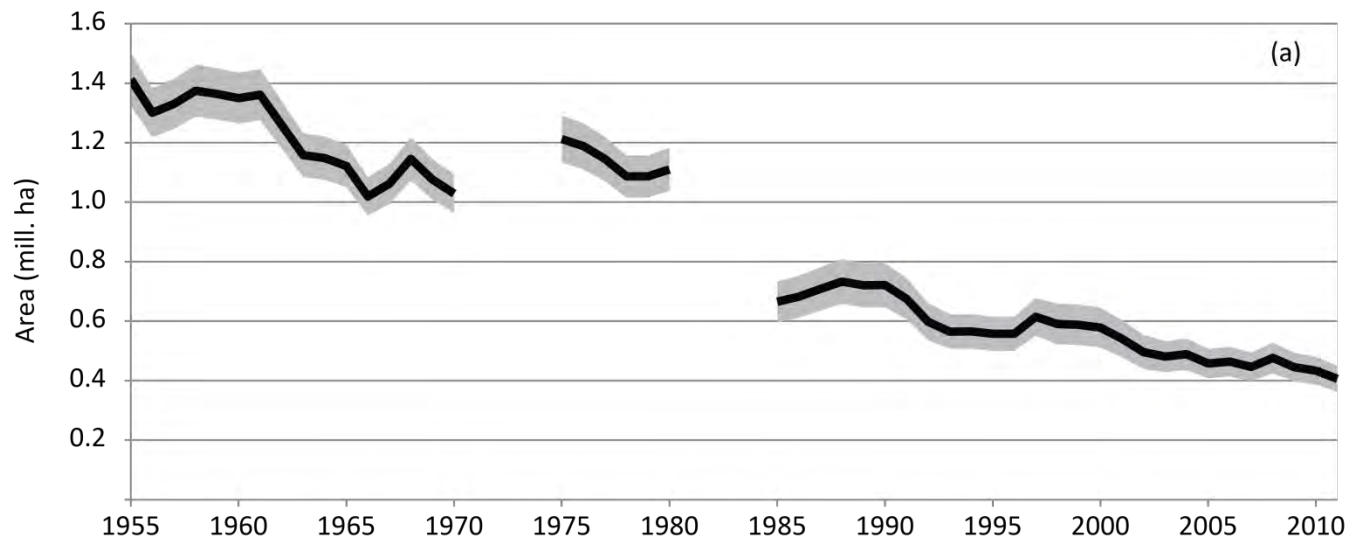
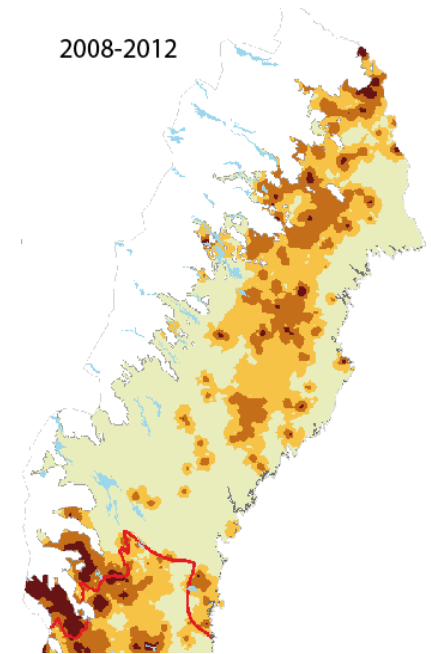
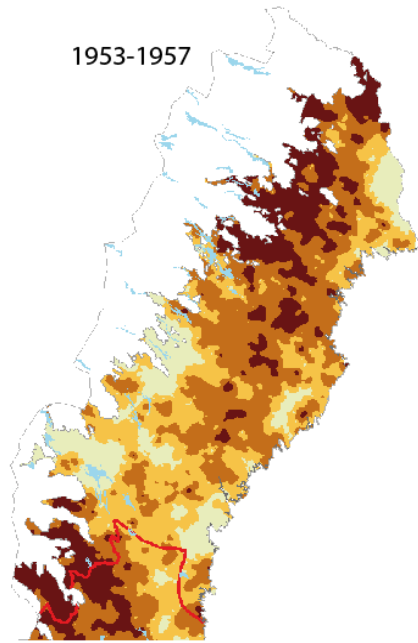
145 NILS plots



