ECOPOTENTIAL

PLUS PLANNING OF LANDSCAPE AND URBAN SYSTEMS

ETH Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Ecosystem services within and outside of protected areas: The Swiss National Park and Davos

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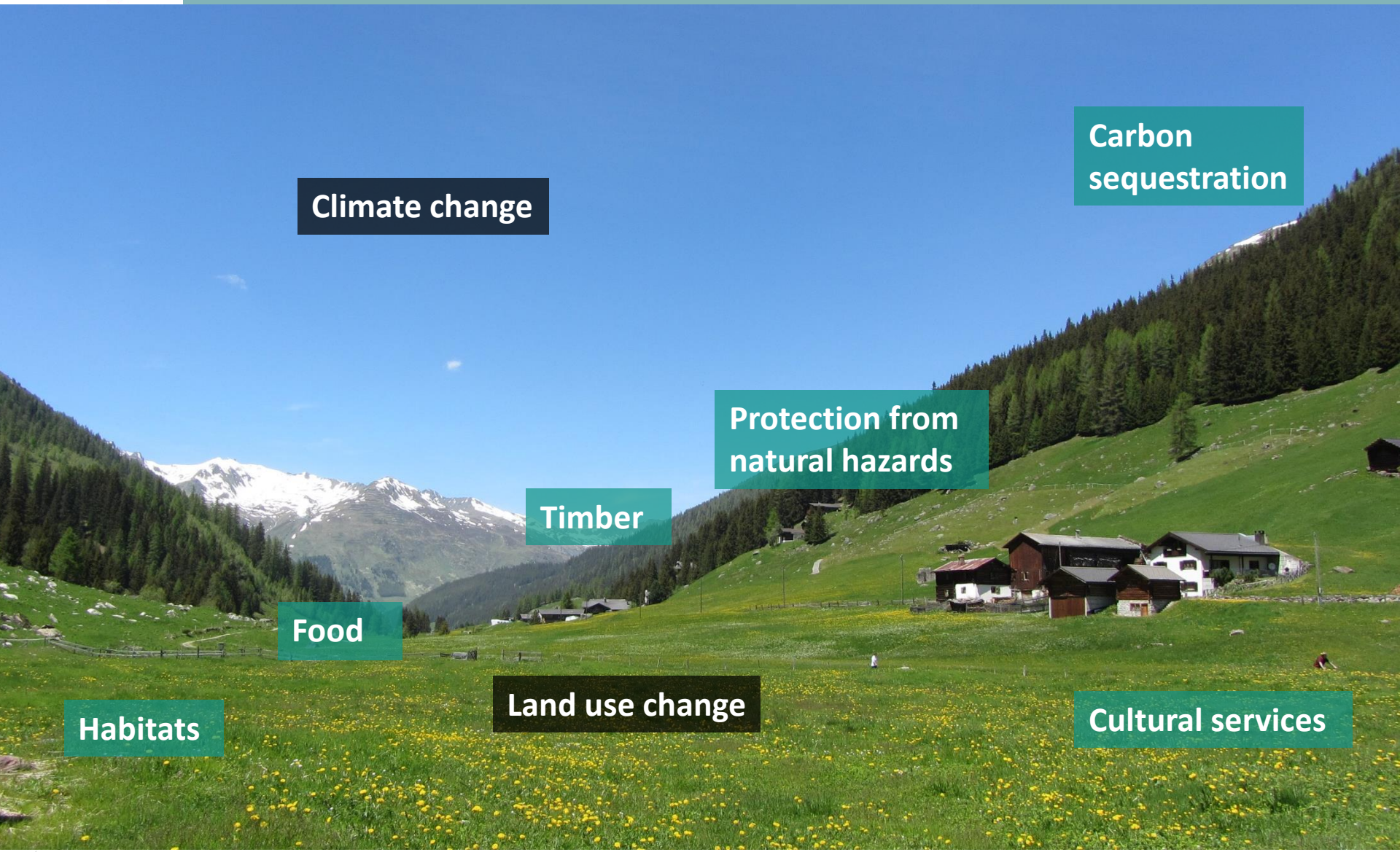
Mountain ecosystems



Mountain ecosystems: Management

Societal and management responses:

