Accounting for biodiversity

Per Arild Garnåsjordet

Statistics Norway

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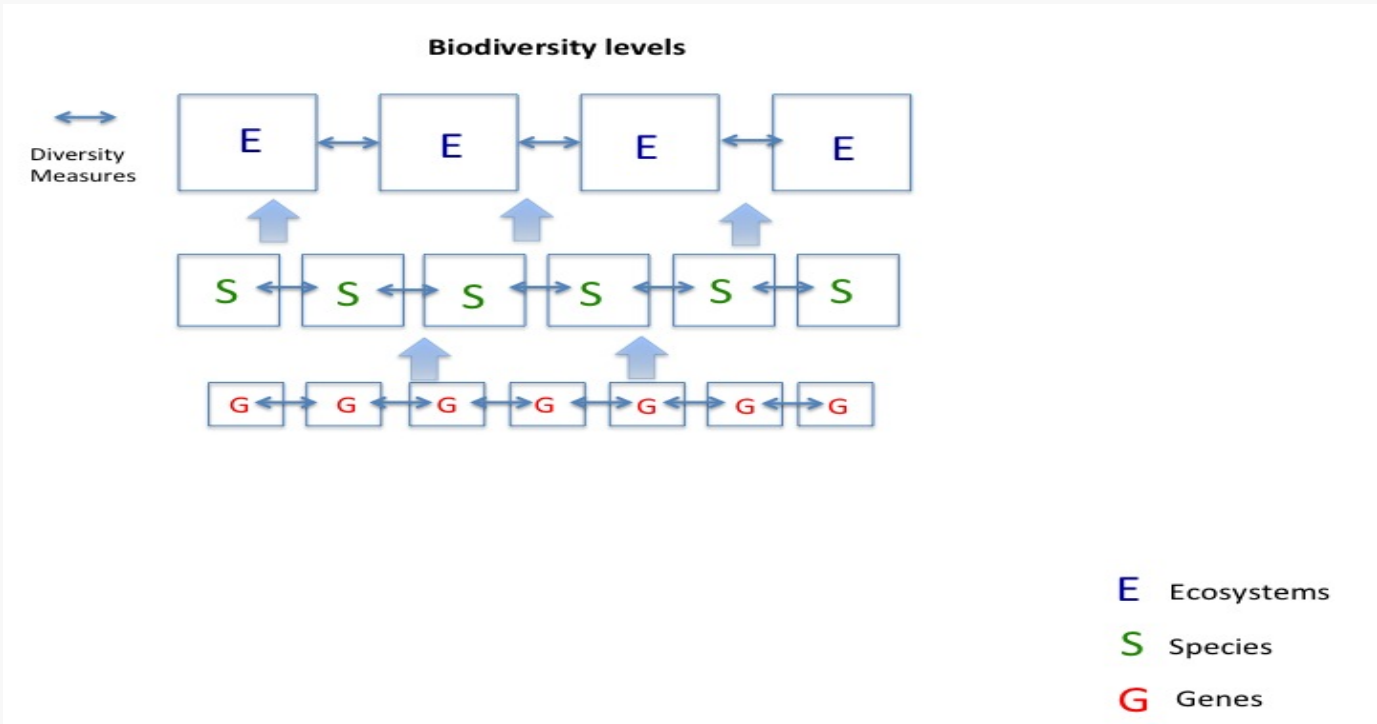
Definition of biodiversity

