Marine remote sensing, conservation and restoration

6th Natura 2000 Monitoring Workshop

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2025-09-25

SeaMoreEco

Interreg Aurora

Co-funded by the European Union

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Restoration actions

- Removing invasive waterweed (*Elodea canadensis*) using various methods
- Cultivation and planting of Baltic water-plantain (*Alisma wahlenbergii*)
- Cultivation and DNA-analysis of Swedish Fourleaf mare's-tail (*Hippuris tetraphylla*) in Oulu University Botanical Garden
- Planting of Coral stonewort (*Chara tomentosa*)
- Habitat restoration of Pendant grass (*Arctophila fulva*)
- Lagoon threshold restoration
- Plugging a ditch into a lagoon
- Hiking trail renovation

Marine remote sensing for mapping and monitoring

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Test methods for full mapping of a seacape

Images

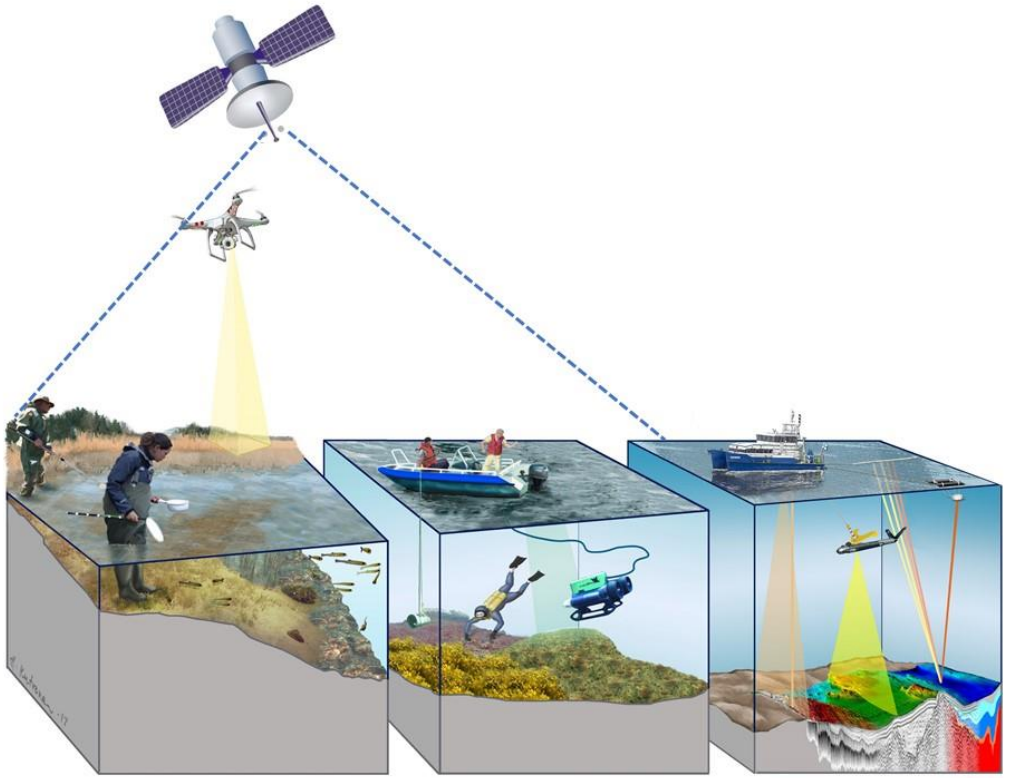
→ Satellite

→ Drone

Active sensors

→ Multibeam from boat and drone

→ Green Lidar from drone



Remote sensing with drones imagery

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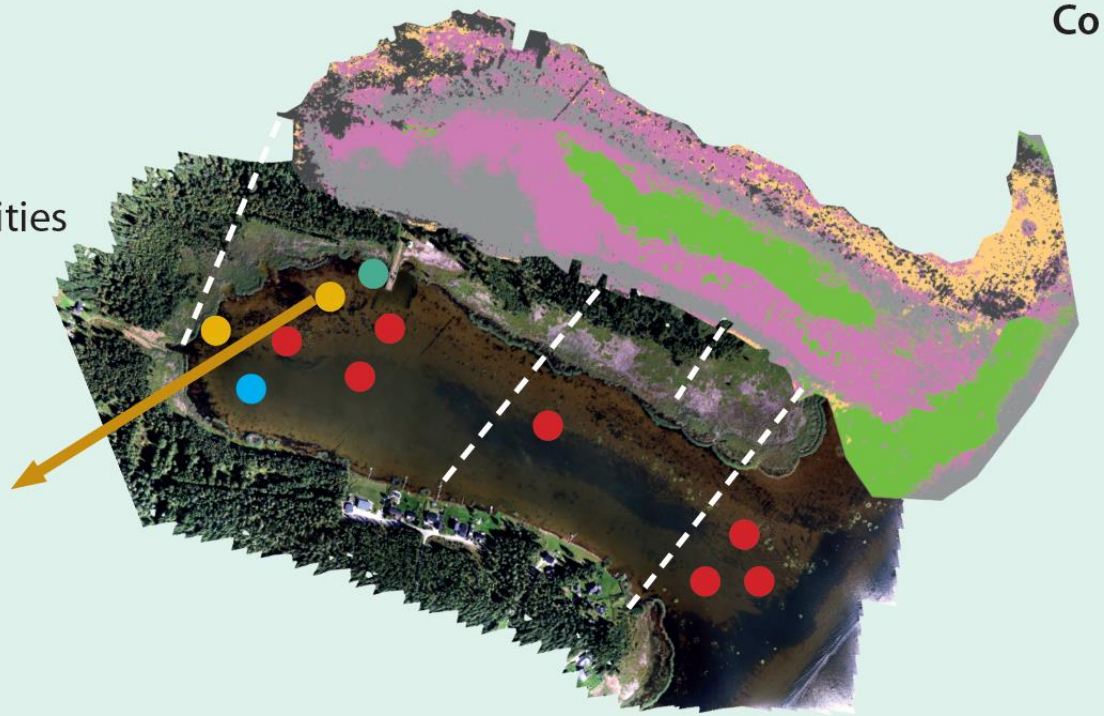
Common methdology for drone monitoring

- Bare substrate
- Eleocharis/Sagittaria communities
- Water moss
- Mixed vegetation
- Water weed (Elodea)

Invasive alien plant species
e.g. water weed (Elodea)

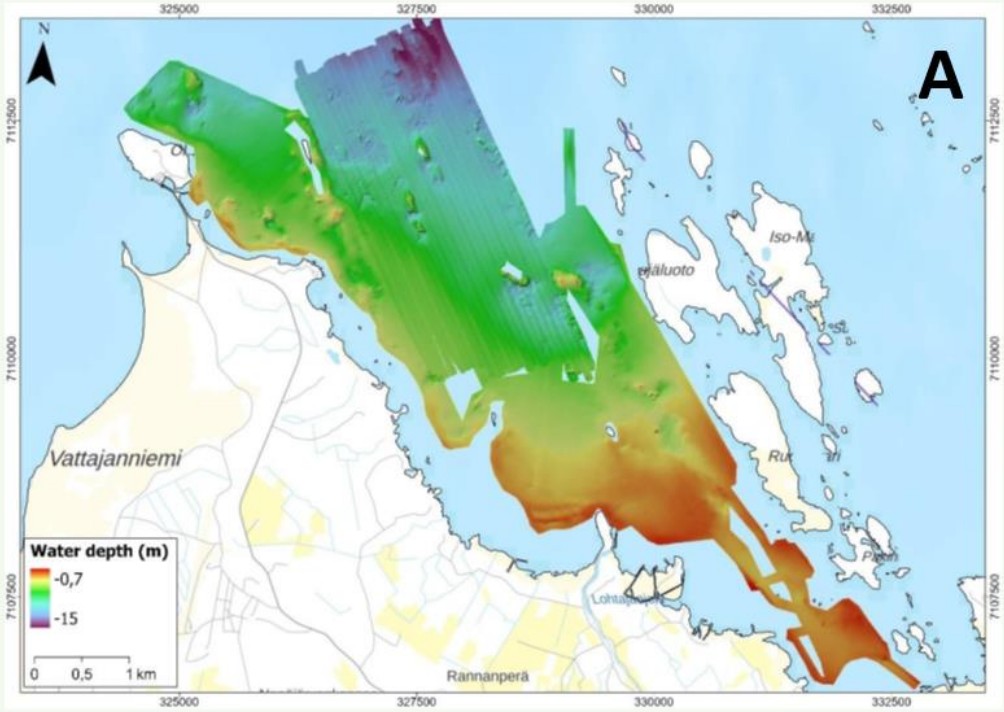
Restoration efforts e.g.
Physical removal
Covering experiment

