Co-production of land use assessments towards innovative solutions

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Arctic and boreal regions are undergoing rapid changes due to industrial exploration of natural resources. In northern Sweden, expanding land use forms include forestry, wind and hydropower, mining, and infrastructure projects. Over time, such projects have combined to form a complicated web of cumulative impacts, which profoundly affects the status of landscapes in terms of function and connectivity. To understand and illustrate how individual and cumulative impacts affect landscapes, we assess the status of landscapes using the requirements of Sami reindeer husbandry as an indicator of landscape function and connectivity. Reindeer husbandry depends on connected landscapes to allow for annual, long-range migrations between seasonal grazing lands. To conduct such assessments, we collaborate with reindeer herders, land managers and industry through continual dialogues. The assessments are thereby based on a combination of natural science and indigenous and local knowledge systems.

The approach to assess individual and cumulative impacts on landscapes is divided into three interconnected activities. The activity of documenting and communicating impacts on landscape over time is a critical component of assessments. The methods of this activity have been continuously developed and implemented for 20 years as part of our work connected to reindeer husbandry plans. Another activity is analyzing how different land use forms affect reindeer and reindeer husbandry. Ongoing studies are conducted to assess impacts of forestry activities, energy, mining and infrastructure developments. These impact assessments are cumulative, addressing all ongoing land use forms in an area. Outcomes of such impact assessments include estimations of zones of influences, and measures of lost landscape connectivity. The third activity is connected to the cumulative barriers to landscape connectivity that were identified in the impact studies. In this activity, we identify, design and implement solutions for landscapes that have been negatively affected by intense land use. Such solutions include identification and implementation of new forestry methods that promote conditions for ground lichen, a key winter food resource for reindeer. Other solution-oriented work includes optimizing placement and design of animal crossings over highways and railways. This solution-oriented set of activities also provides the necessary information that supports plans for compensation and restauration when landscapes are negatively affected by industrial developments. In addition to publishing our work in traditional scientific journal, our impact assessments are used in court testimonies and by land management agencies.