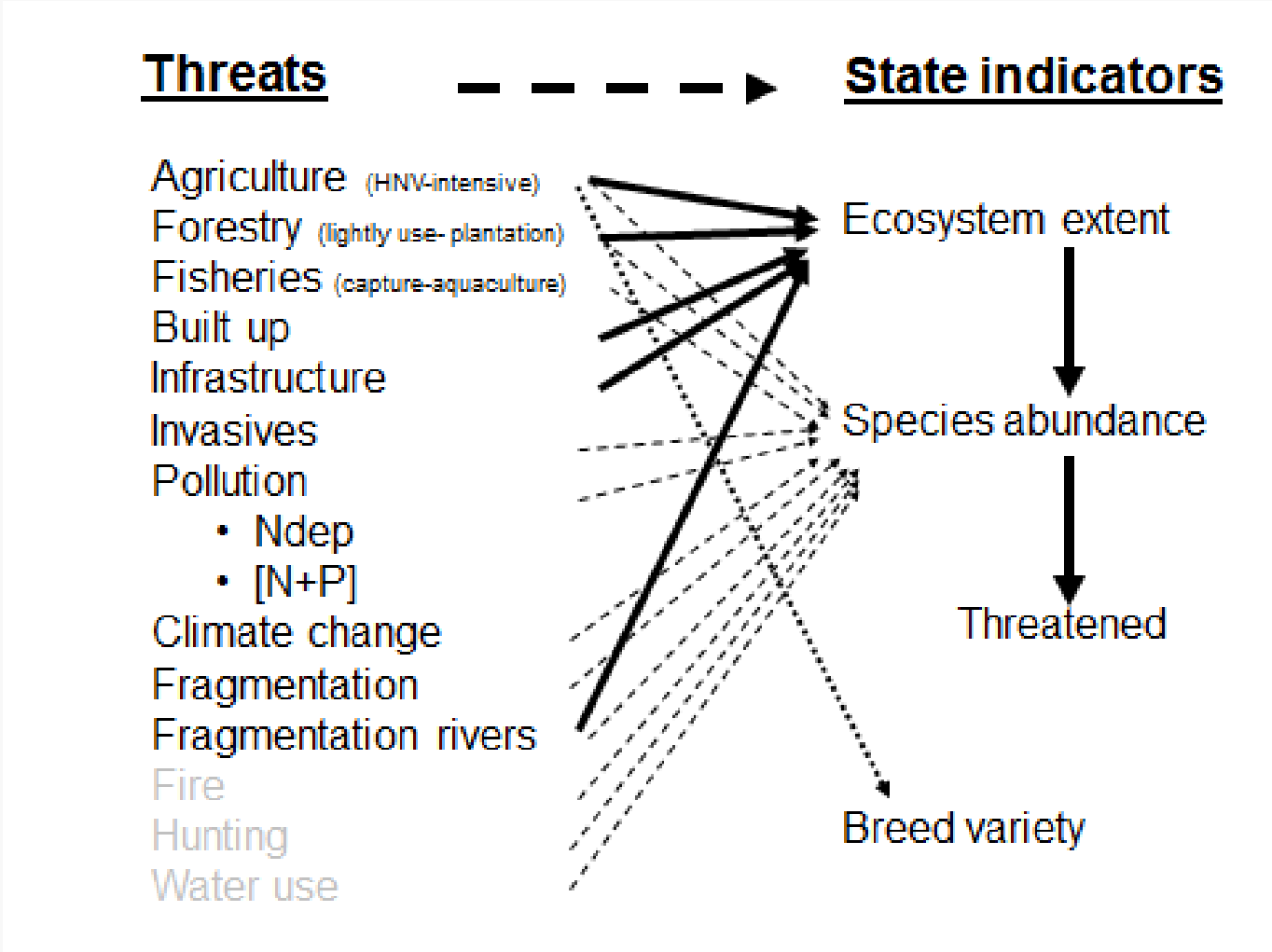
Biodiversity is defined as ‘the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, this includes diversity within species, between species and ecosystems’ (Secretariat of the Convention on Biological Diversity, 2003).



