



PROGRAMME OF THE
EUROPEAN UNION



COPERNICUS4REGIONS 2025

COPERNICUS MISSIONS IN SUPPORT OF EUROPEAN DIRECTIVE FOR BIODIVERSITY

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Seagrass is an important habitat in the coastal zone. It provides a wealth of ecosystem services to the seascape and the nearby communities. We are obliged to protect them for the future generations.

Antonis Barnias,

Management Unit of Samaria National Park and Protected areas of Western Crete, Natural Environment & Climate Change Agency, Ministry of the Environment and Energy

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✓ *Posidonia oceanica* meadow in Greece | Own work

The monitoring of the extent of critical marine habitats is important for the EU countries, as part of their obligation to report in the framework of MSFD and Habitats Directive. Copernicus Missions can have an important role in mapping and monitoring them.

THE CHALLENGE

Within the scope of MSFD and the Habitats Directive, each Member State is required to report the extend and areal cover of key habitats. For MSFD this is linked to the Descriptors 1 and 6 while for the Habitats Directive to the habitat types within each Natura 2000 site. For the marine environment, habitat 1120* is the only priority habitat where Earth observation plays a crucial role in mapping its areal extend and monitor spatial and temporal changes. Operational use by public bodies to fulfill reporting obligations can be achieved by leveraging Copernicus Sentinel 2 or Copernicus Contributing Missions and available open-source tools. Here, this approach emonstrates how this priority habitat can be mapped using satellite data and highlights the benefits for end-users.

THE SPACE SOLUTIONS

Copernicus Sentinel 2 and the Copernicus Contributing Missions offer unique opportunities to monitor critical habitats, allowing a transparent reporting under the MSFD and Habitats Directive.

Here we use such data coming from Copernicus Sentinel 2 constellation and Copernicus Contributing Mission, named Planet labs as it allow us to select the based imagery, clean of waveglint, wavecaps, and sunglint and use in the development of a high quality product around baseline seagrass in the Natura 2000 site GR1110004 (Fengari Samothrakis, Anatolikes Aktes, Vrachonissida Zourafa Kai Thalassia Zoni).

The benefits of the use of satellites rely on the capability to create seagrass maps at any given timestep (i.e. annual), to use it for monitoring purposes (i.e. seagrass restoration) and also, using historical imagery, to map the heritage of them.

Such data are required from European Regulations in reporting the habitats status in the Natura 2000 sites.

The space solution allow us to create a workflow that can be adapted to any protected area in the European Union, where the priority habitat occur. By that, cost effective approaches in reporting and monitoring can be further evolved towards transparent approaches.