A maintained open (grazed) mountain landscape requires reindeer migration to, and winter grazing possibilities in, the boreal forests in the east (bottle neck resource)



Ground-lichen rich forests in northern Sweden - decreased by 70% in 50 yrs



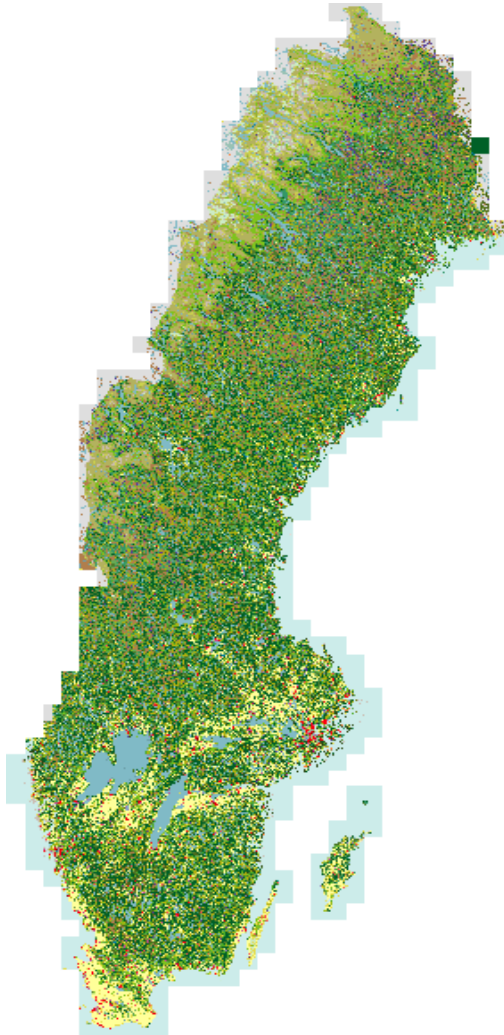
Data from the Swedish NFI. Interruptions in the curve are caused by changed inventory methods

“Conversion matrix” to derive ES from data

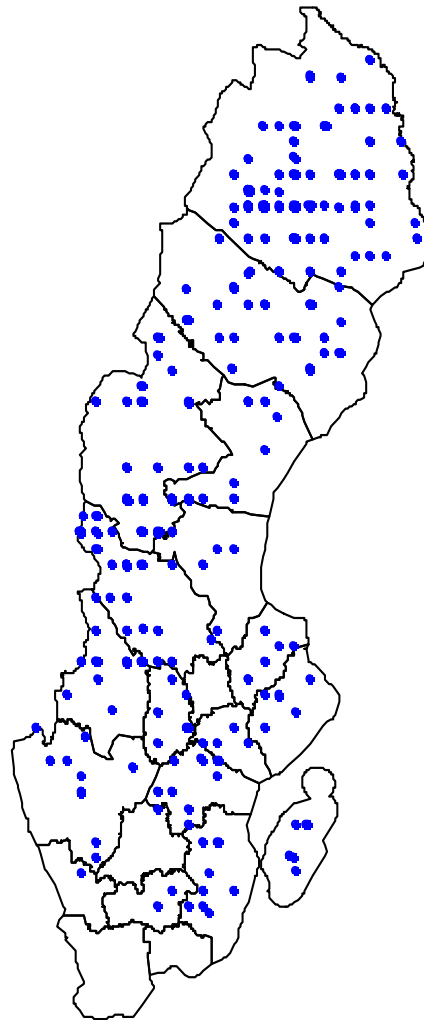
ES categories (CICES)	Types of ecosystem services	Proxy (indicator)	Data in NILS
Provisioning	Reindeer meat biomass	<ul style="list-style-type: none"> • Area ground-lichen forests • Connected landscapes 	<ul style="list-style-type: none"> • Cover of ground lichen • Distribution of habitat types
Regulation and maintenance	Liquid flows	<ul style="list-style-type: none"> • Density natural watercourses • Density disturbed watercourses 	<ul style="list-style-type: none"> • Riparian vegetation • Anthropogenic disturbance
Cultural	Aesthetic values Sámi culture	<ul style="list-style-type: none"> • Magnificence attributes • Land-use history and ongoing reindeer herding 	<ul style="list-style-type: none"> • NILS field photos • Reindeer husbandry plans

Mapping ecosystem services - ground lichen (reindeer meat)