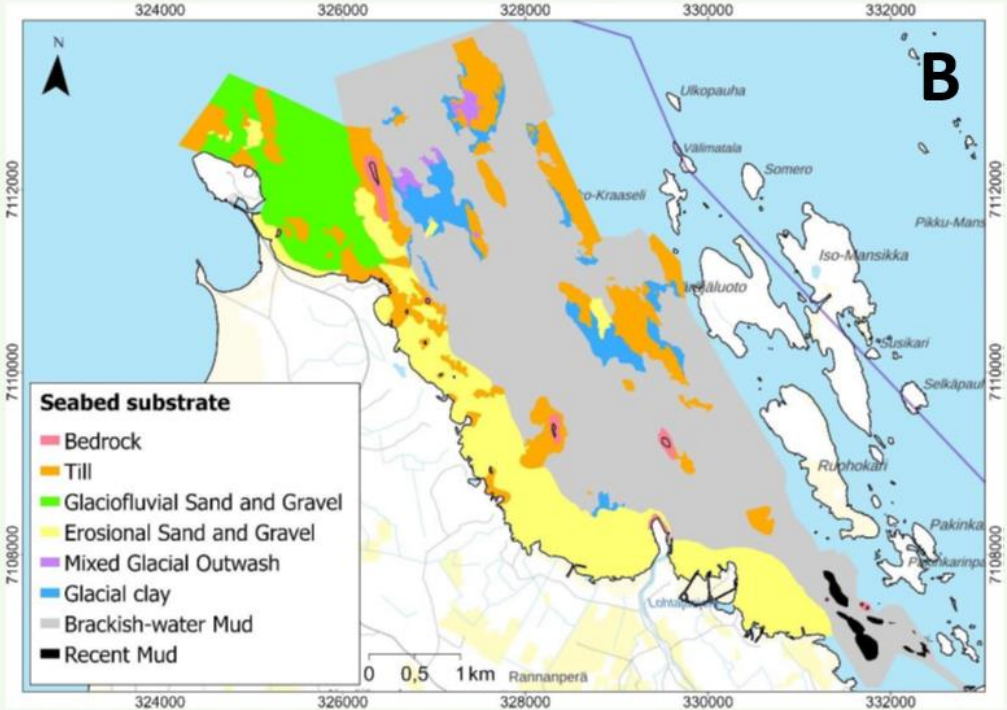


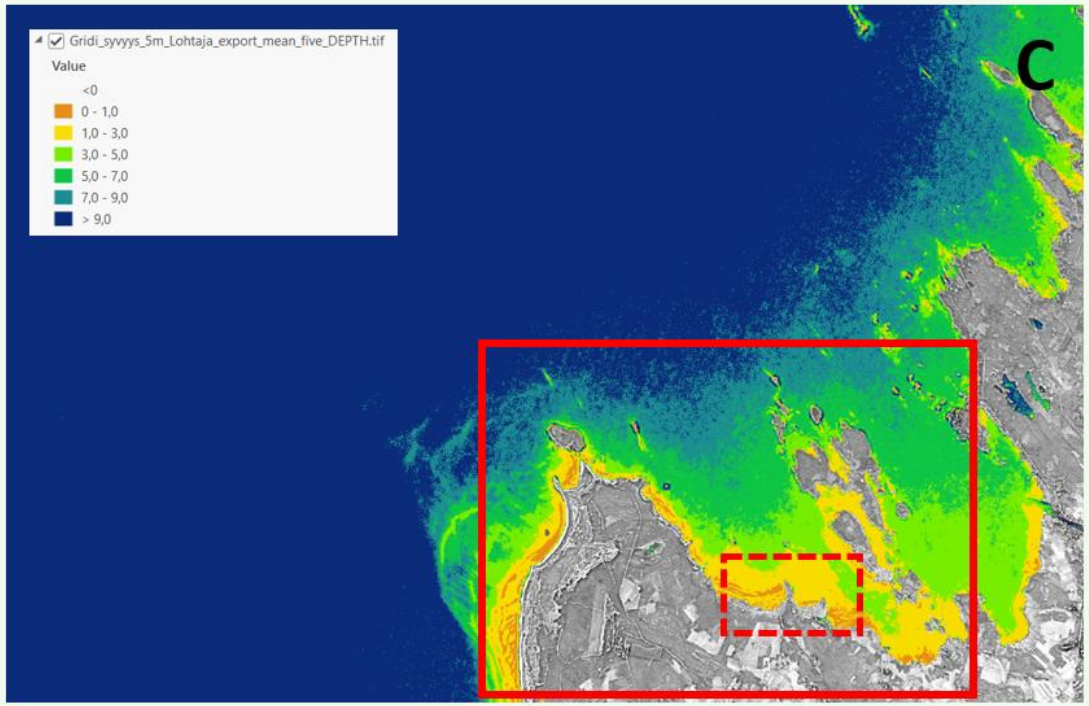
Common monitoring methodology

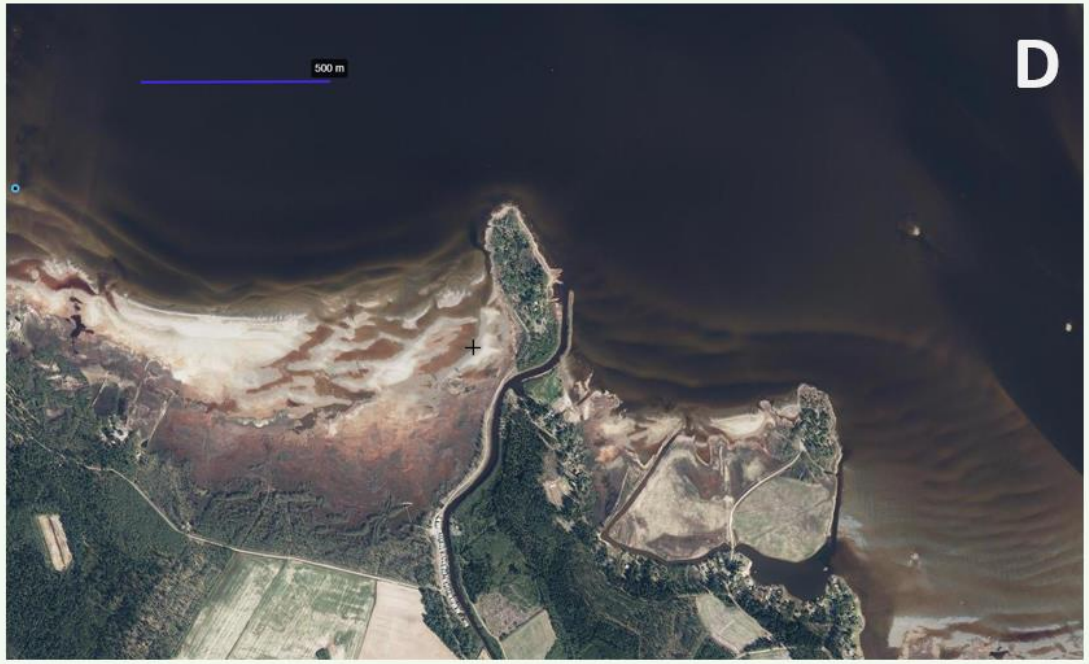
Endangered species e.g.
- Chara braunii
- Potamogeton compressus
- Potamogeton friesii
- Persicaria foliosa

Restoration efforts e.g.
Translocation
Planting
Clearing of competing species


A
Vattajanniemi
Rannanperä
Water depth (m)
-0,7
-15
0
0,5
1 km


B
Ulkopauha
Välimatala
Somero
Iso-Mansikka
Ruohokari
Rannanperä
Seabed substrate
Bedrock
Till
Glaciofluvial Sand and Gravel
Erosional Sand and Gravel
Mixed Glacial Outwash
Glacial clay
Brackish-water Mud
Recent Mud
0
0,5
1 km


