

# Piloting Marine Ecosystem Accounting in Finland

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**MAIA**  
Mapping and Assessment for  
Integrated ecosystem Accounting

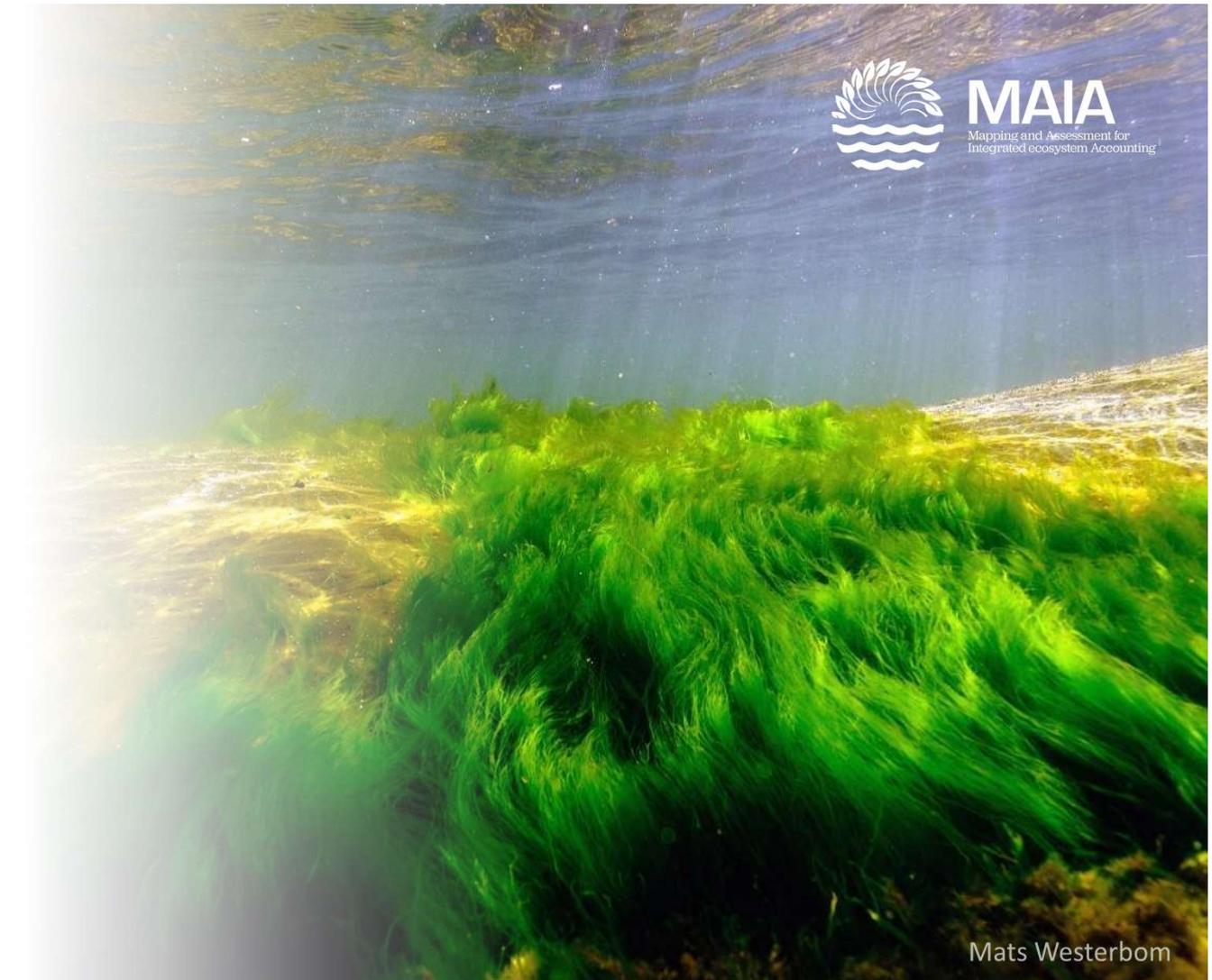


**MAIA Final Project Conference**  
September 21, 2022



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# Goal

to define, describe and quantify

- ✓ ecosystem extent
- ✓ ecosystem condition

→ Basic information for marine ecosystem accounting

# Approach



1) Define extent of key species and habitats



2) Determine condition of habitats & species

3) Determine **links** between species/habitats and ecosystem services (ES)