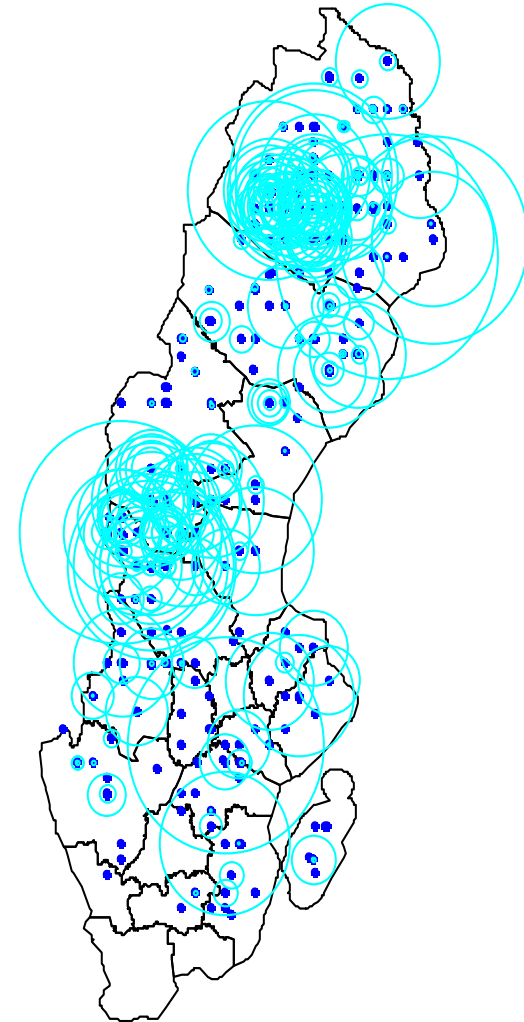
Swedish land-cover map, class 43: "Coniferous forest with lichen"



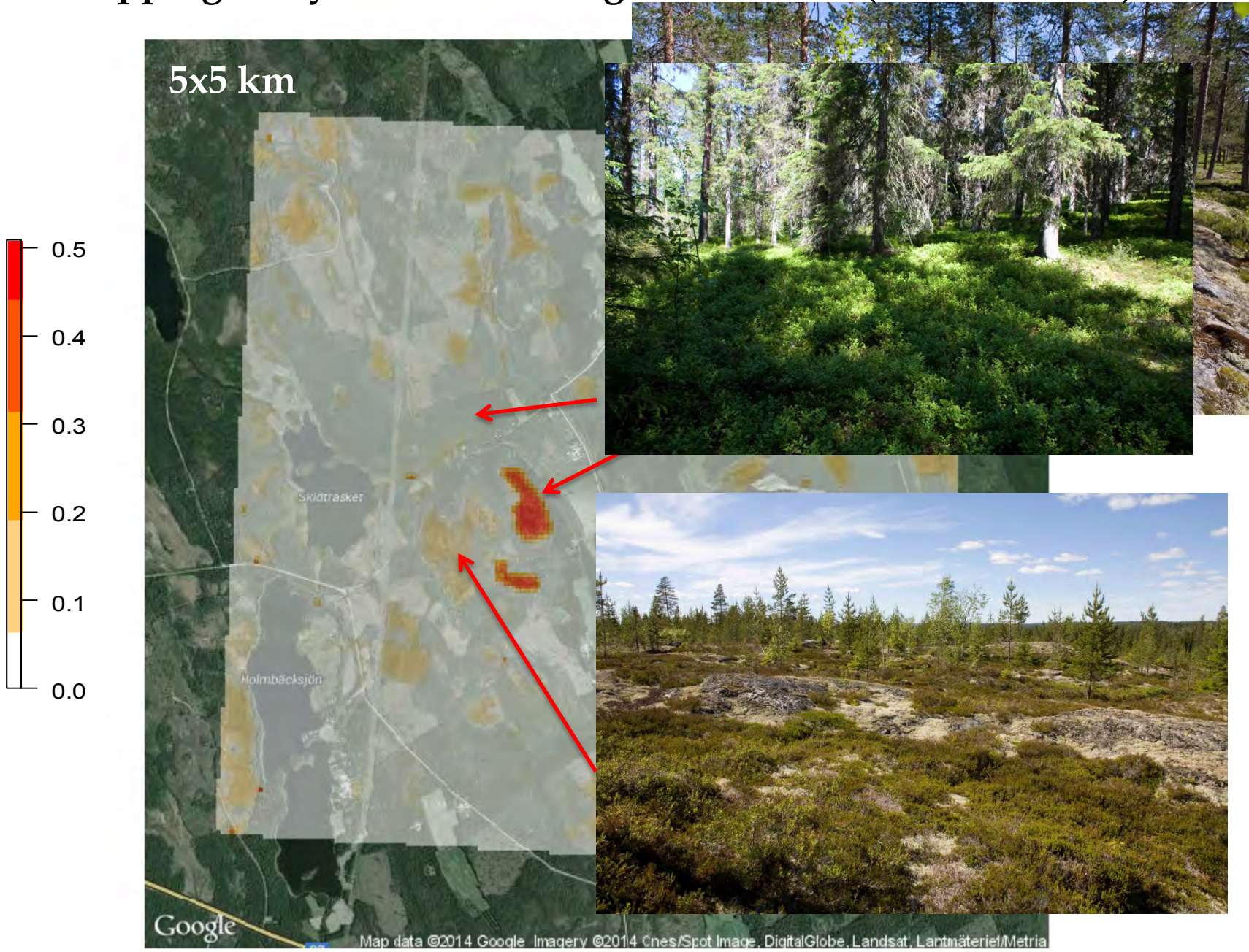
SMD43 covers 400 NILS field plots. Ground lichen has been recorded in 269 of these