✓ Researcher working in a meadow | Own work

THEMATIC AREA



Biodiversity and
Environmental Protection

REGION OF APPLICATION



North Aegean

SENTINEL MISSION USED



S2

COPERNICUS SERVICE USED



CCM

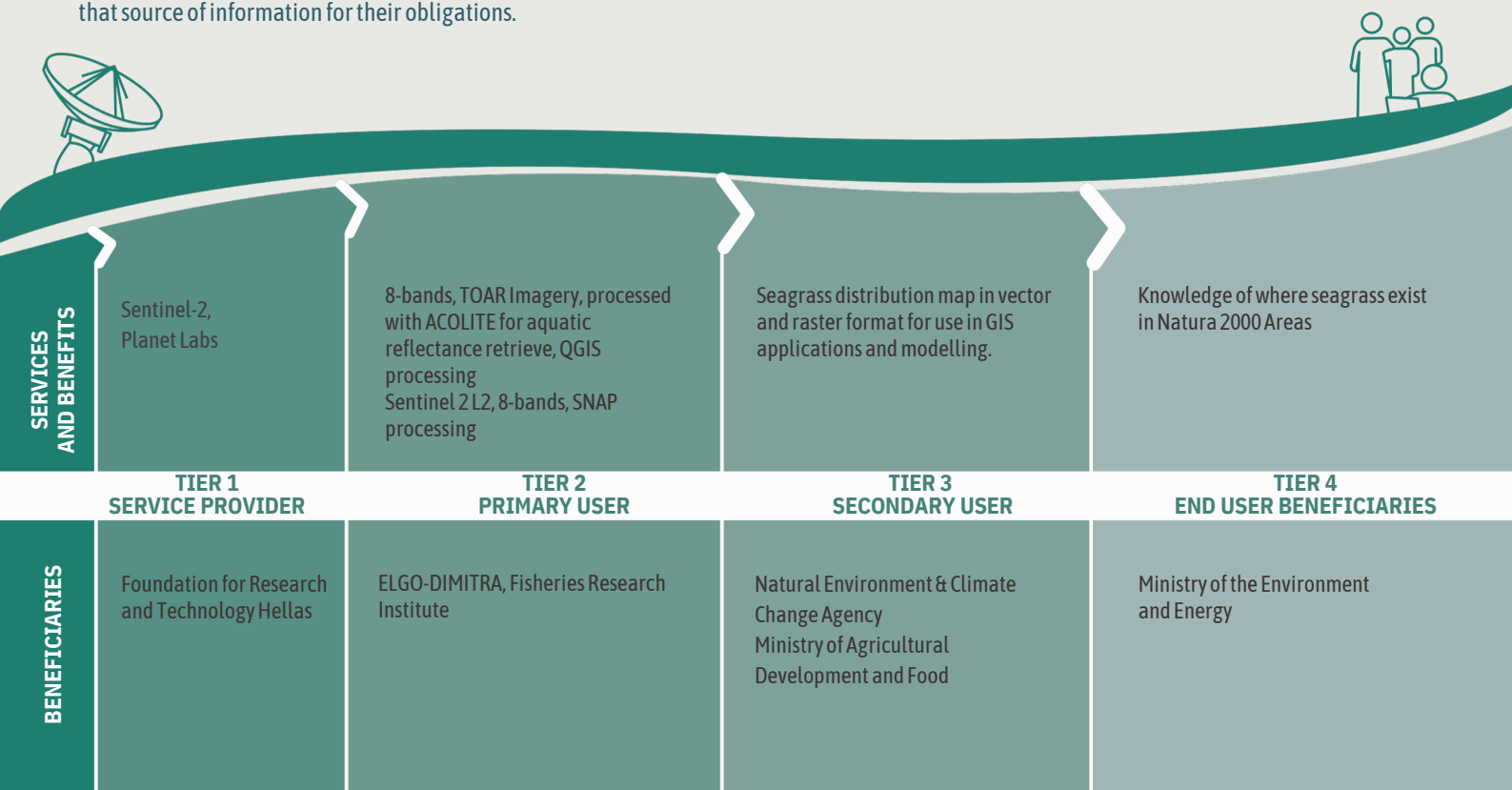
THE BENEFITS AND THE BENEFICIARIES

The implementation of Directives like the MSFD across EU Member States has highlighted a significant lack of benthic habitat maps. Benthic habitat maps are crucial for effective environmental assessments, significantly improving management measures, and are prioritized in most ongoing MSFD monitoring programs.

Moreover, benthic maps need to be updated frequently, to be useful for change detection purposes and the evaluation of established measures. Here we present a methodology for mapping seagrass meadows of a Natura 2000 site at two mapping scales, using Copernicus Sentinel 2 and Copernicus Contributing Mission (PlanetLabs) to understand the impact of the different pixel size in the areal extend and distribution and support the Ministry of Environment and Energy in understanding the value of that source of information for their obligations.

Extended fieldwork with hydroacoustic methods is demanding both from an economical and time management aspect. As such in our protocol we collected acoustic data only from limited areas within the N2000 zone and used them, together with ROV and scientific diving data, to feed the algorithmic workflow we developed.

Accuracy wise, we achieved to have a product that is 89% accurate with minimum loss of information at the deep limits of the habitat. By combining satellite imagery for shallow areas and hydroacoustic data for deeper areas, this methodology enables the creation of comprehensive national-scale seagrass maps. It can be used easily, within the ongoing national MSFD monitoring programs, in the context of Descriptors 1 and 6 and the Habitat Directive.



EU POLICY / DIRECTIVE



Habitats Directive

TYPE OF SERVICE PROVIDER



Public Service

TYPE OF FUNDING SOURCE



EU Research Programme

USAGE MATURITY LEVEL



4



A FUTURE WITH COPERNICUS

The Copernicus family provides a wealth of data sources, each one unique. By that, we can track changes of key ecosystems such as the seagrass meadows, setup critical baselines and build monitoring projects for our unsung heroes, the seagrass.



DID YOU KNOW?

Seagrass are marine flowering plants that grow in the coastal zone. In the Mediterranean Sea, the Neptune's seagrass, *Posidonia oceanica*, form extensive meadows that can reach the 40 meters depth. While has extensive meadows, coastal development, pollution and land-sea interactions have cause the loss of meadows in several areas in Europe.



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