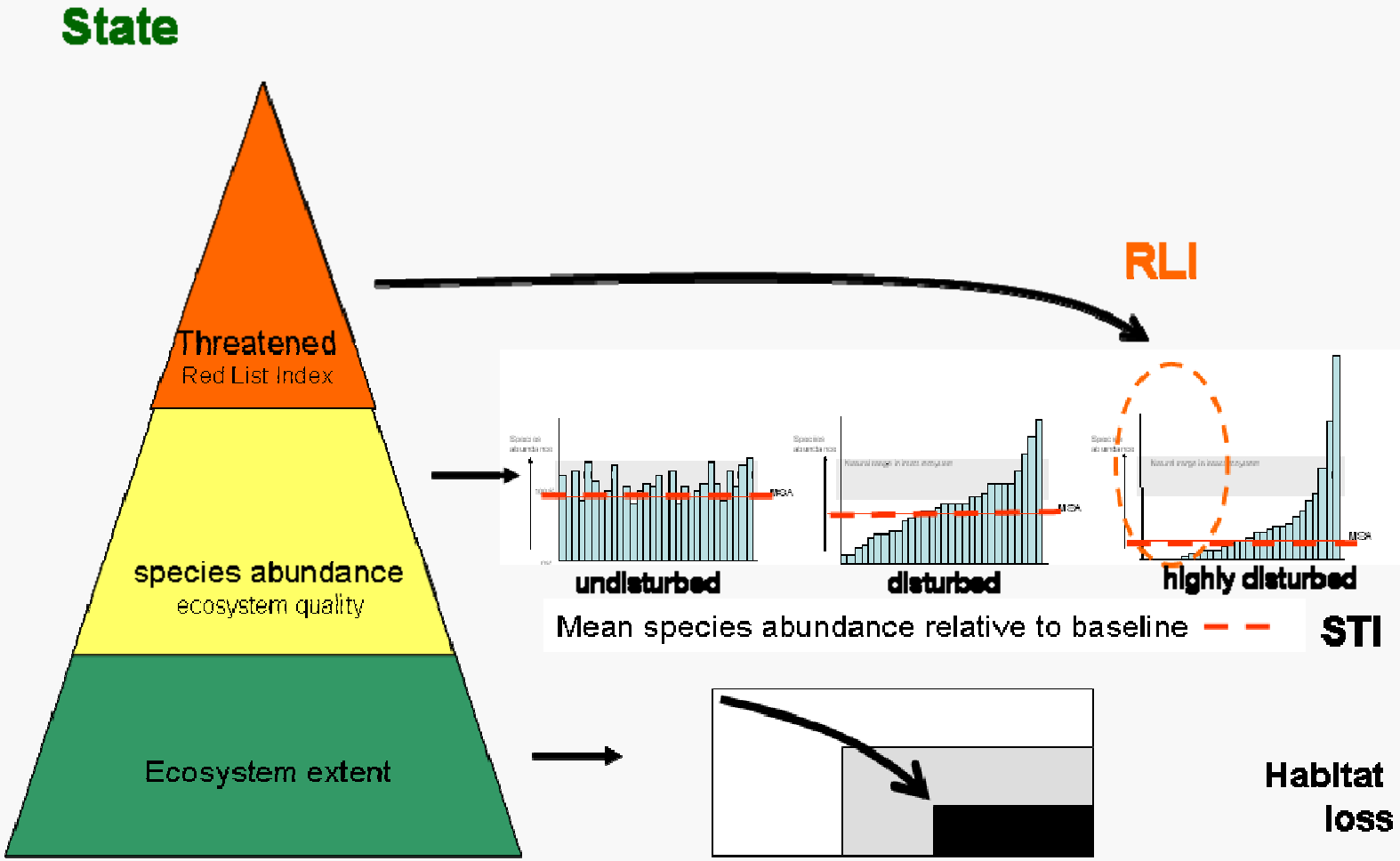
Biodiversity loss

- At ecosystem level, biodiversity loss is characterised by the conversion, reduction or degradation of ecosystems (or habitats). Generally as the level of human use of ecosystems increases, biodiversity loss increases.
- At species level, many original species originally occurring in a particular area will decrease in abundance while at the same time a few other, often opportunistic, species increase in abundance, as a result of human interventions.

State indicators for biodiversity and key drivers



Changes in biodiversity



Pvisional indicators for the state of biodiversity proposed by SBSTTA9 (subsiduary body of CBD)

- Trend in abundance and distribution of selected species
- Trend in status of threatened species
- Trend in extent of selected ecosystems
- Change in genetic diversity

SEEA priorities

- Trend in extent of selected ecosystems (land cover and land use accounts)
  - Changes in Nature types
  - Status and changes in Protected areas
  - Less impacted areas
- Trend in abundance and distribution of selected species (species abundance accounts)
- Trend in status of threatened species (species status accounts,)

