

How can the concept of ecosystem services influence conservation planning strategies?

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Abstract

Considering ecosystem services in conservation decision-making is a fairly new approach (Chan et al. 2011), while conservation area networks represent a policy instrument which has been developed through the last century. Different types of conservation areas have different effects on the flow of ecosystem services. Some services are compliant with full protection (regulating services or certain cultural services), while others can be understood as an opportunity cost of conservation (provisioning services such as timber harvest).

Norway has a deficit of protected areas within the “productive forest” zone, and there are intentions to increase the area of old-growth forest with high biological qualities by implementing, for example, voluntary conservation schemes. Following the ecosystem services paradigm, raising awareness of public benefits provided by these forests other than biodiversity conservation may be used to argue for increased area under protection. Ecosystem services may also justify revision of some subsidies to the forestry sector such as those that support accessibility.

Hypothesising that protecting ecosystem services will broaden the scope of regulatory instruments, the aim of this paper is to investigate how the concept of ecosystem services can influence spatial targeting of conservation instruments. We analyse to what extent planning outcomes differ when multiple sets of ecosystem services are systematically taken into account from planning scenarios which only consider ecological criteria.

Using forest areas in Telemark County (Norway) as a case we simulate possible designs of future sets of conservation areas. For simulating such scenarios we use MARXAN with Zones (Watts et al. 2009) which enables to identify optimised solutions for conservation area network design where different levels of protection (“zones”) are applied. Typically in MARXAN, conservation features have been weighed against opportunity costs in terms of foregone forestry. In our ecosystem services approach we compare solutions when timber harvest is modelled as one of many ecosystem services objectives, versus the more classical reserve site selection approach where foregone forestry is as an opportunity cost weighted against other ES as conservation features.

Ecological criteria that are considered independently of ecosystem services are old-growth forest habitat types, forest habitats of special conservation interest, ecological corridors and the Nature Index for Norway. Ecosystem services considered are timber harvest, forest carbon sequestration and storage, snow slide prevention, recreational hiking and existence of areas without technical

interference. Spatial models for each of these services have been developed (Schröter et al. 2014). We consider two conservation instruments, namely fully and partially protected areas.

MARXAN with zones simulations help to identify and quantify both expected goal conflicts in the planning process and deviation among possible future scenarios in the outcome of the process. Thereby, the exercise will help to demonstrate the strengths and weaknesses of applying the ES concept with regard to systematic conservation planning. Such information can be used for spatial targeting of conservation instruments.

References

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