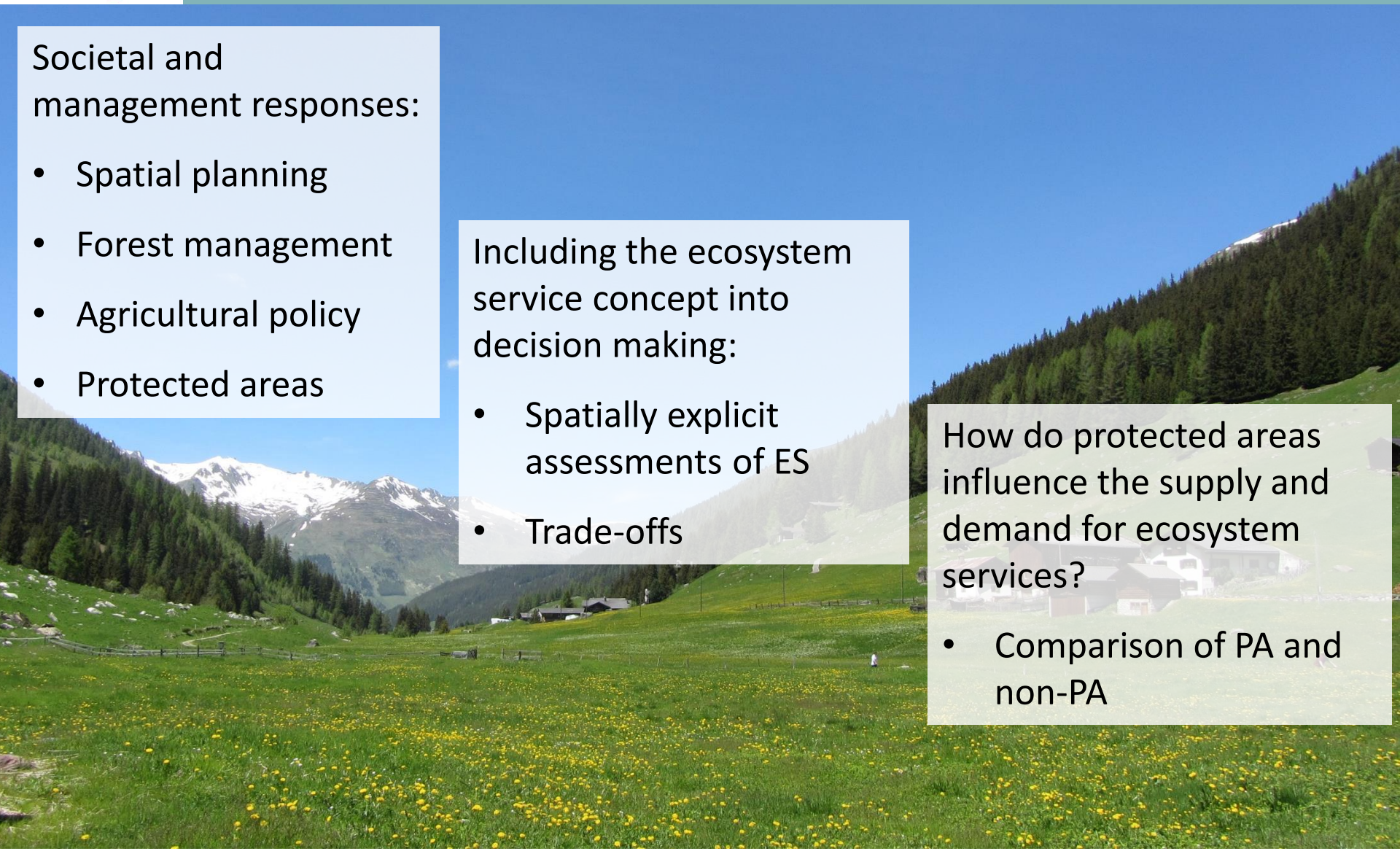
- Spatial planning
- Forest management
- Agricultural policy
- Protected areas

Including the ecosystem service concept into decision making:

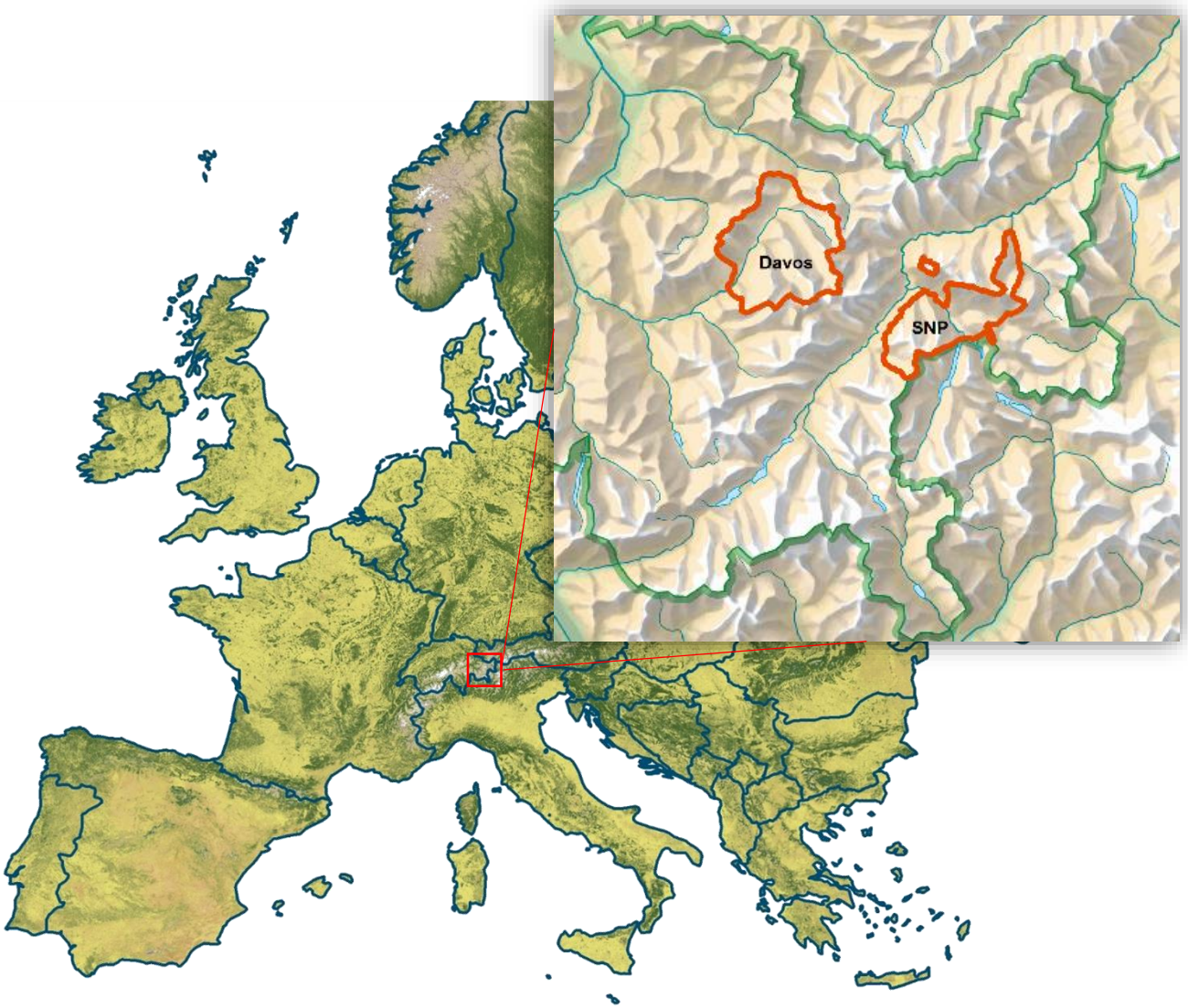
- Spatially explicit assessments of ES
- Trade-offs

