European Pavilion
Digital Ocean
Nice | France
2 - 13 JUNE 2025

Posidonia mapping across the Mediterranean

09-06-2025

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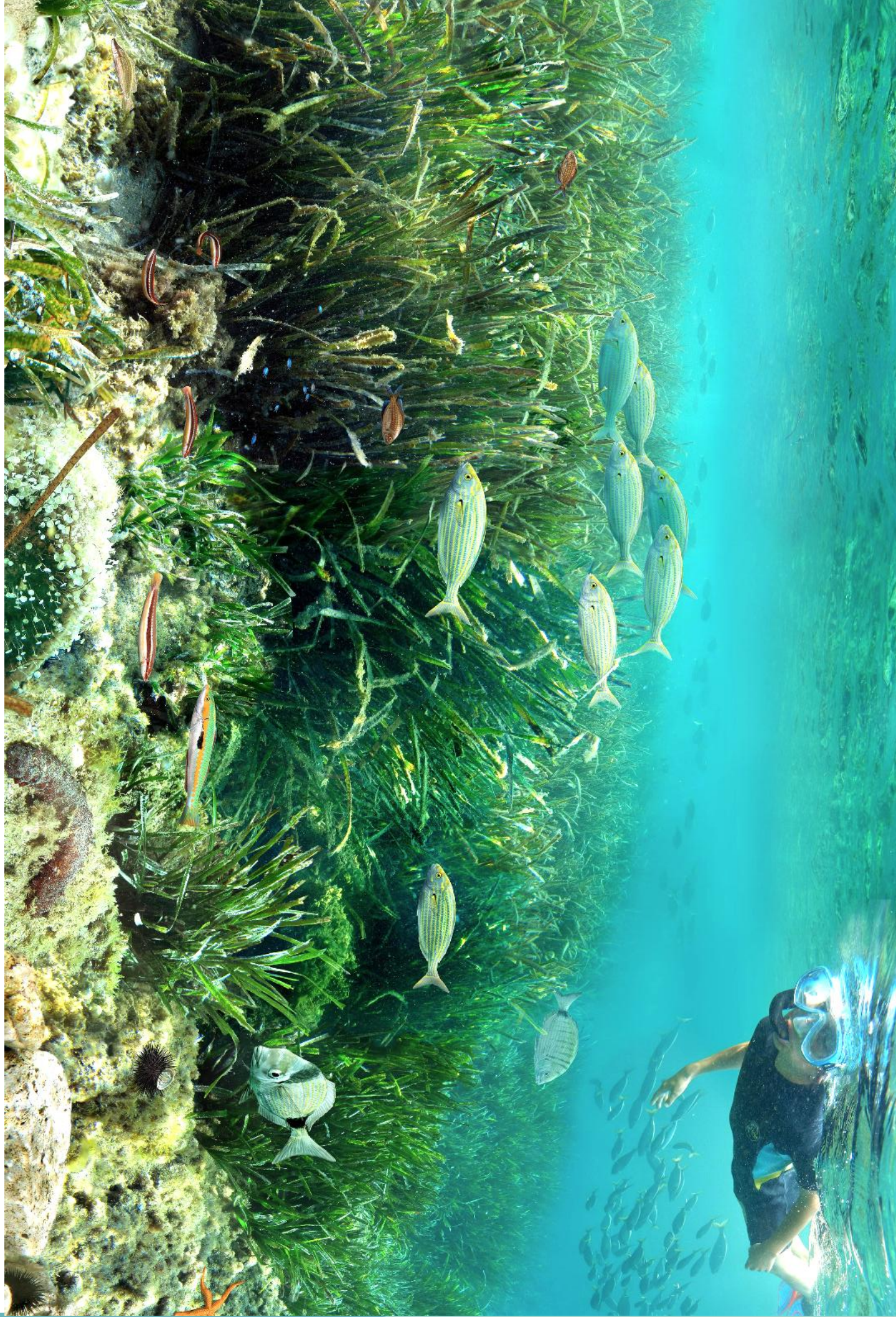

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ANCHORS – CHAINS- IMPACTS

One of the main threats to *Posidonia oceanica* meadows is anchoring by recreational boats. The problem is made worse by the lack of accurate and accessible maps showing where seagrass is located.