4) From 1-3, assess capacity of habitats & species to supply ES

# Challenge

The mosaic archipelago!

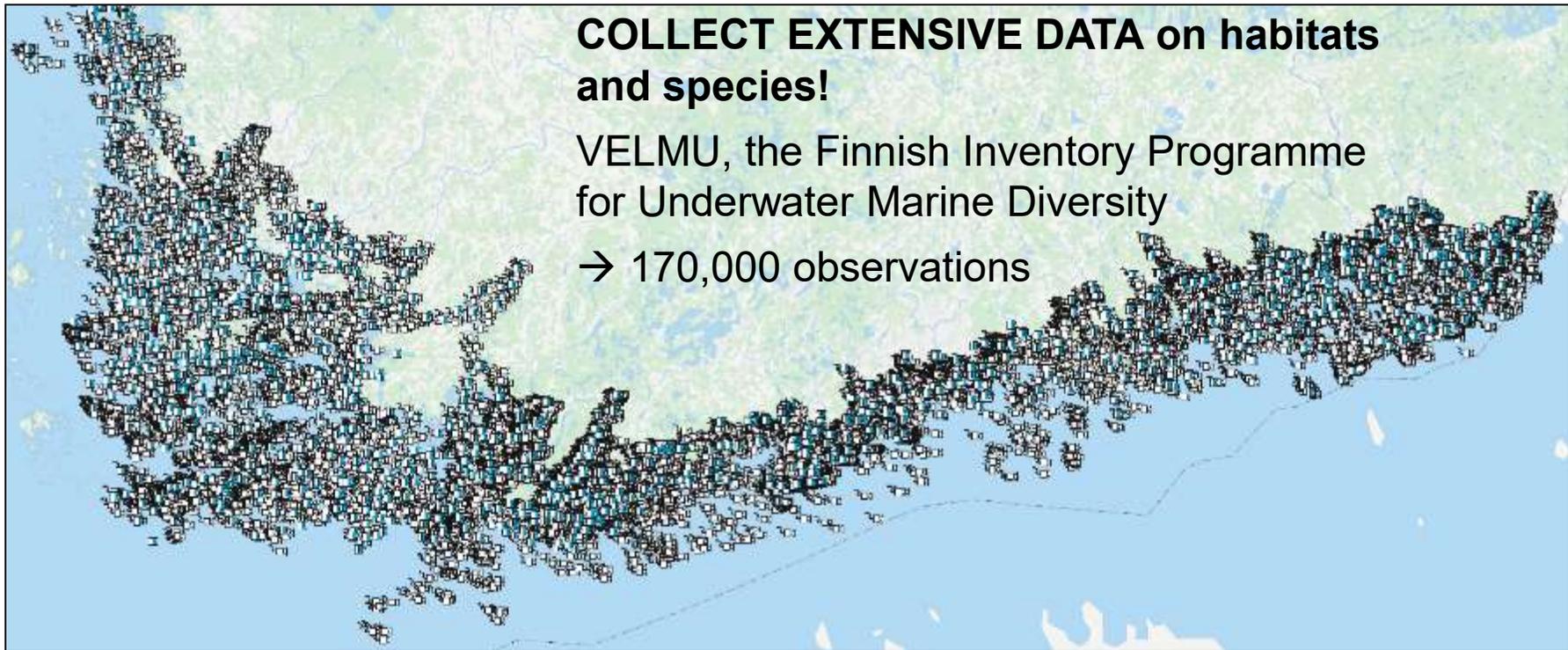


Archipelago Sea



Kvarken

# Solution



**COLLECT EXTENSIVE DATA on habitats and species!**

VELMU, the Finnish Inventory Programme for Underwater Marine Diversity