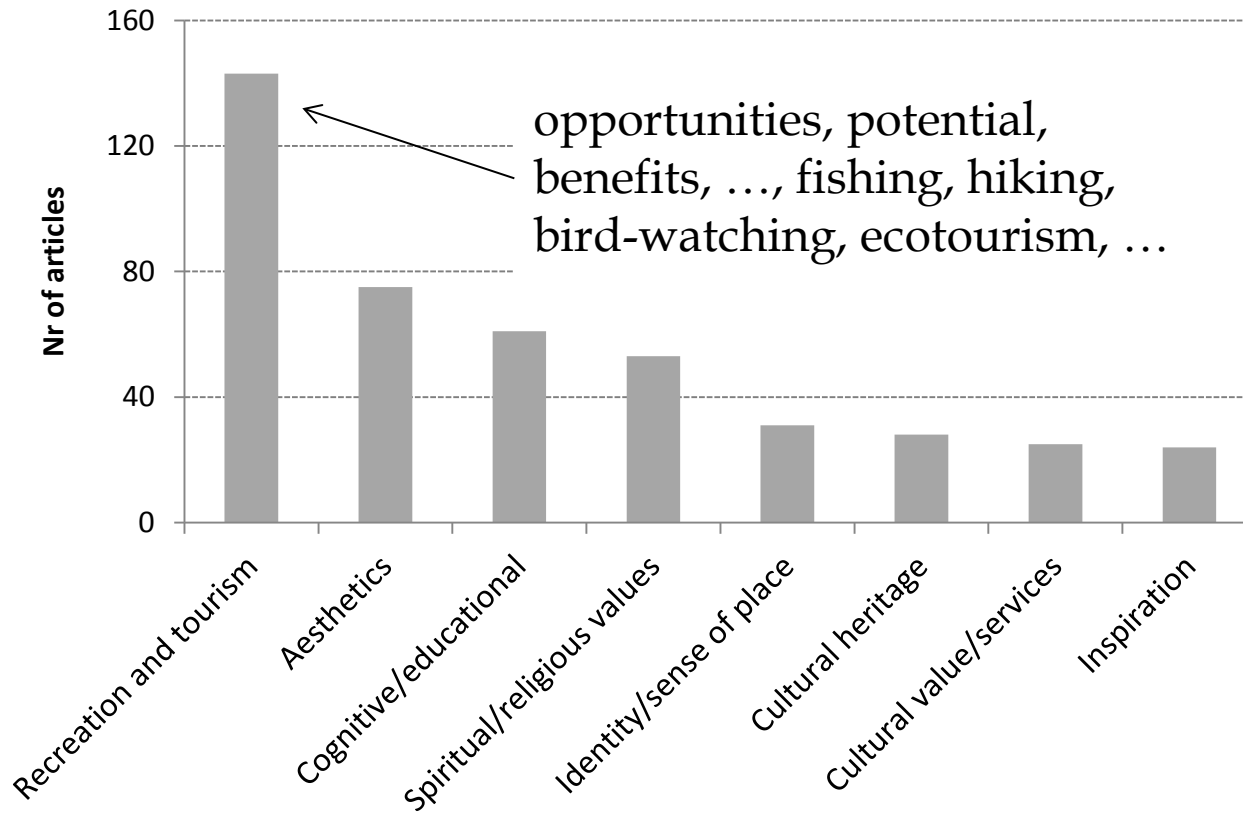
Model of ground lichen rich forests based on NILS