How do protected areas influence the supply and demand for ecosystem services?

- Comparison of PA and non-PA



Case study areas



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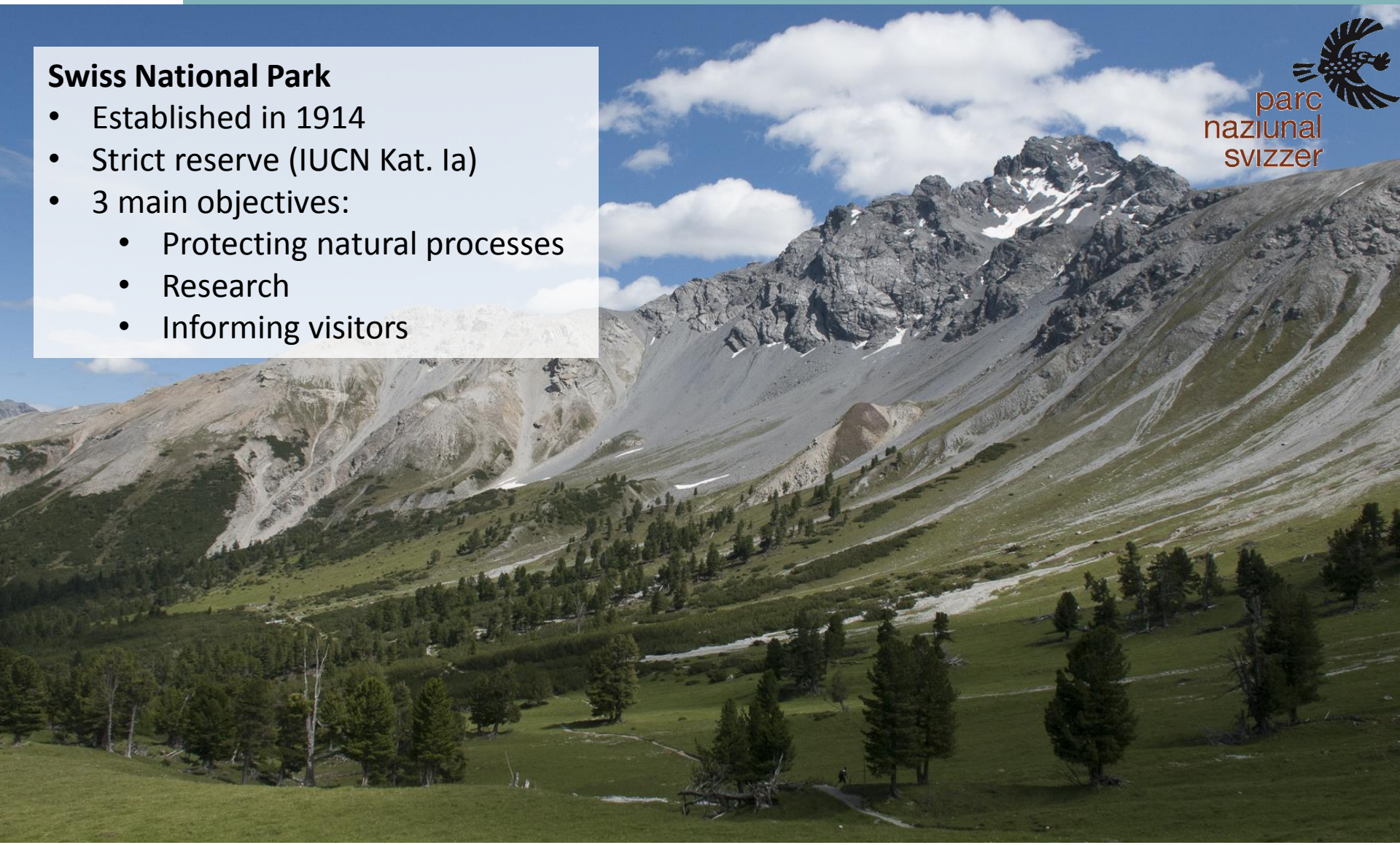