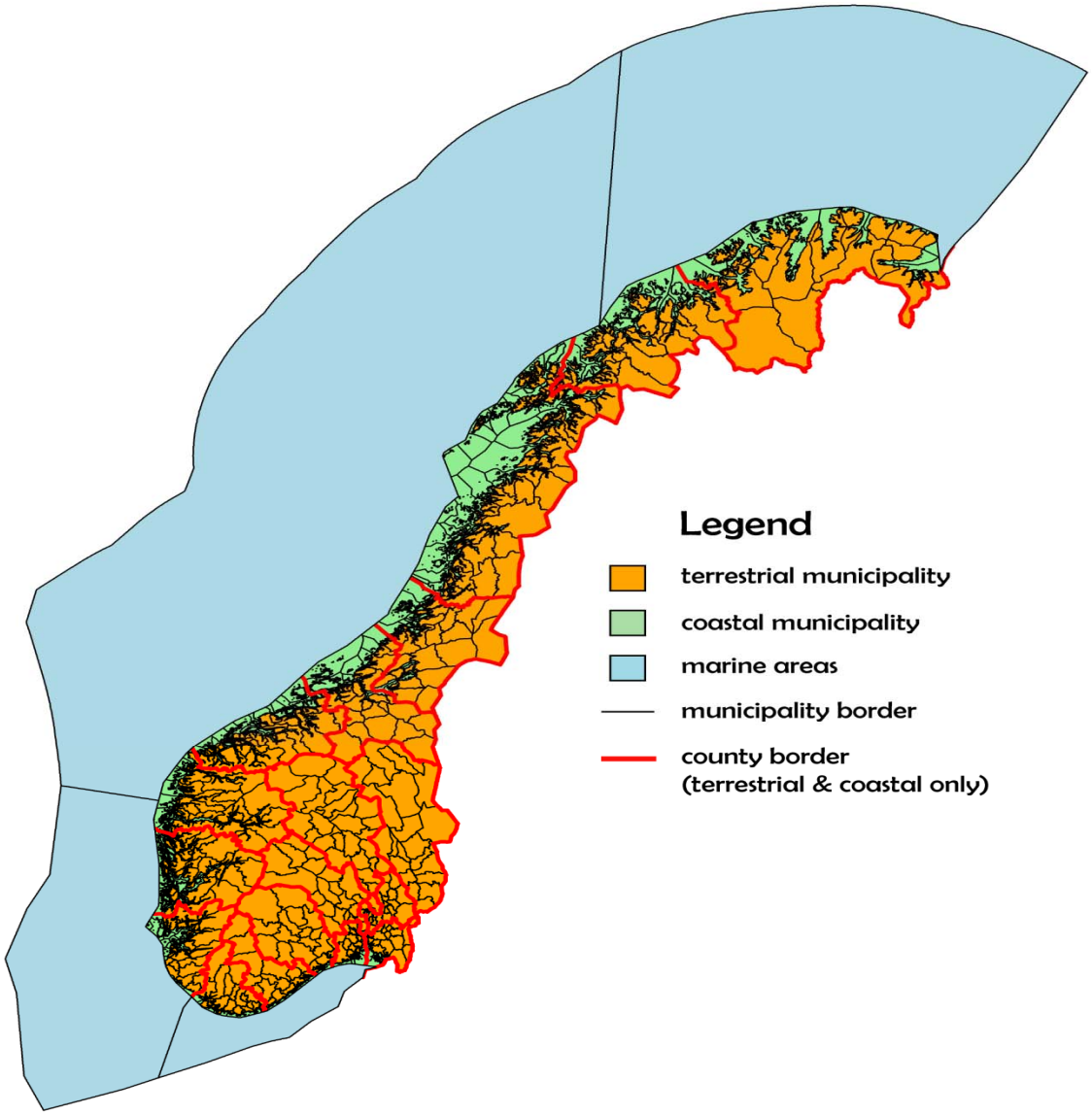
Meaasurement of species abundance

- Selection of species (All species cannot be included)
  - The selection should be taxonomiccally representative
  - Both common and rare species
  - All throphical levels should be reresented
  - Represent significant ecological processes
  - Responsive to different human impact factors
  - Represent different nature types, favouring habitat specialists
  - Represent different parts of a country
  - Proxies may represent important species or group of species
- Definition of a reference condition- stable and close to optimal/natural ecological condition
- Different physical measures

Species Abundance Accounts

EAU, 1,2, 3 ... n	Ecosystem type 1,2,3,,, n							
Representative Species	Reference Condition	Opening population	Changes in one year	closing population	Data sources	Model	Uncertainty measures	Key drivers and pressures
Mammals								
Birds								
Reptiles								
Amphibians								
Insects								
Fungi								
Protista								
Plants								

DIREKTORATET FOR NATURFORVALTNING



5 national research institutes + Statistics Norway
125 Researchers
Internet based data-collection
1950, 1990, 2000, 2010, 2020
309 indicators

$$NI_t = \sum_{ijk} S_{ijkt} W_{ijkt}$$

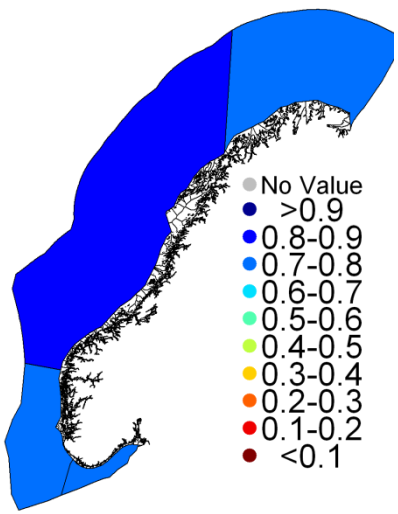
S = State
W= Weighted at trophic level
t= time
i= species
j= ecosystem
k= municipality, area