Mediterranean Posidonia Network

Develop financing mechanisms
by 2030 to finance priority action sites

Develop low-impact moorings by 2030:
1,000 moorings for small and large yachts in priority action sites

Support the implementation of European regulations
prohibiting large ships from anchoring in meadows, in particular on the north-western shore of the Mediterranean

Complete the mapping of Posidonia
and in the southern shore countries

Stakeholder engagement and raising awareness
so that meadows are recognised on the same level as coral reefs and mangroves

Identify and map the main pressures
threatening Posidonia all across the Med including pollution, anchoring, fishing activities and urbanisation

MEDITERRANEAN POSIDONIA NETWORK

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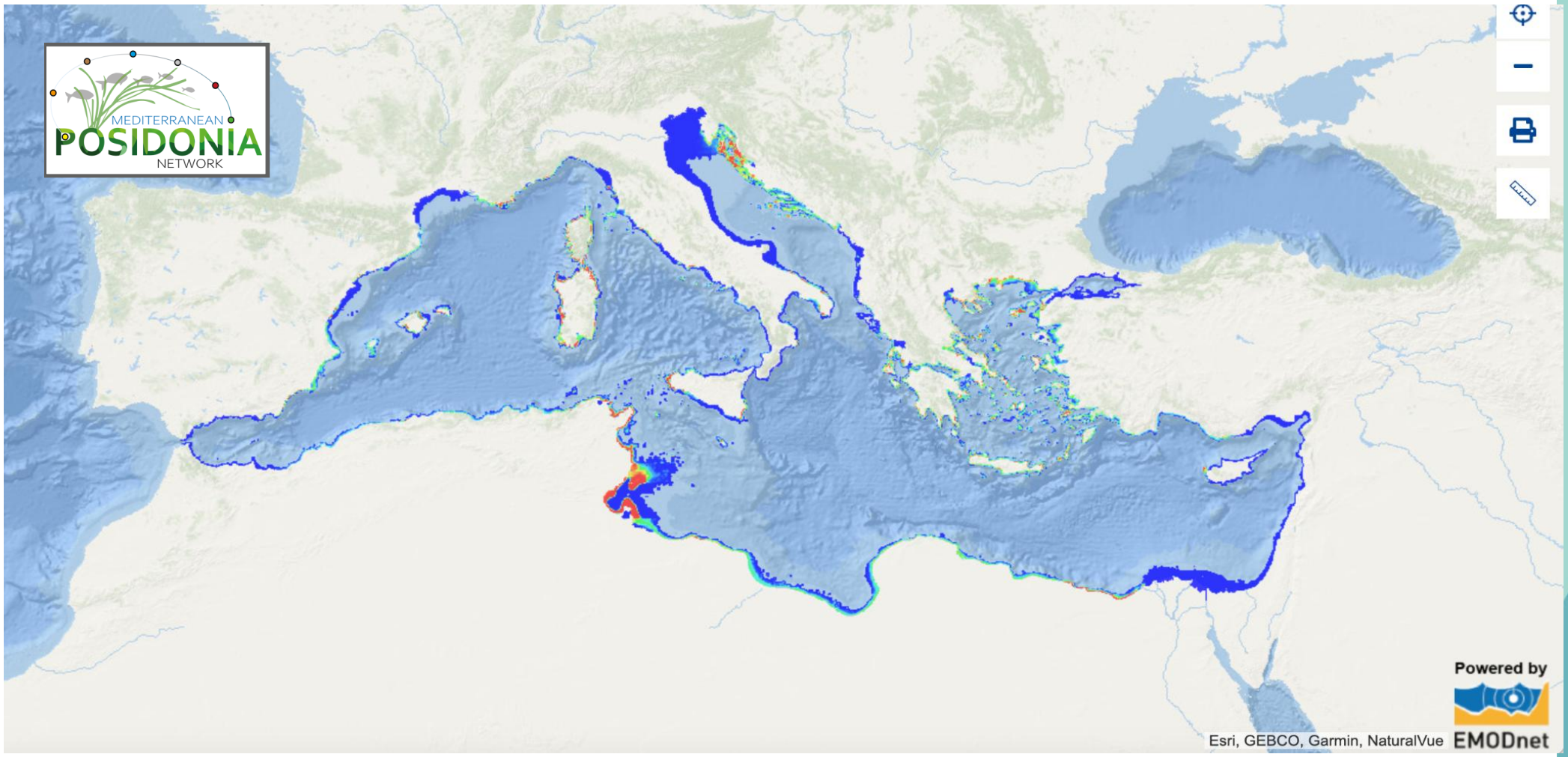