Swiss National Park

- Established in 1914
- Strict reserve (IUCN Kat. Ia)
- 3 main objectives:
  - Protecting natural processes
  - Research
  - Informing visitors

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Case study areas

Landschaft Davos

- Touristic main valley
- Three side valleys dominated by mountain agriculture
- 13 000 inhabitants
- 25 000 guest beds

Case study areas

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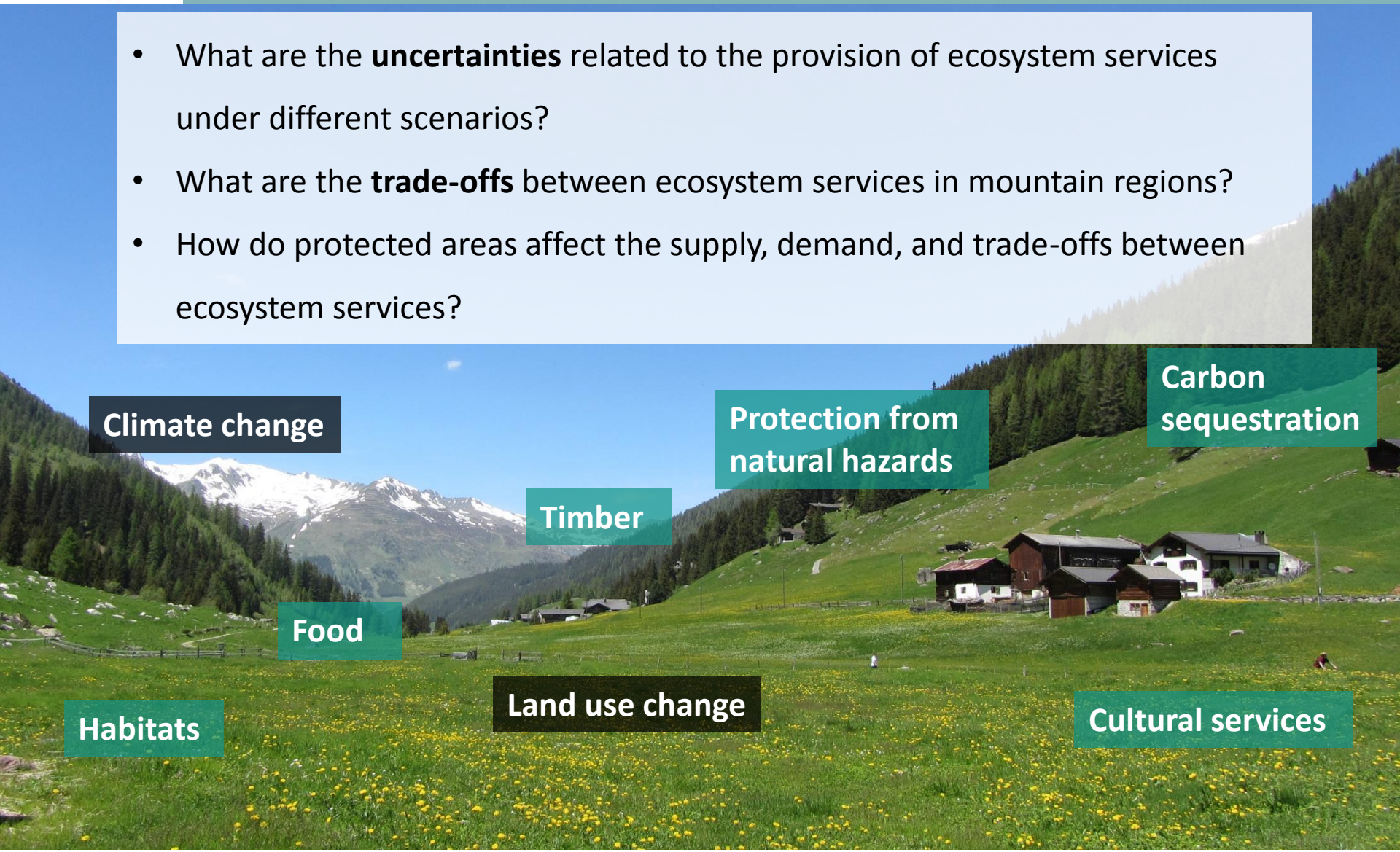
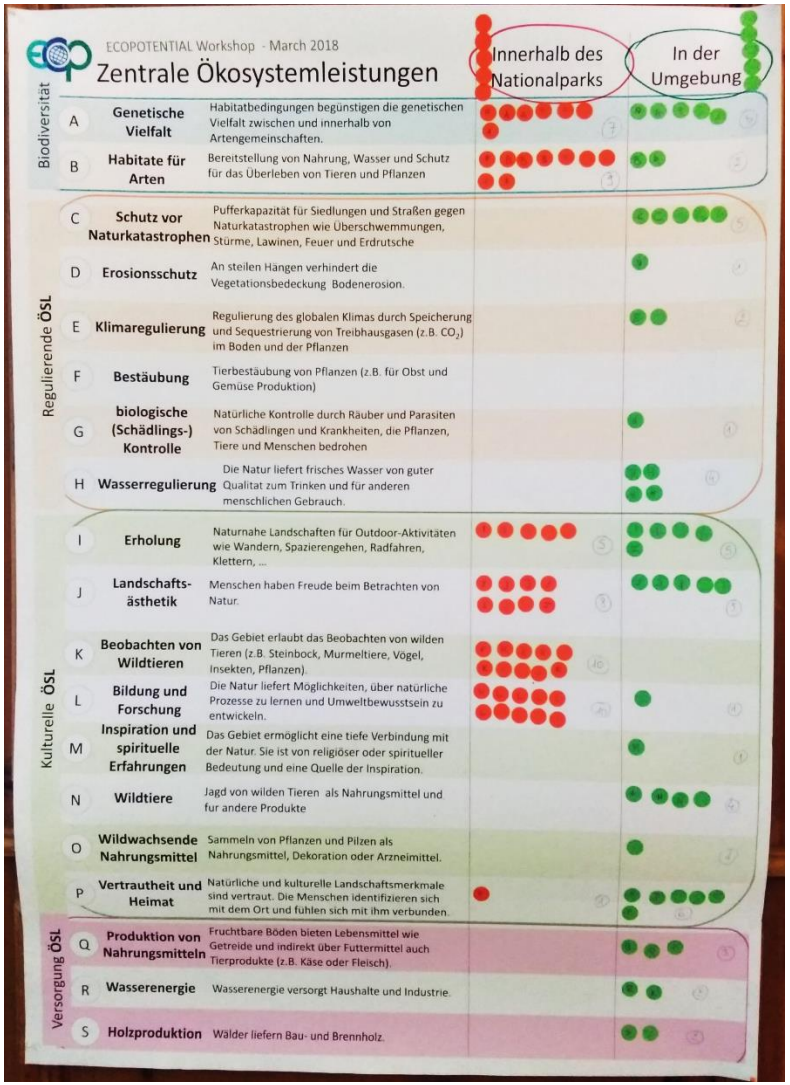
Questions