Mapping ecosystem services – ground lichen (reindeer meat)



Cultural Ecosystem Services



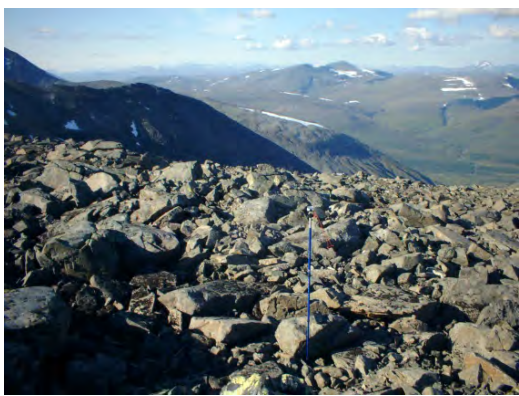
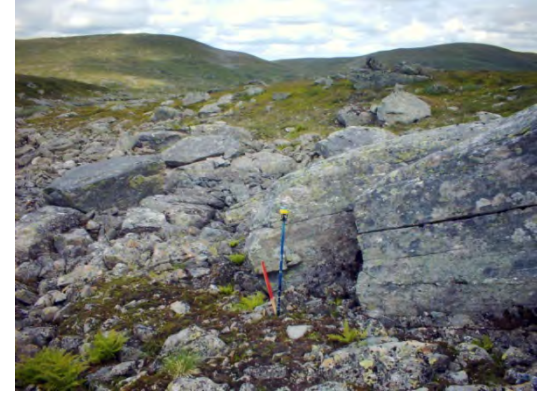
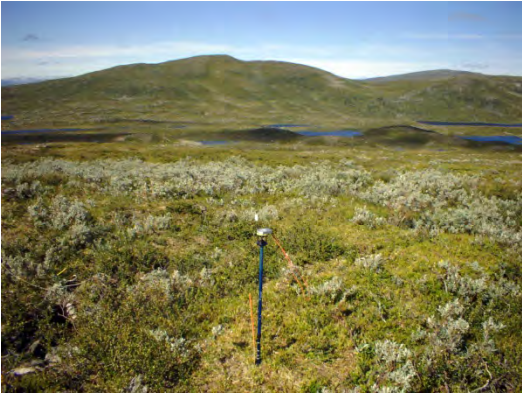
Other (examples):

- Symbolic
- Livelihood
- Cultural diversity
- Cultural fulfilment
- Psychological benefits
- Existence value
- Traditional use
- Social relations
- Access to economic resources
- Ecosystem as unifying element of cultures
- Subsistence
- Tradition
- Cultural fulfilment
- Ecosystems as unifying elements of cultures
- Existence value
- Relaxation...