Where is the posidonia seagrass?
Who is doing what?
We need to create a network

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NEW SATELLITE CARTOGRAPHY - SEAGRASS

CSIC ICMAN DLR
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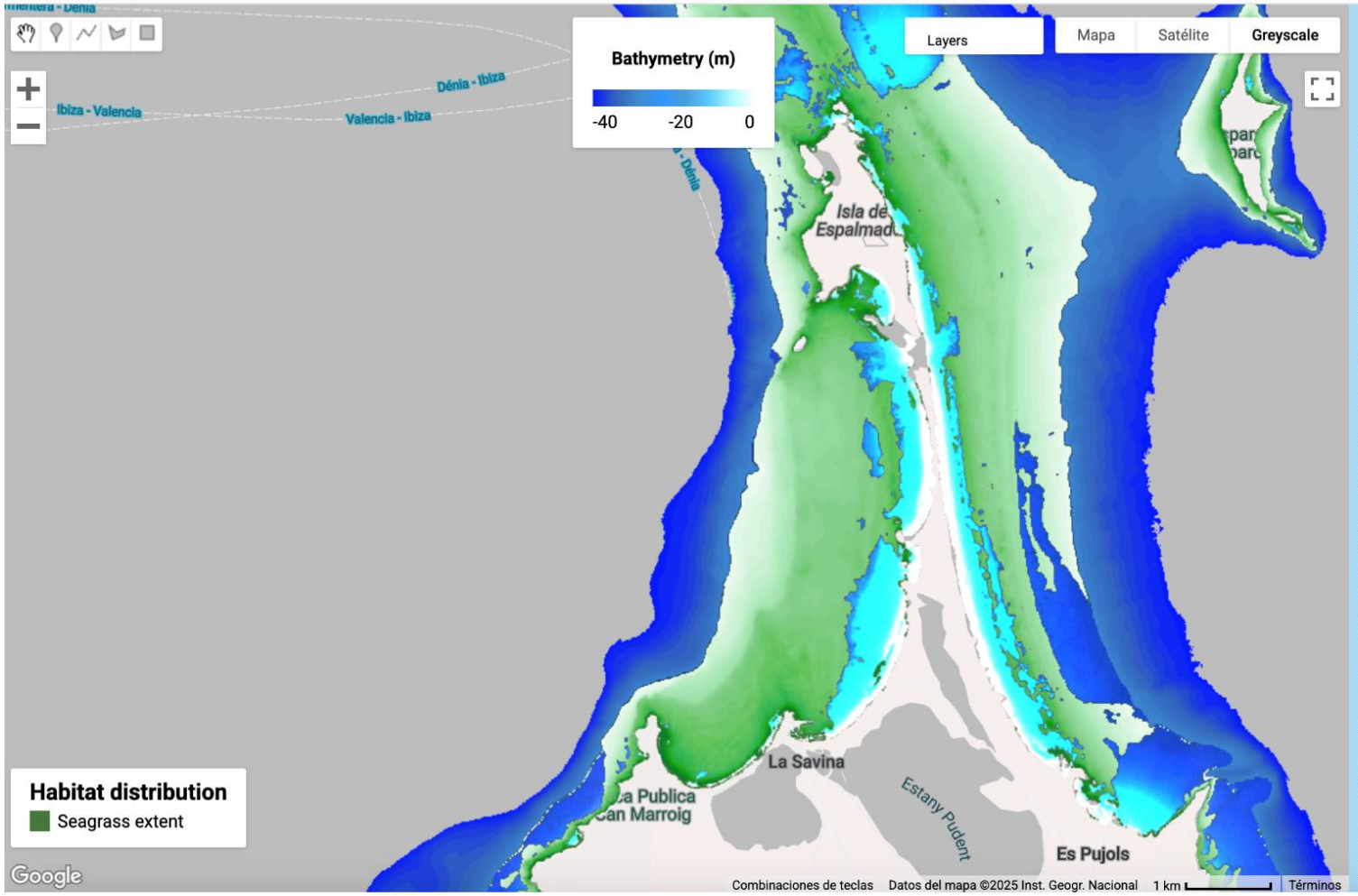
Search places