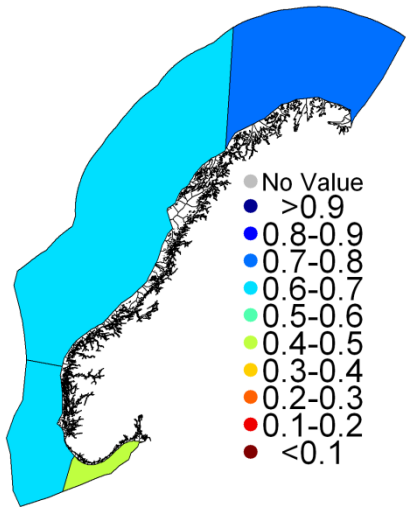
Uncertainty: 25 and 75 % quartiles

Marine ecosystems 2010

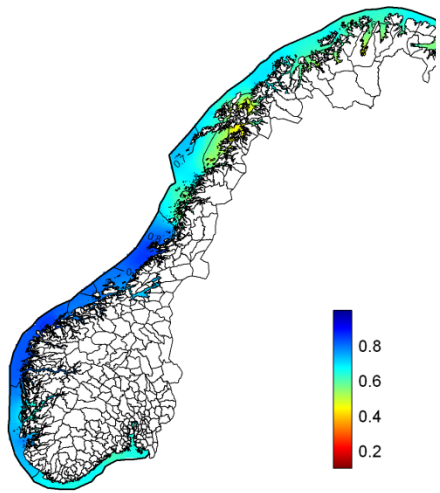
DIREKTORATET FOR NATURFORVALTNING

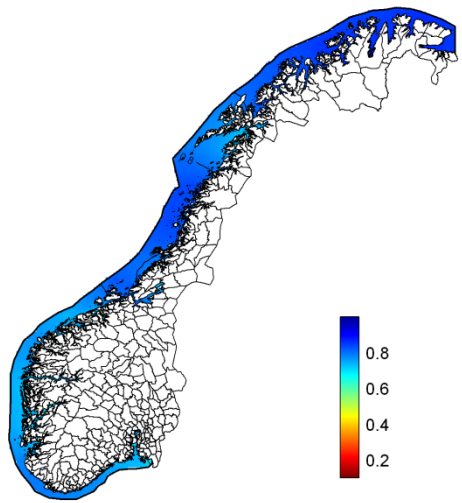
Sea bottom and pelagic





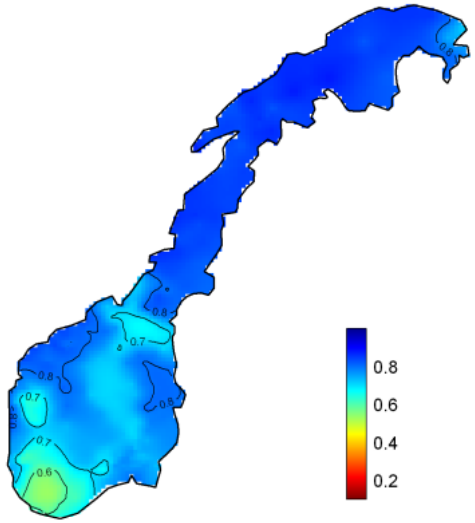
Coastal waters bottom and pelagic



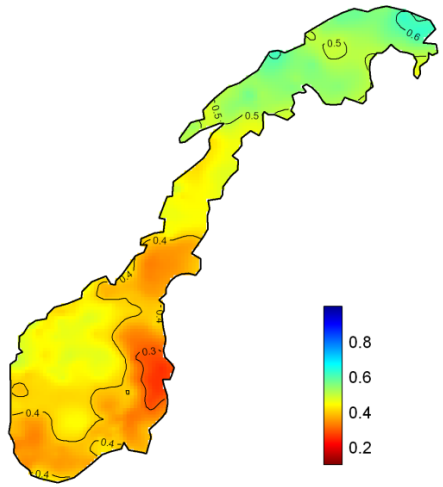


Terrestrial ecosystems

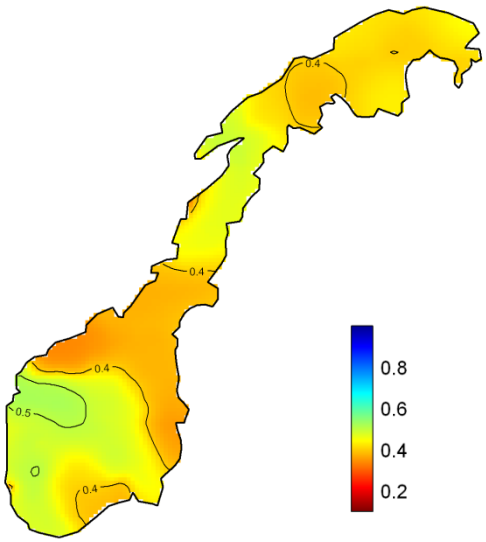
Freshwater



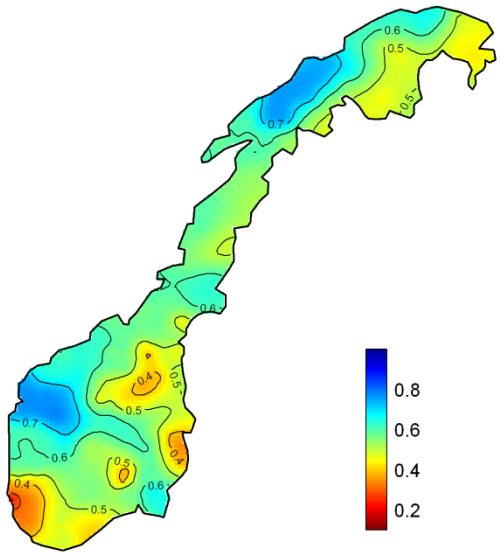