C
Gridi_syvyys_5m_Lohtaja_export_mean_five_DEPTH.tif
Value
<0
0 - 1,0
1,0 - 3,0
3,0 - 5,0
5,0 - 7,0
7,0 - 9,0
> 9,0


D
500 m

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Climarest

Habitat: Arctic Fjords
Demo Site 1: Svalbard
Replication Site: Sweden

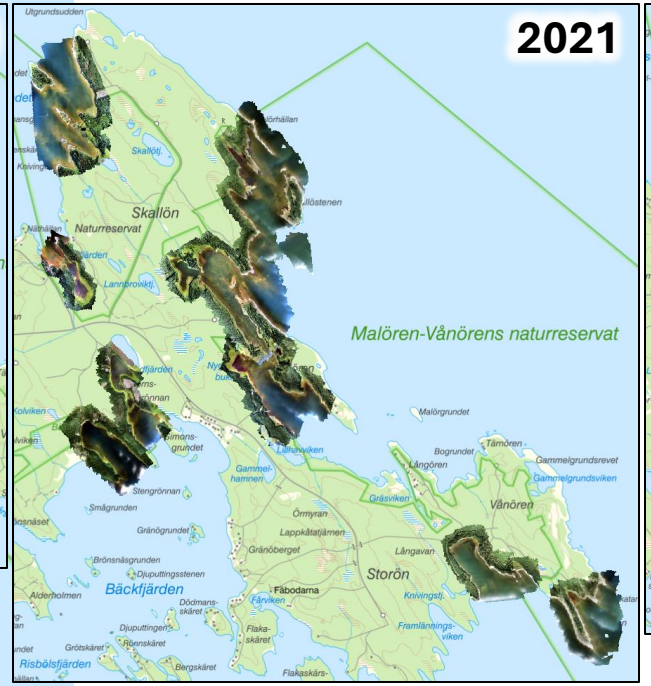
Habitat: Seagrass meadows
Demo Site 2: Ireland
Replication Site: Greece

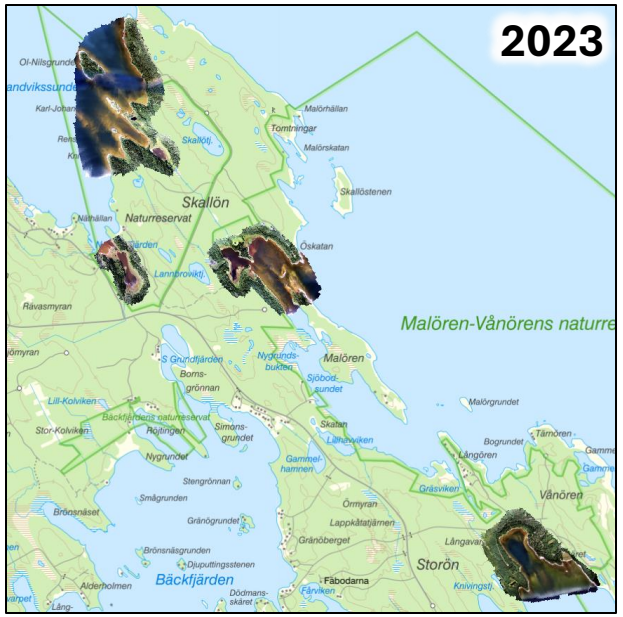
Habitat: Oyster reefs
Demo Site 3: France
Replication Site: Germany

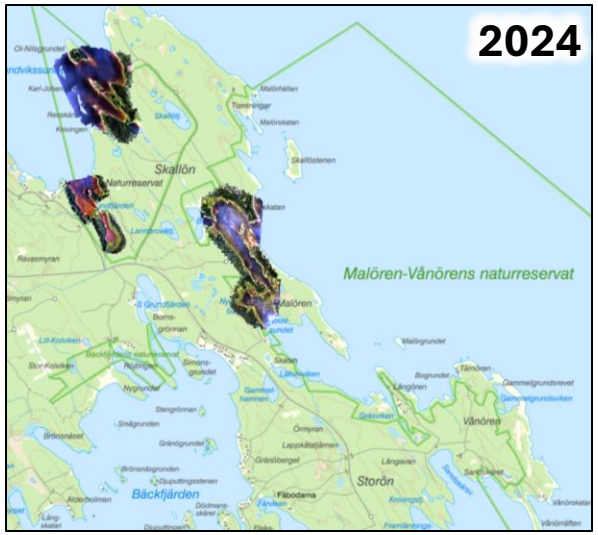
Habitat: Sedimentary soft-bed ecosystems
Demo Site 4: Spain
Replication Site: Croatia