Earth Engine App



Seagrass Ecosystem Accounting

Balearic Islands (Spain)

Seagrass ecosystems are among the most important orga carbon sinks on Earth, playing a key role as climate change buffers. Posidonia oceanica is an endemic seagrass speci in the Mediterranean Sea and has been observed to feature the highest carbon stock among all seagrasses. Here, we show an Earth Observation approach to help monitoring seagrass distribution, carbon sequestration and fixation ra

Earth Observation approach

Product: Sentinel-2 L1C (2016-2022) (3,499 images)

Bathymetry: new interpolated dataset generated with available information at 10m pixel aligned to S2 grid (0-40 depth)

Carbon in situ data: we estimated the Tier 2 blue carbon st of the mapped seagrass extent in Megagrams (Mg) of CO2 Mg = 1 ton). We also generated carbon fixation and sequestration maps for P. oceanica along depth, as showe layers Carbon Fixation and Sequestration Rate (yearly estimations).

Results

Seagrass extent mapped: 505 km2 (0-30 m depth)

Carbon fixation rate (P. oceanica, 0-30 m depth): 1,116.3 Mg Corg km-2 annually

Carbon sequestration rate (P. oceanica, 0-30 m depth): 227 Mg Corg km-2 annually

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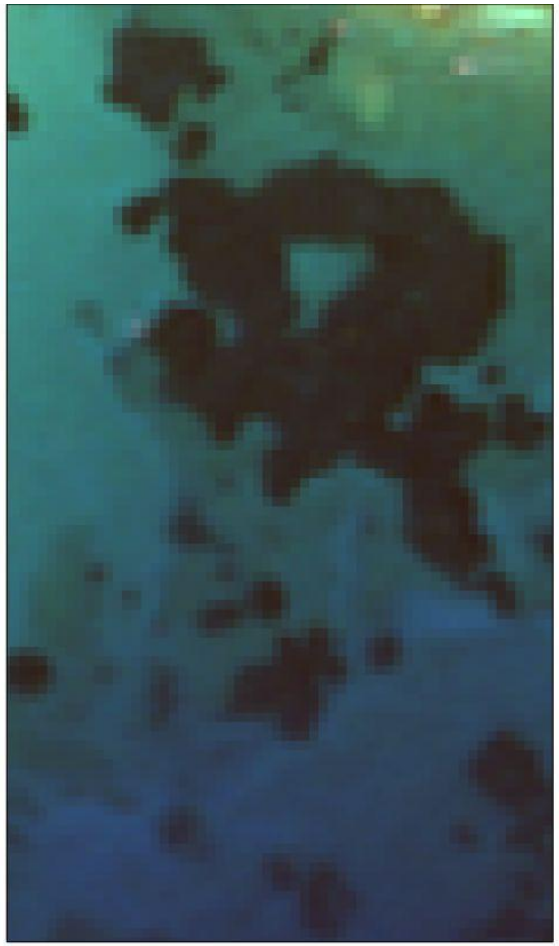
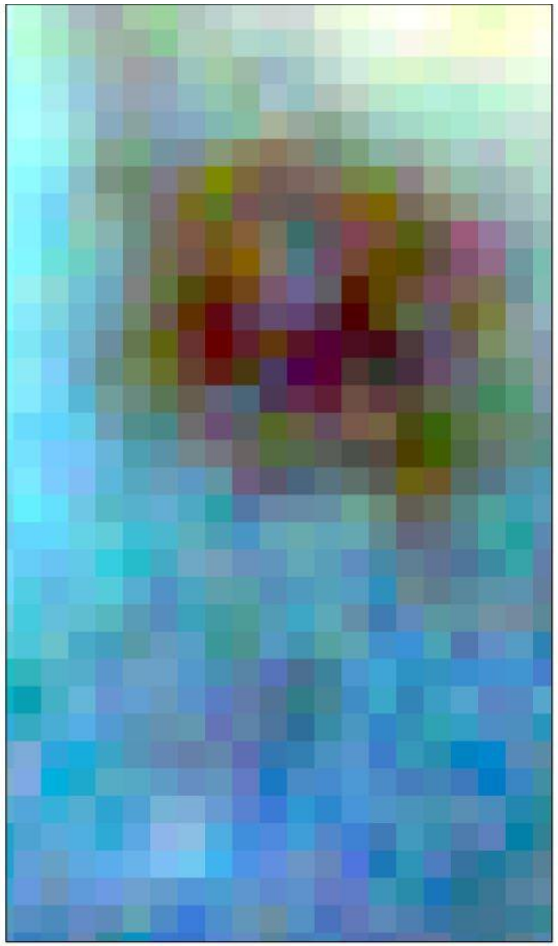
RESOLUTION

