



# Incorporating threat in joint hotspots of biodiversity and ecosystem services

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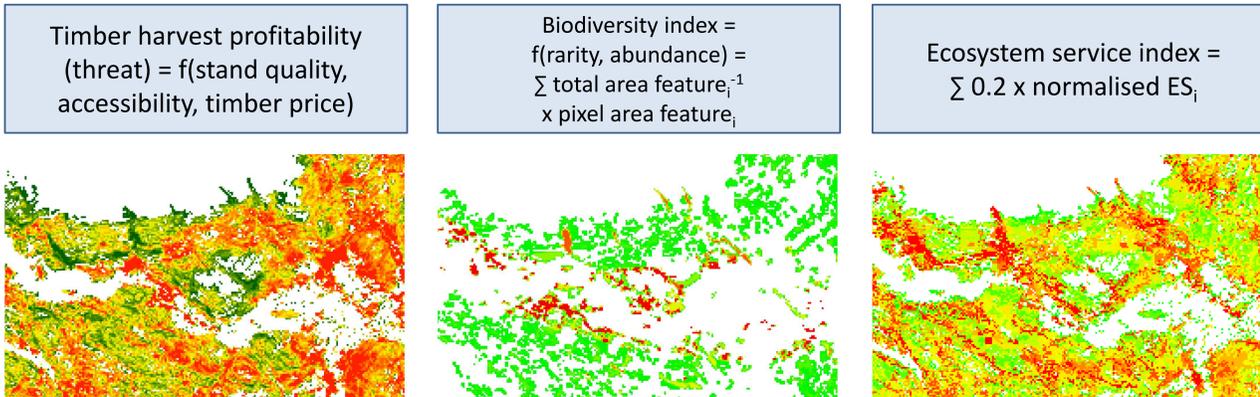
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## Background

Hotspots are a common way to prioritise areas for biodiversity conservation. Increasingly, hotspots are also used to delineate important areas for sustained ecosystem service (ES) provision. However, definitions for ES hotspots vary widely [1]. While biodiversity hotspots often include measures of high biodiversity value and high threat [2], ES hotspots so far do not consider threats. Furthermore, a joint approach for a hotspot of biodiversity and ES is missing. Discussion is needed to which extent ES go along with different degrees of biodiversity protection.

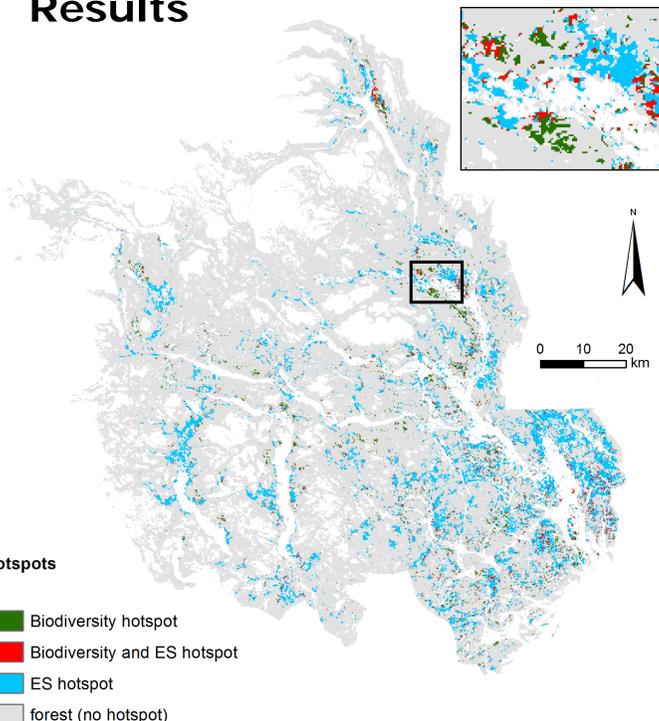
## Objectives

- Map hotspots for biodiversity and ES, including a shared human impact (clear-cutting of forest) as a measure of threat for Telemark, Norway
- Compare results in terms of delineated area and spatial agreement



- Sensitivity analysis: Definition of upper quantiles (5%, 10%, 20%, 30%)
- Hotspot = areas of high biodiversity and high ES and high threat

## Results



Considering the top 3 deciles (30%) of cells leads to a selection of:

- 81 000 ha as ES only hotspot
- 18 000 ha as BD only hotspot
- 11 000 ha as joint BD-ES hotspot

Together these areas account for 14% of the forest area.

### Sensitivity analysis (ES only)

(colours represent conservation prioritisation level, red=highest)

Hotspot size in hectares	Ecosystem services				
	upper quantile	5%	10%	20%	30%
Threat (timber harvest profitability)	5%	413	7,102	19,130	23,624
	10%	655	11,581	32,443	43,258
	20%	1,086	17,160	49,831	71,097
	30%	1,659	21,236	62,124	91,883

Study area: Telemark, Norway

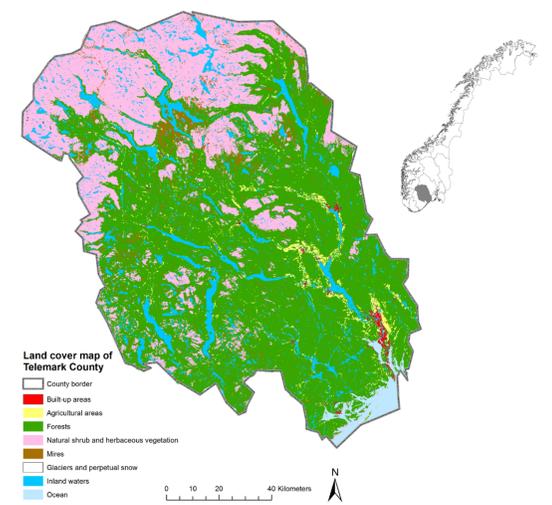


Fig. 1. Biodiversity data: 40 types of old-growth forest and 10 types of vegetation of particular conservation interest.



Fig. 2. ES data: five regulating and cultural services: carbon storage, carbon sequestration, snow slide prevention, recreational hiking and existence of wilderness-like areas [3].



Fig. 3. Measure of threat: Timber harvest profitability model [4].

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