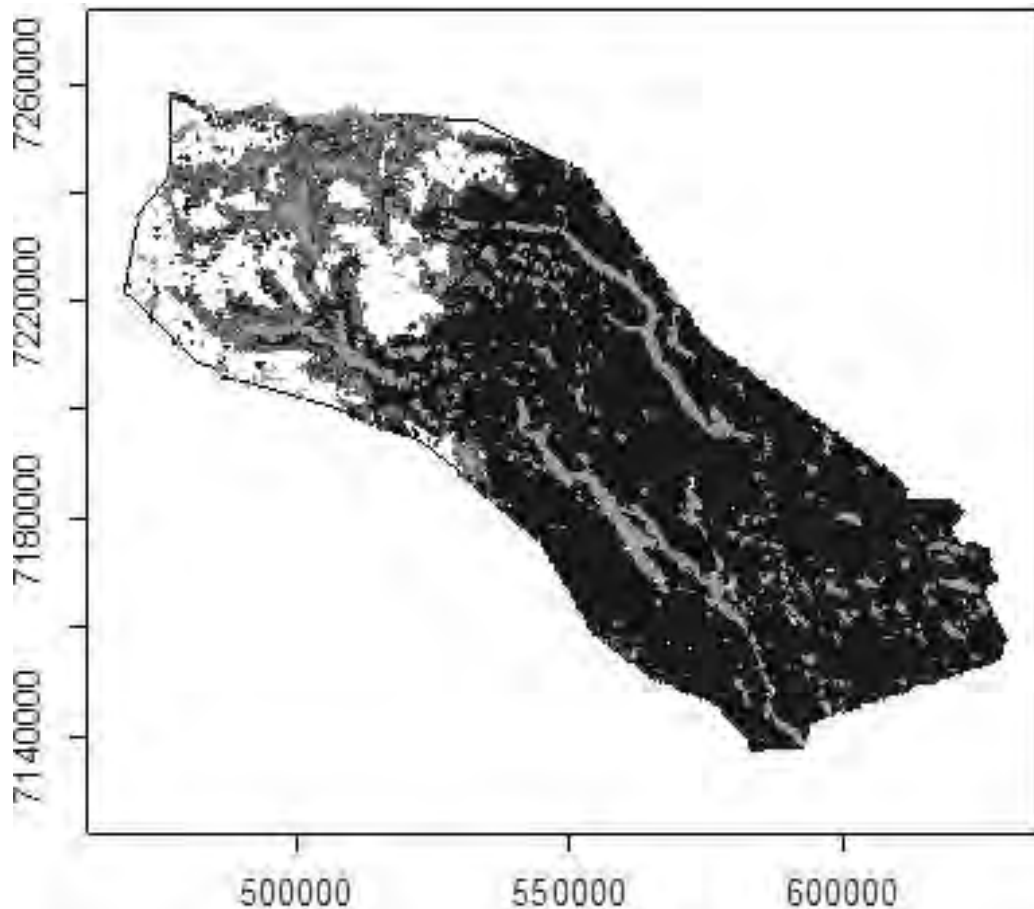
NILS field photos

About 7 000 photos from about 1 700 systematic sample plots in the mountains

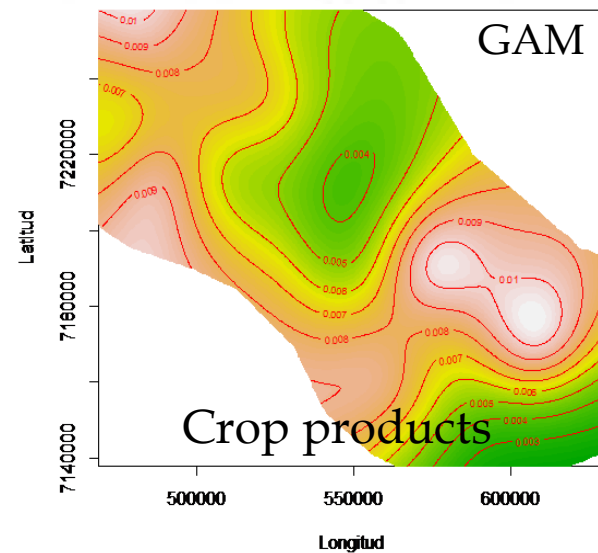
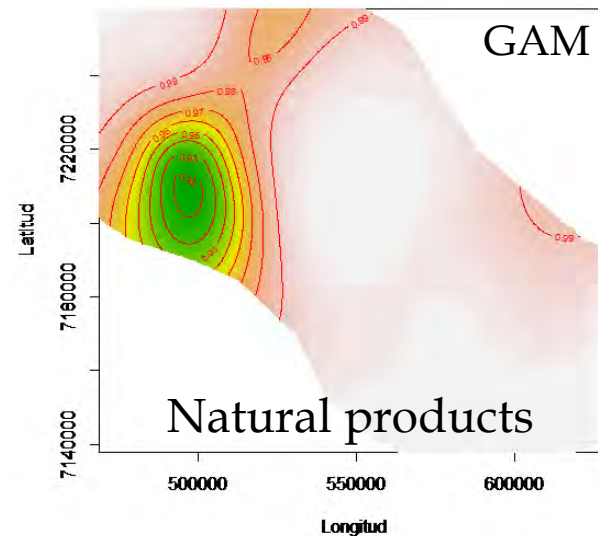


Mapping ES on the scale of a Municipality (mountain area)

Density of ES (15 types in all ES categories and all land-cover types)



Vilhelmina Municipality (780 000 ha) in the boreal forest to alpine transition





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