Habitat: Rocky substrates
Demo Site 5: Portugal
Replication Site: Cyprus

Detection of waterweed (Elodea = invasive species)



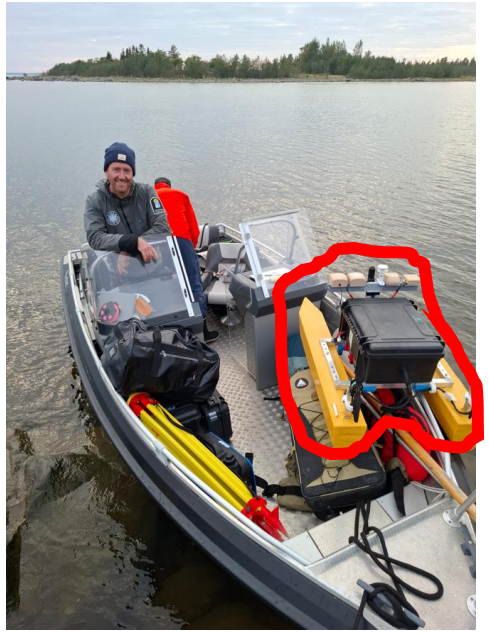


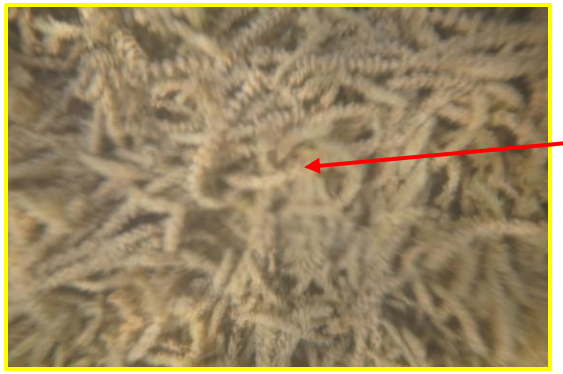


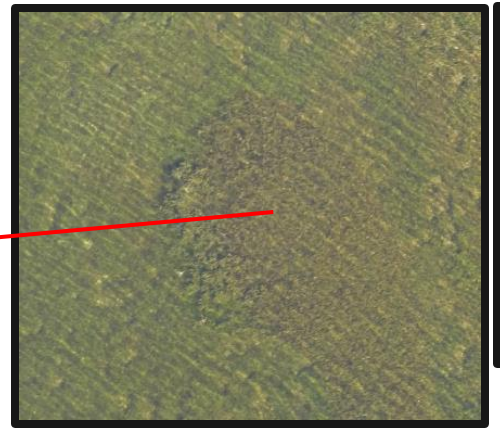
Plan

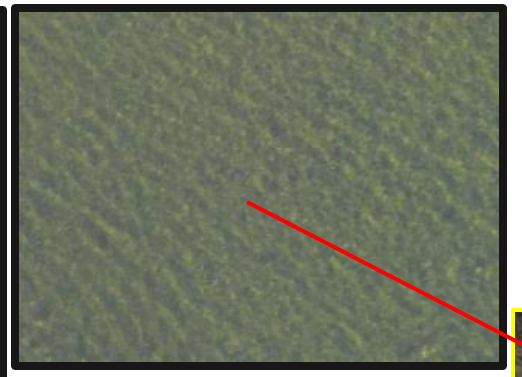
- Define potentially areas for presence of Elodea★
- Fly with drone
- Photointerpretation of possible areas with Elodea
- Fly with drone and verify