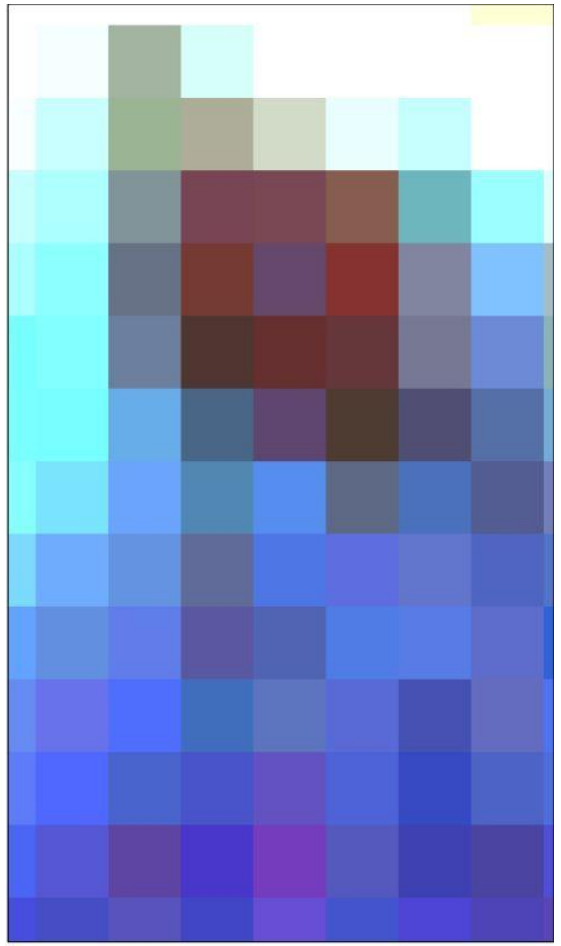
Drone, Mavic E3M, 3cm pixel size



Commercial Satellite, MAXAR WVIII, 1.2m pixel size



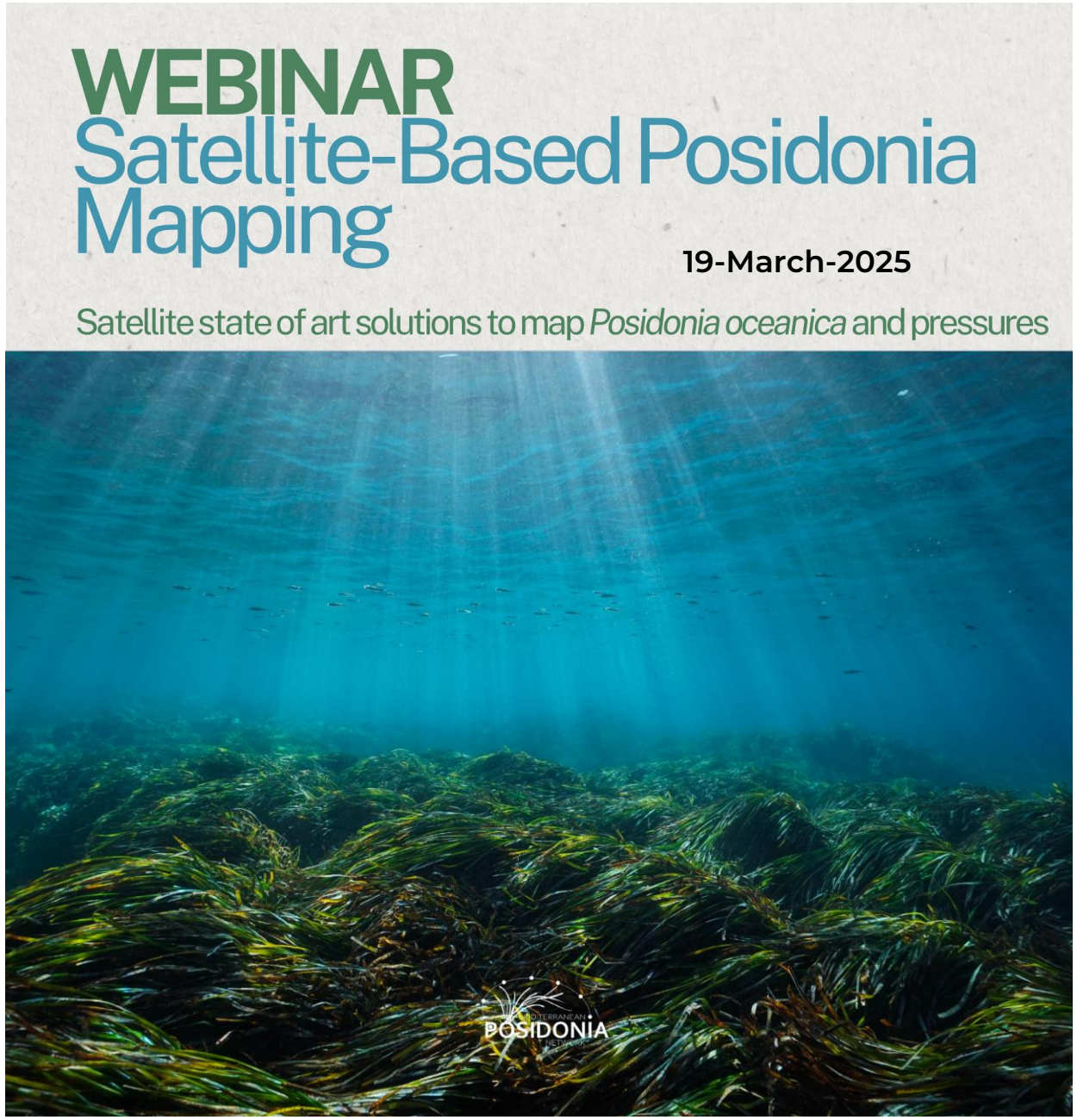
Commercial Satellite, PlanetLabs, 3m pixel size



Copernicus Sentinel 2, 10m pixel size

0 25 50 m.

Island of Crete, Greece, location = 35°24'29.2"N 25°01'17.4"E



Highest mapping accuracy in shallow, transparent waters (0–20m). 99% -85%

Accuracy decreases with depth and turbidity.

Still limited in detecting species with similar spectral signatures.

Ground-truth data and validation are essential to improve models.

Mapping in turbid or mixed-habitat areas remains a major challenge.