Open lowland



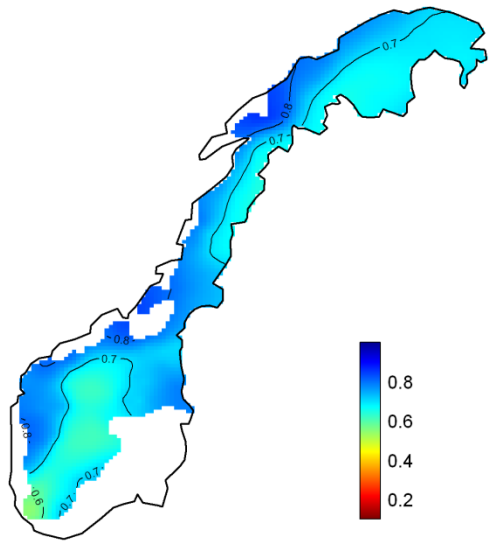
Forest



Marsh



Mountains



State of biodiversity 2010

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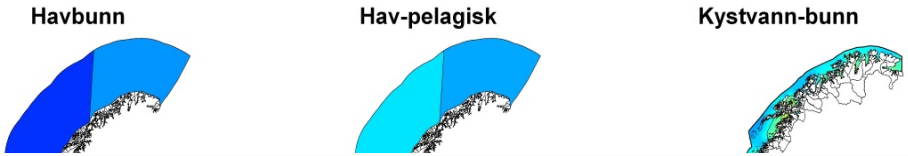
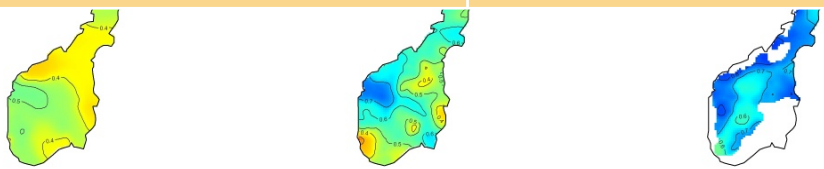
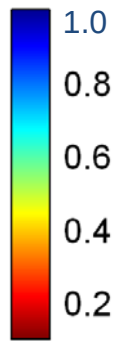


NI-values all Norway	Ecosystem
0,70-0,80	Sea bottom Coastal waters, pelagic Freshwater Mountains
0,60-0,69	Costal waters, bottom Sea, pelagic
0,50-0,59	Marsh
0,40-0,49	Open lowland Forests