- What are the **uncertainties** related to the provision of ecosystem services under different scenarios?
- What are the **trade-offs** between ecosystem services in mountain regions?
- How do protected areas affect the supply, demand, and trade-offs between ecosystem services?



Workshop in the Swiss National Park



- Participants from PA management, municipality, tourist organisation
- Most important ecosystem services?
  - Inside and outside the park

Category	Ecosystem service	In the Park	In the surroundings of the Park
Biodiversity	A - Genetic resources	7	5
	B - Habitats for species	9	2
Regulating services	C - Protection against natural hazards	0	5
	D - Erosion prevention	0	1
	E - CO2 sequestration	0	2
	F - Pollination	0	0
	G - Biological control	0	1
	H - Water regulation	0	4
Cultural services	I - Recreation	5	5
	J - Scenic beauty	8	5
	K - Wildlife observation	10	0
	L - Research and education	10	1
	M - Inspiration and spiritual experience	0	1
	N - Wild animals	0	4
	O - Wild plants and mushrooms	0	1
	P - Identification	1	6
Provisioning services	Q - Agricultural production	0	3
	R - Hydro-energy	0	2
	S - Wood production	0	2

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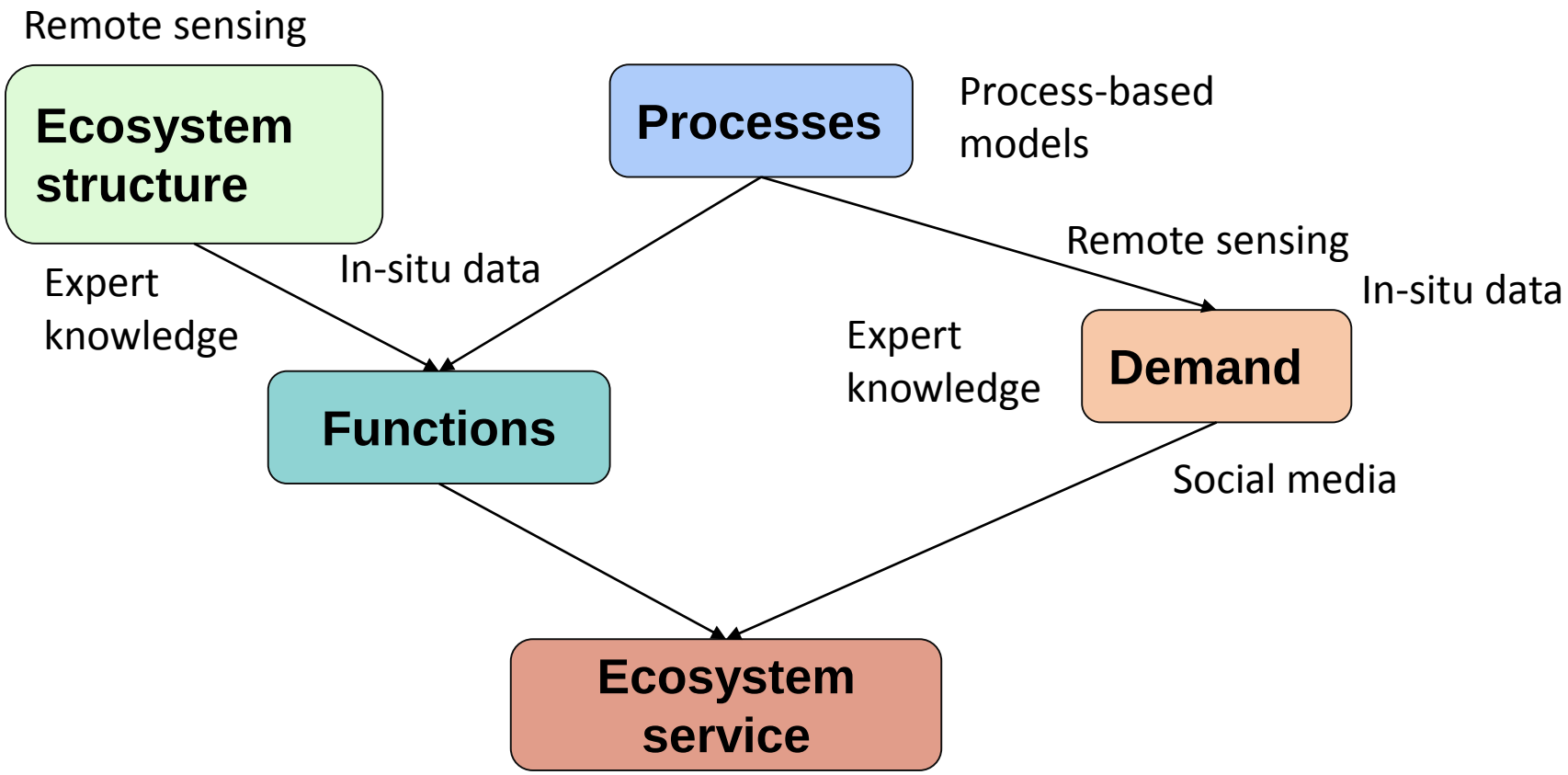
Modelling ecosystem services