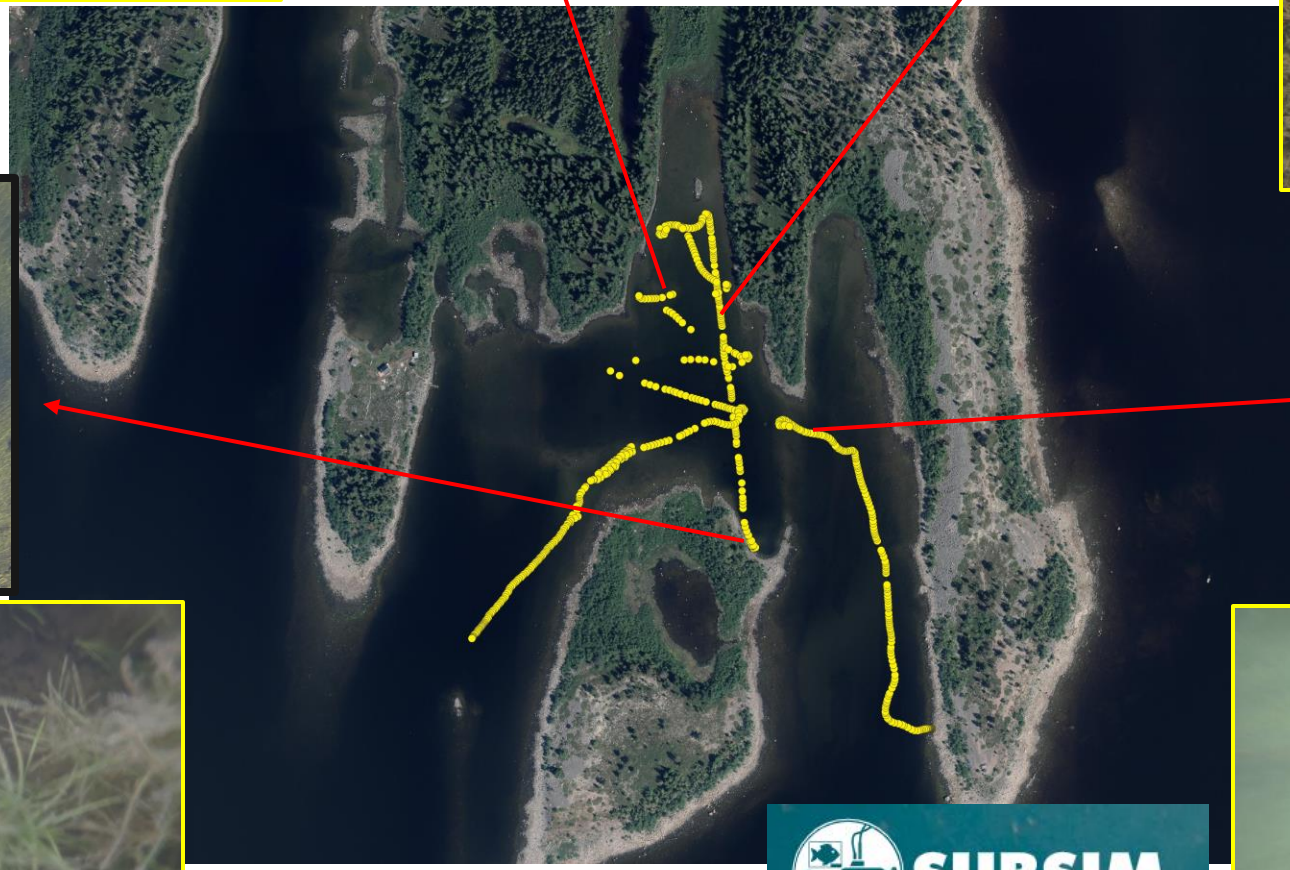
Cost effective, time effective and automatization