→ 170,000 observations



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# METHODS



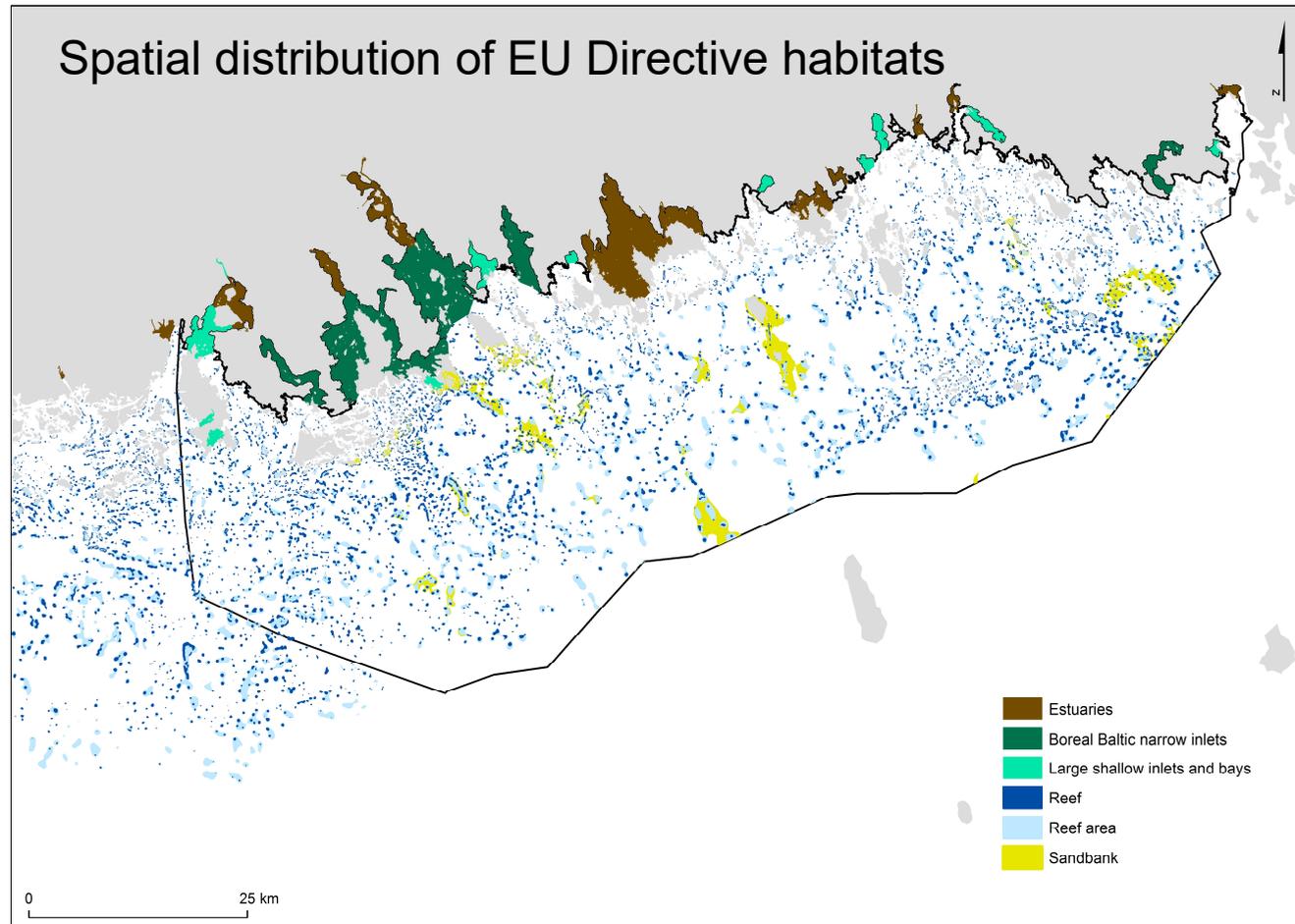


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# 1. Ecosystem extent

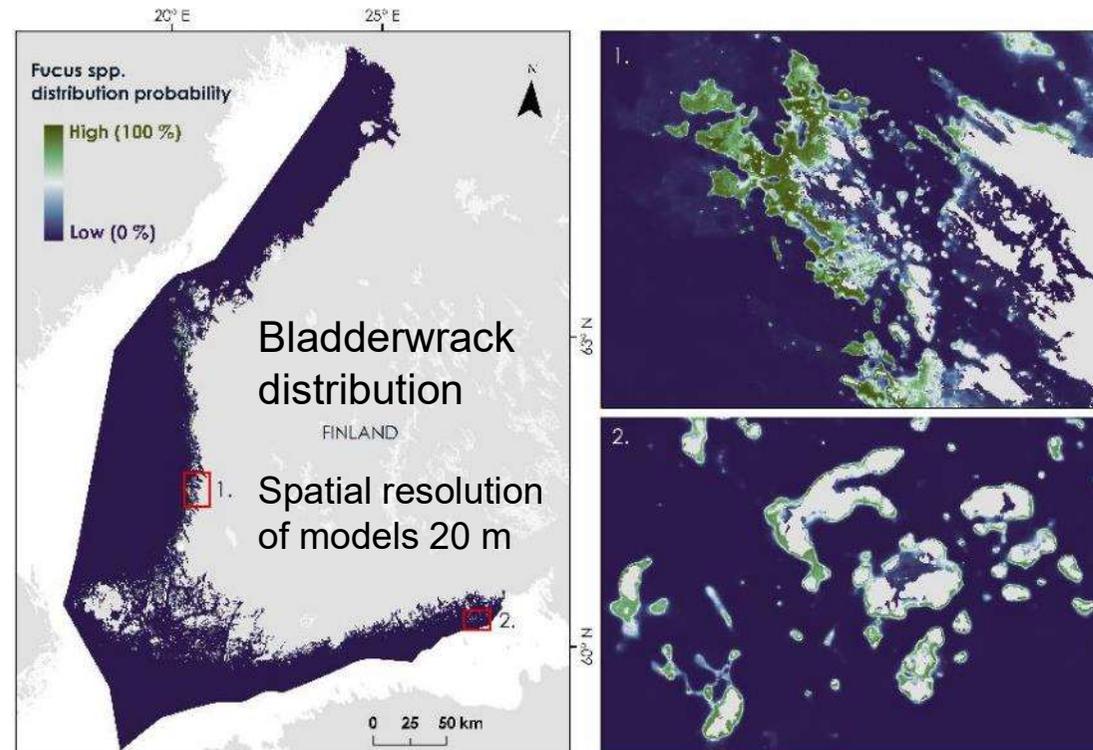
Photo: Mats Westerborn

## Spatial distribution of EU Directive habitats



## Spatial distribution of species

- Models developed for ~200 species
- Models already consider generic pressures, such as eutrophication, but not abrupt changes caused by human activities