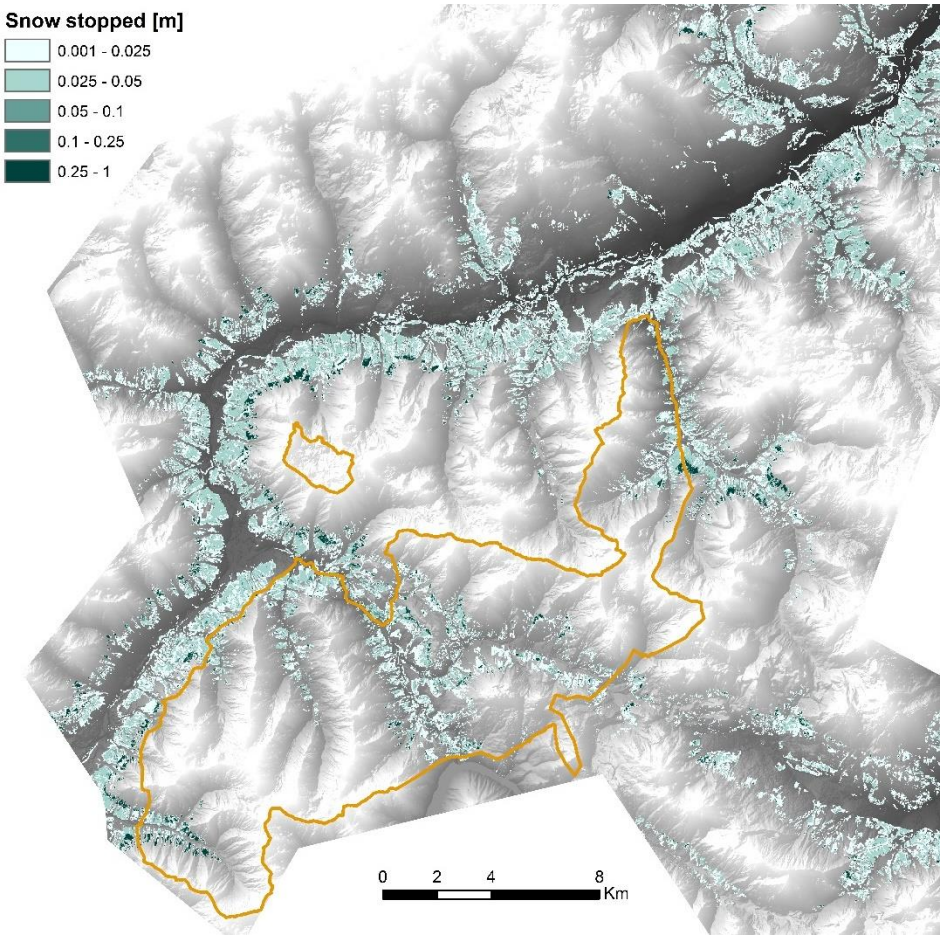


- Integrating different types of data
- Uncertainties

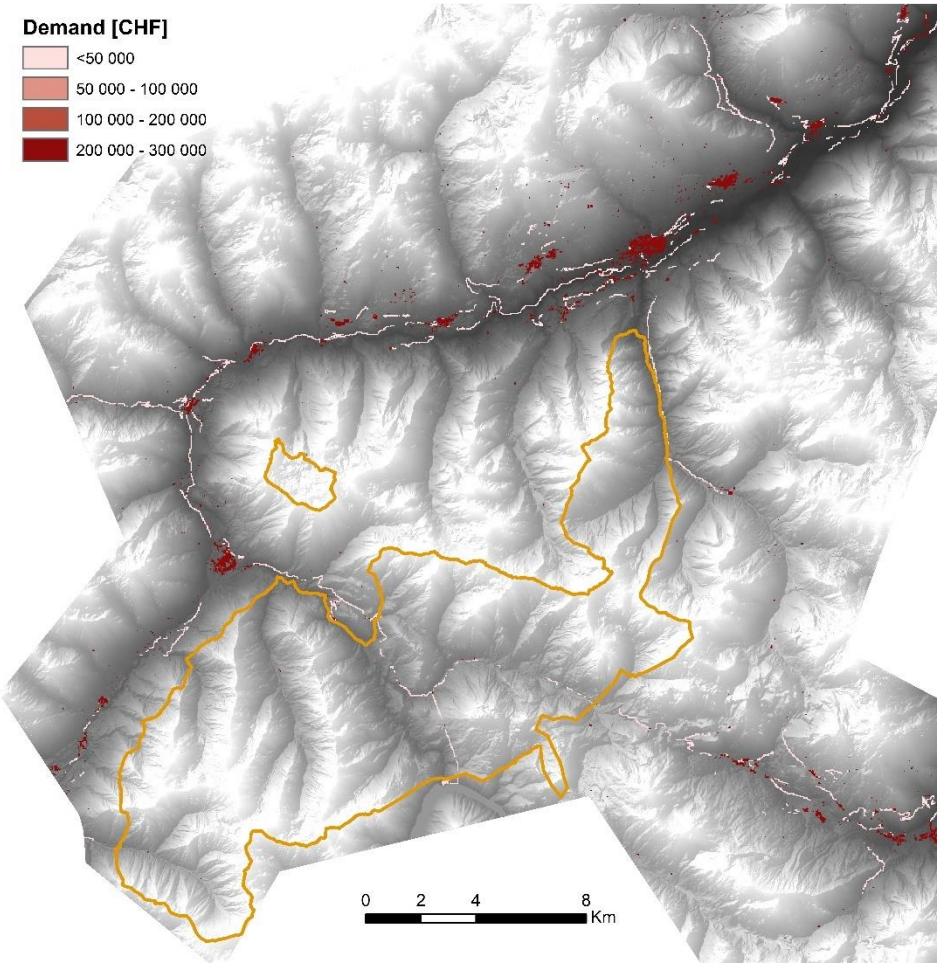
Bayesian Networks

Avalanche protection: SNP

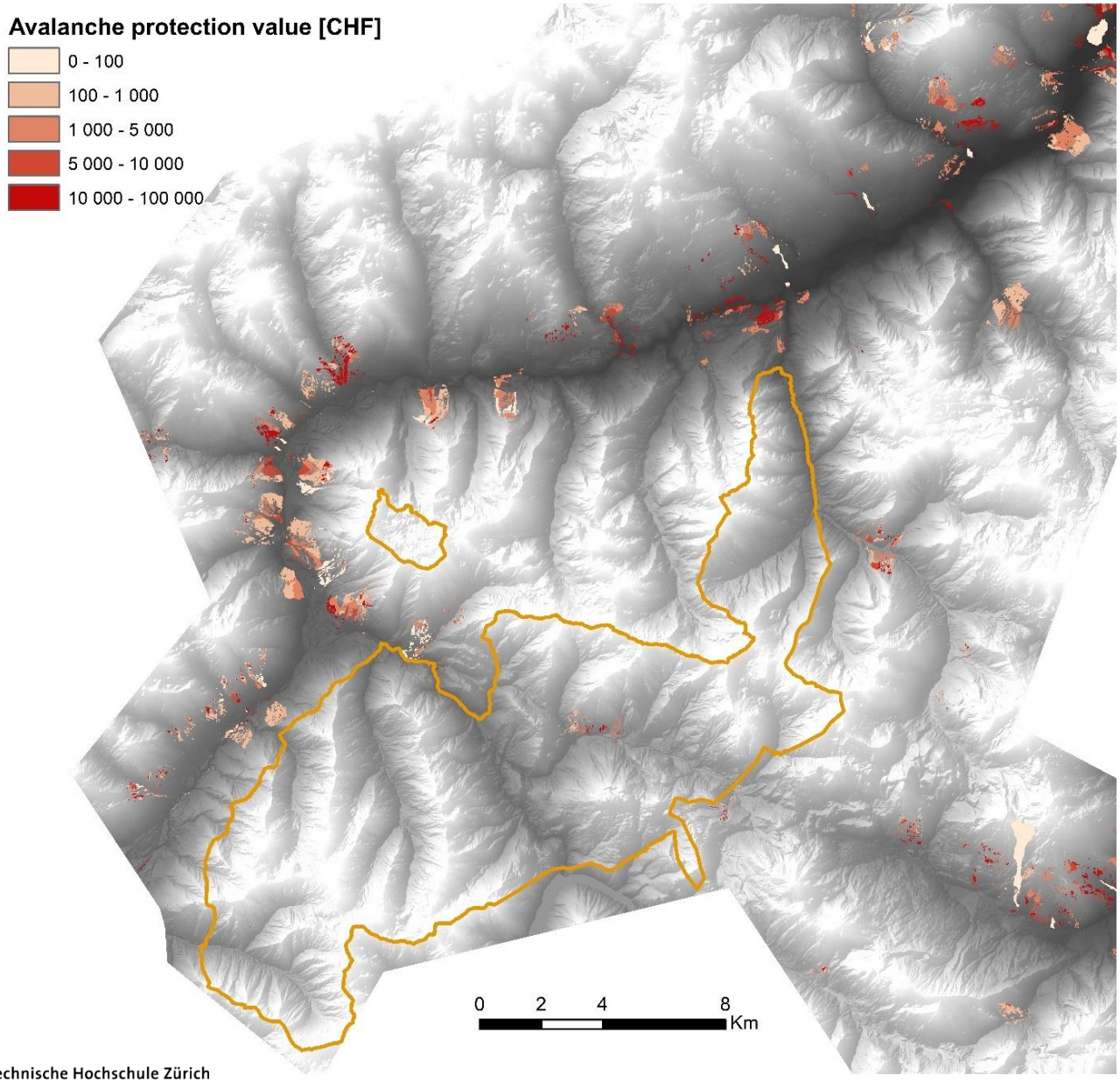
Provision