% change from1990 to 2010

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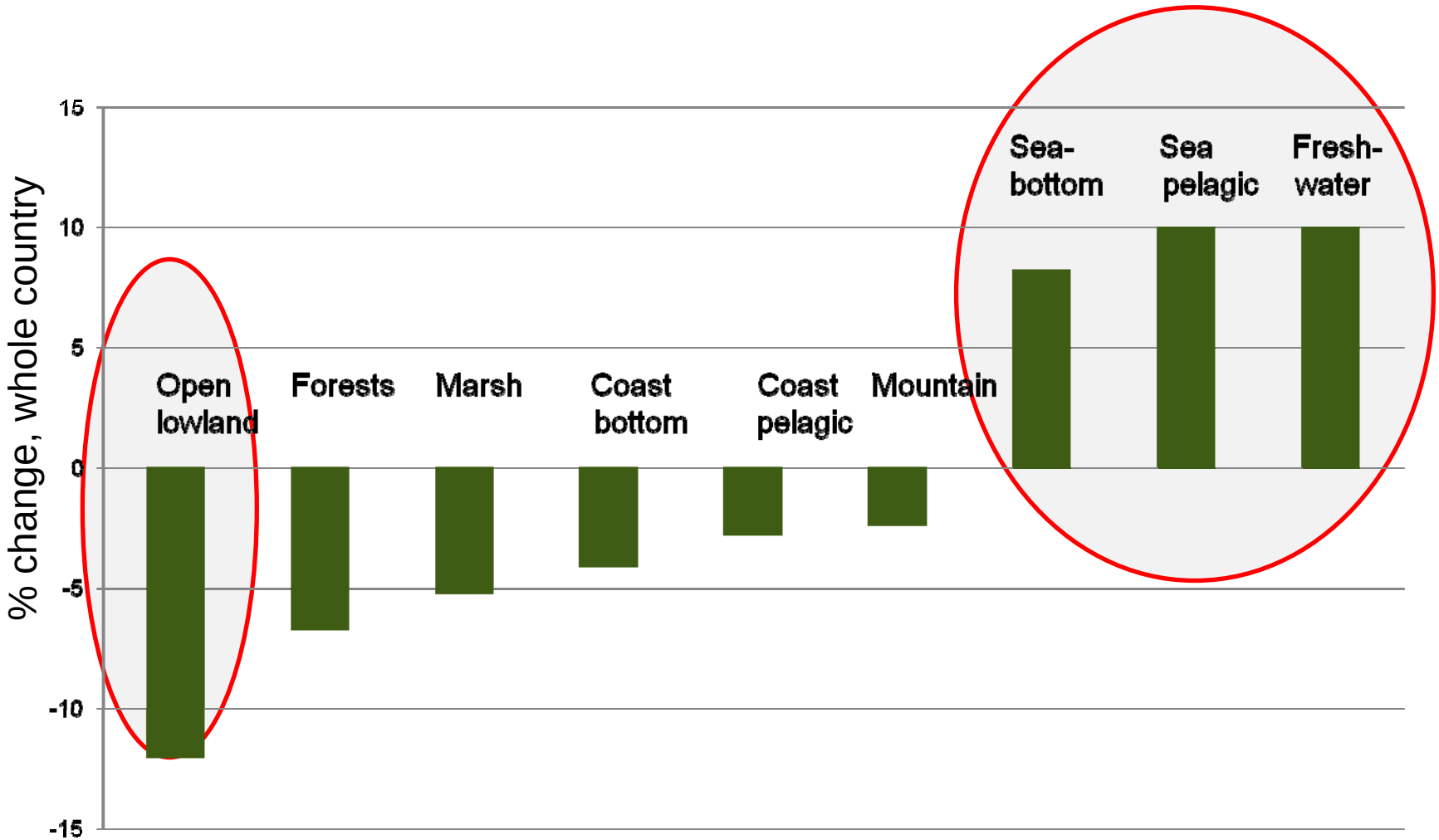