Elina Virtanen, SYKE



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## 2. Ecosystem condition

Virtanen et al.; MAIA Final Project Conference 21.09.2022

Photo: Juuso Haapaniemi, Parks & Wildlife Finland

## Data on human activities on sea

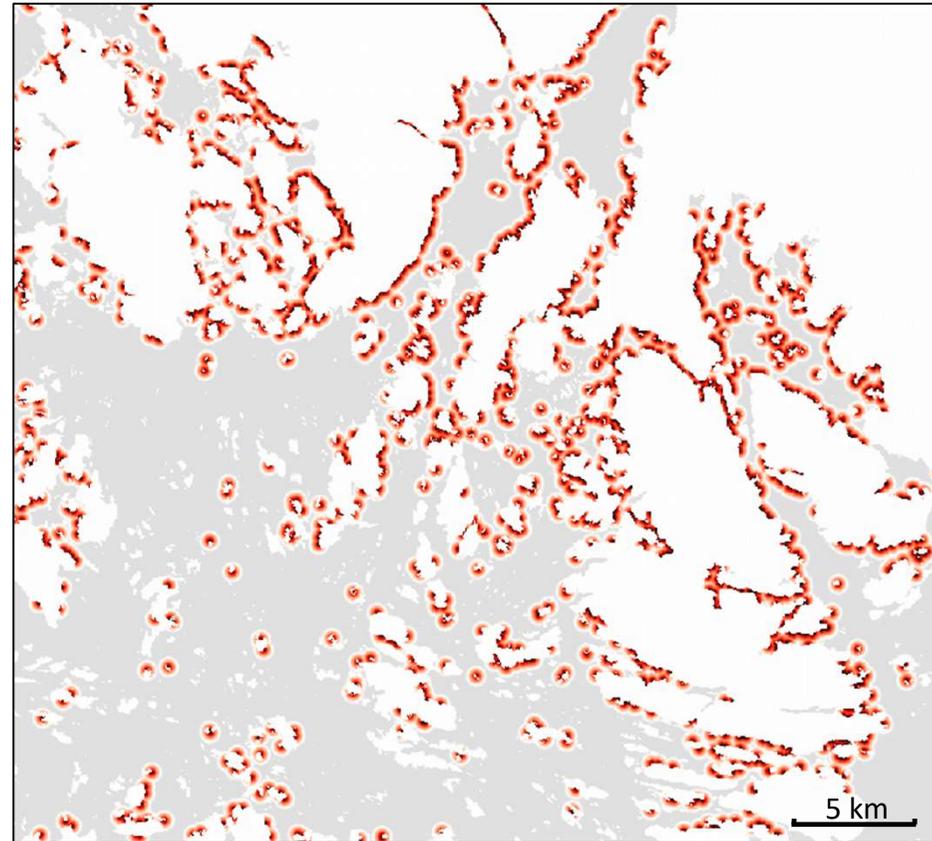
115,000 sites identified where human activities take place

- Human activities related to coastal development causing habitat loss and disturbance
- Pressures caused by these activities modify extent and condition of species and habitats