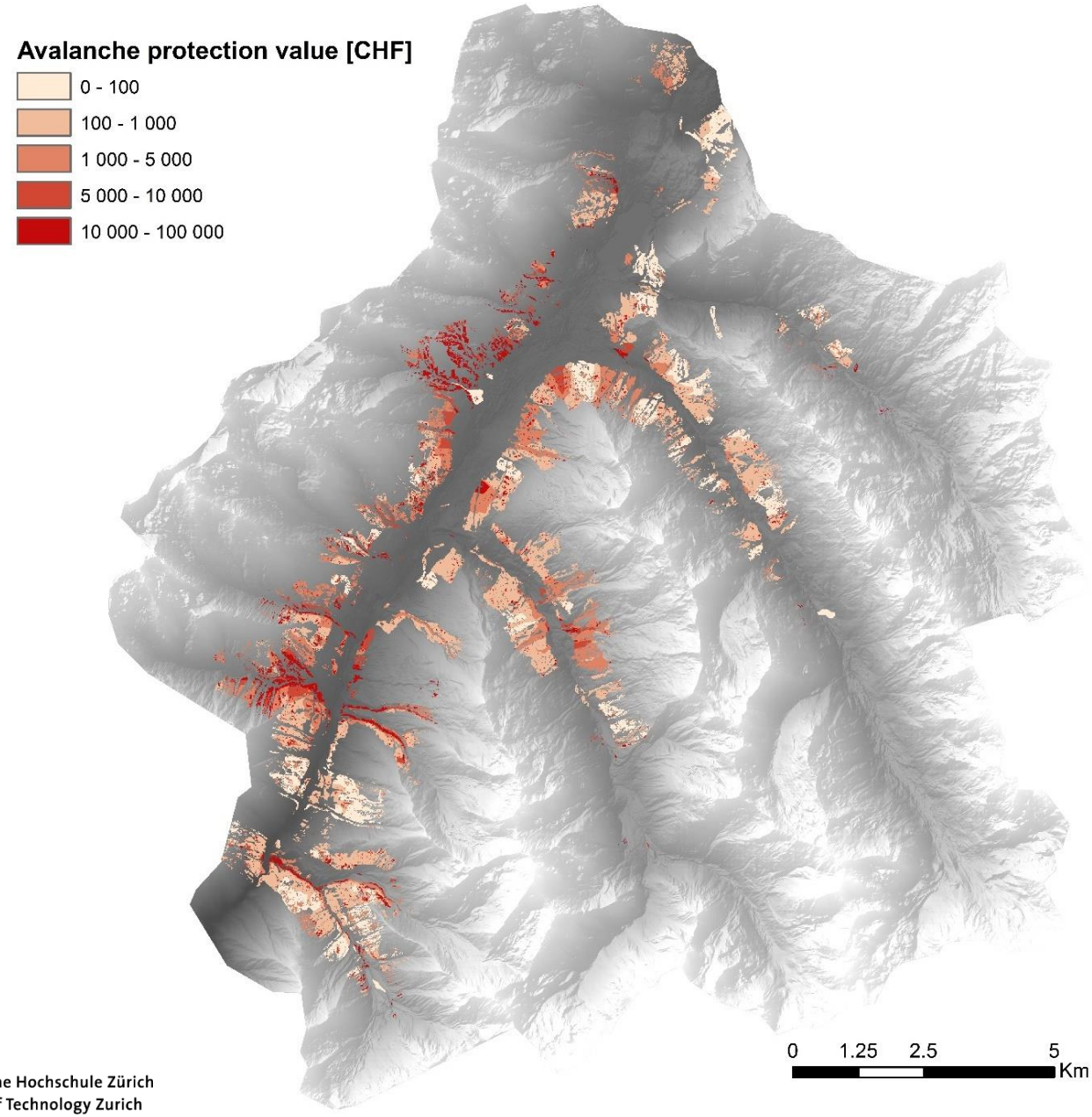
Demand



Avalanche protection: SNP



Avalanche protection: Davos



Outlook

- Ongoing work on modelling recreation, habitats, and carbon sequestration
- What we've learned so far:
  - Spatial Bayesian Networks can integrate different types of information on ecosystem services
  - High uncertainties about ecosystem processes (disturbances)
  - Management objectives and local differences in demand affect the value of ecosystem services