Accuracy of satellite-based mapping of *Posidonia oceanica* meadows

(in clear waters, using Sentinel-2 and high-resolution imagery)

Depth Range (m)	Estimated Accuracy (%)
0–10	99%
10–20	85%
20–30	65%
30–40	43%

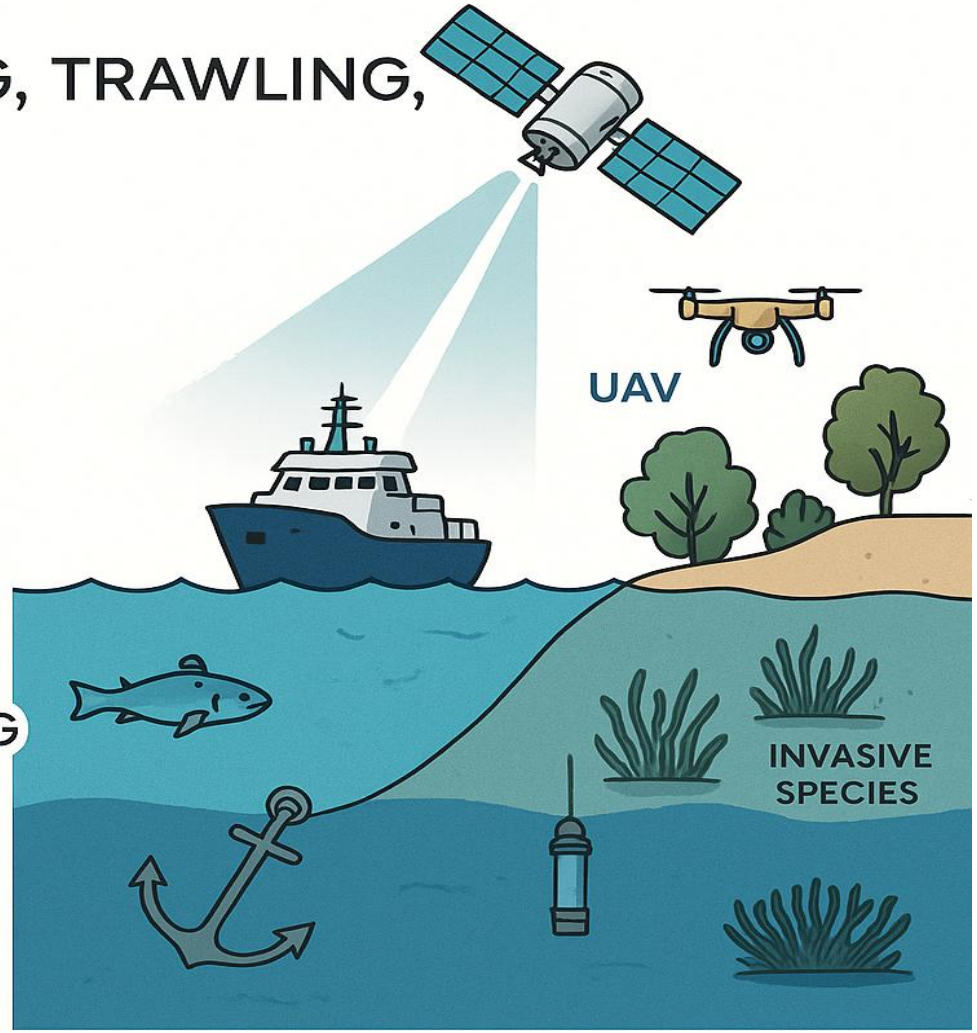
SATELLITES → ANCHORING, TRAWLING, INVASIVE SPECIES

DRONES / LIDAR
→ FINE-SCALE MAPS IN SHALLOW OR TURBID AREAS

AIS + MACHINE LEARNING
→ VESSEL DETECTION AND PRESSURE ANALYSIS

MOBILE APPS + GPS
→ HUMAN ACTIVITY MAPPING ON COASTLINES

IN SITU SENSORS
→ WATER QUALITY AND POLLUTION IDICATORS



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MEDITERRANEAN POSIDONIA NETWORK PROPOSES A COLLABORATIVE POSIDONIA SEAGRASS AND PRESSURES MAP ACROSS THE MEDITERRANEAN SEA

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