Nature Index

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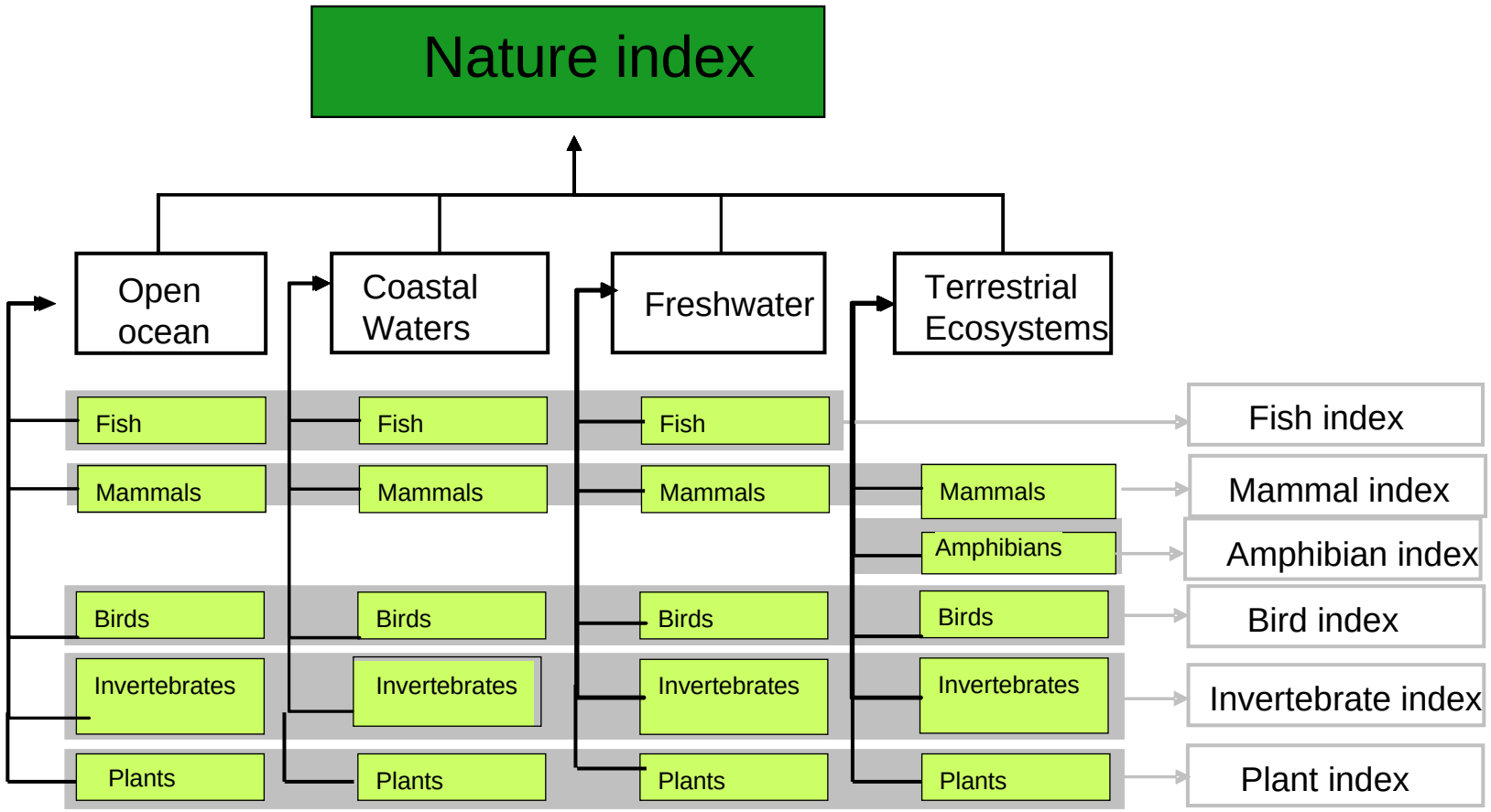

IUCN has in cooperation with most countries in the world established information on threatened species

This information which is updated regularely may be used in an accountiing system.

There are however some problems:
- The lover throphic levels are not repesented
- This type of account can only be made for large regions, often for the whole country

IUCN categories for species status

- **Extinct** is when there is no reasonable doubt that the last individual of a species has died; **Extinct in the wild** is when a taxon is known to only survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range;
- **Critically endangered** is when a taxon is considered to be facing an extremely high risk of extinction in the wild;
- **Endangered** is when a taxon is considered to be facing a very high risk of extinction in the wild;
- **Vulnerable** is when a taxon is considered to be facing a high risk of extinction in the wild; **Near Threatened** is when a taxon is close to qualifying for or is likely to qualify for a threatened category in the near future;
- **Least concern** is when a taxon is widespread and abundant;
- **Data deficient** or **Not evaluated**. Data deficient is when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status (data deficient is therefore not a category of threat). Not evaluated is when a taxon has not yet been evaluated against the IUCN threat criteria.
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Accounts for threatened species

	IUCN Red List categories									
	Extinct	Extinct in the wild	Critically endangered	Endangered	Vulnerable	Lower risk	Near threatened	Data deficient or not evaluated	Least concern	TOTAL
Opening stock										
Additions										
- from lower threat categories										
- from higher categories										
- discoveries of new species										
- rediscoveries of extinct species										
- reclassifications										
- updated assessments										
- new additions to list										
Total additions										
Reductions										
- to lower threat categories										
- to higher categories										
- reclassifications										

Earth from Saturn