# An example of human activities causing pressures

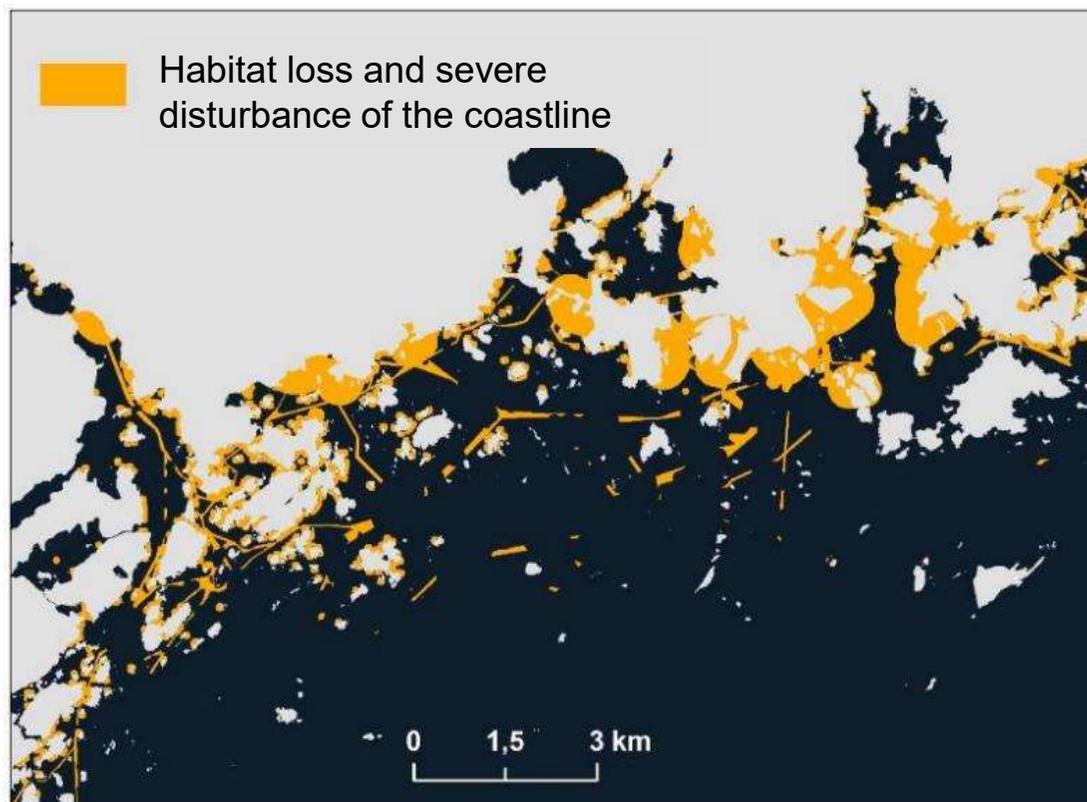
Small-scale dredgings in the Archipelago Sea, SW Finland



Data: Sahla et al. 2020; Kuismanen & Husa 2020. Graph: E. Virtanen, SYKE

# Determining ecosystem degradation

- The condition is reported for human activities which lead to **direct loss of habitats** listed in EU Habitats Directive (Annex I)
- **The loss of an area** is based on the average extent (m<sup>2</sup>) of the activity in question, estimated from aerial images
- Also, **level of disturbance** was estimated in an expert workshop where the impacts on habitats (and species) was assessed





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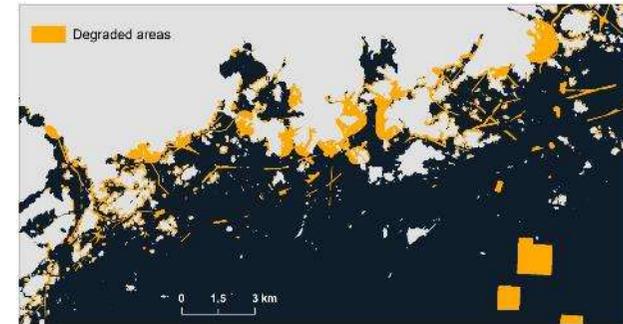
# Key results

Virtanen et al.; MAIA Final Project Conference 21.09.2022

Photo: Jon Ögård, Parks & Wildlife Finland

# Condition

= Extent of degraded habitats



	Total sea area, km <sup>2</sup>	Total extent of EU habitats, km <sup>2</sup> (% of marine areas)	Extent of degraded habitats, km <sup>2</sup> (% of total extent of EU habitats)	Extent of habitats <u>not</u> degraded, km <sup>2</sup> (% of marine areas)
<b>EU Habitats Directive Annex I habitats</b>	81,700 km <sup>2</sup>	5477 km <sup>2</sup> (6,7 %)	162 km <sup>2</sup> (3 %)	5315 km <sup>2</sup> (6,5 %)

*E. Virtanen, SYKE*



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# Conclusion

The potential of the marine ecosystem to produce ecosystem benefits can be determined from the amount of habitats and species that are NOT severely degraded or disturbed

Approach allows to set targets for ecosystem condition, to safeguard provision of ecosystem benefits

Thank You



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*<http://maiaportal.eu/>*

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