CLIMAREST

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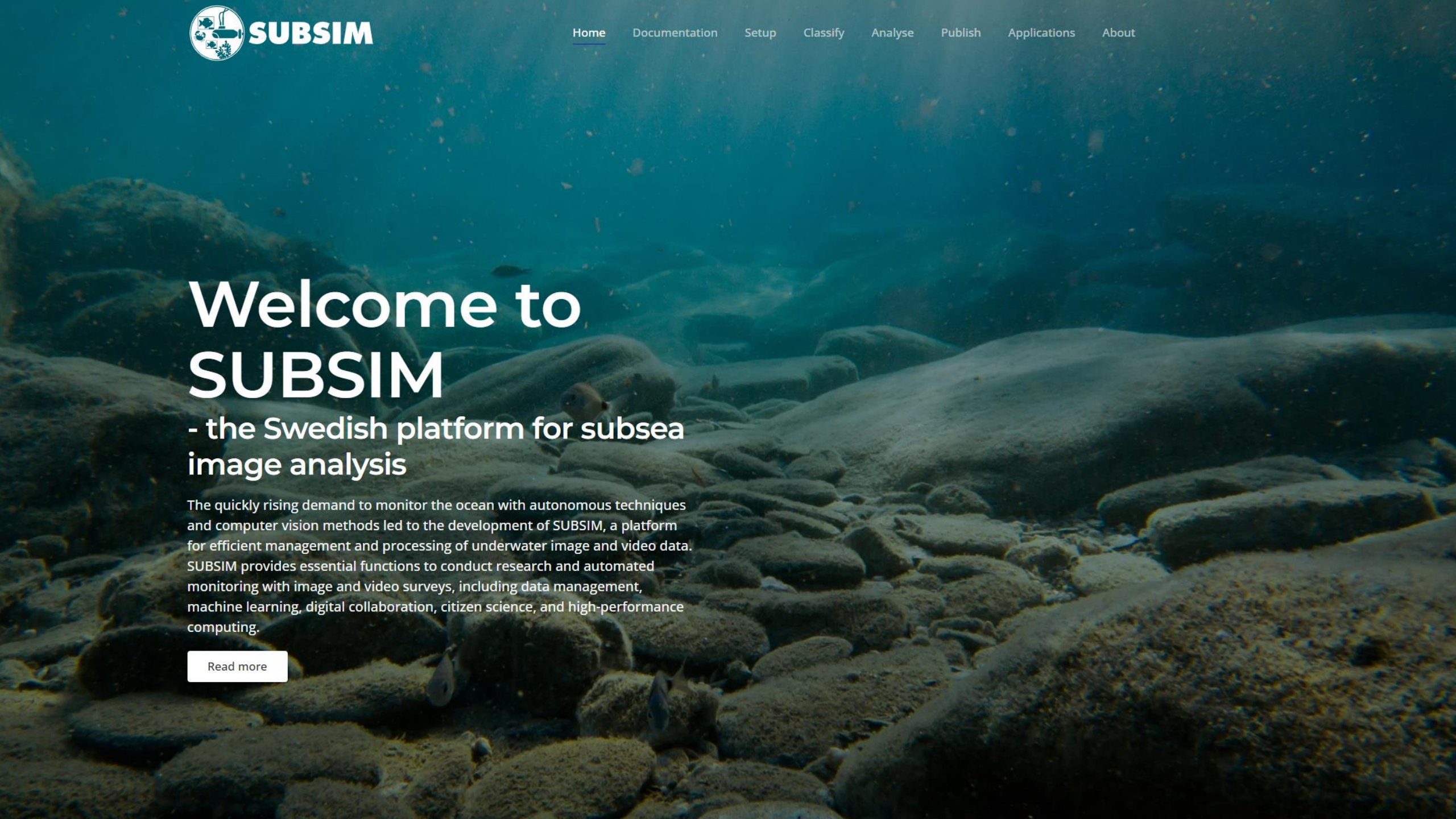
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About
Welcome to SUBSIM
- the Swedish platform for subsea image analysis
The quickly rising demand to monitor the ocean with autonomous techniques and computer vision methods led to the development of SUBSIM, a platform for efficient management and processing of underwater image and video data. SUBSIM provides essential functions to conduct research and automated monitoring with image and video surveys, including data management, machine learning, digital collaboration, citizen science, and high-performance computing.
Read more

Useful results from SeaMoreEco, Climarest and MaFa

→E-protocols (Survey 123)

→Manuals:

-How to fly a drone for mapping marine shallow areas

-Analyse drone images with help of AI-based methods (ArcGIS Pro and Qgis)

→ Translate reference data to Helcom habitat (python script)

Questions?

More information:
SeaMoreEco.se
Final seminar 20 November in Umeå/online

Climarest.eu