

Unraveling Environmental Assessment for Floating Offshore Wind and Grid Infrastructure

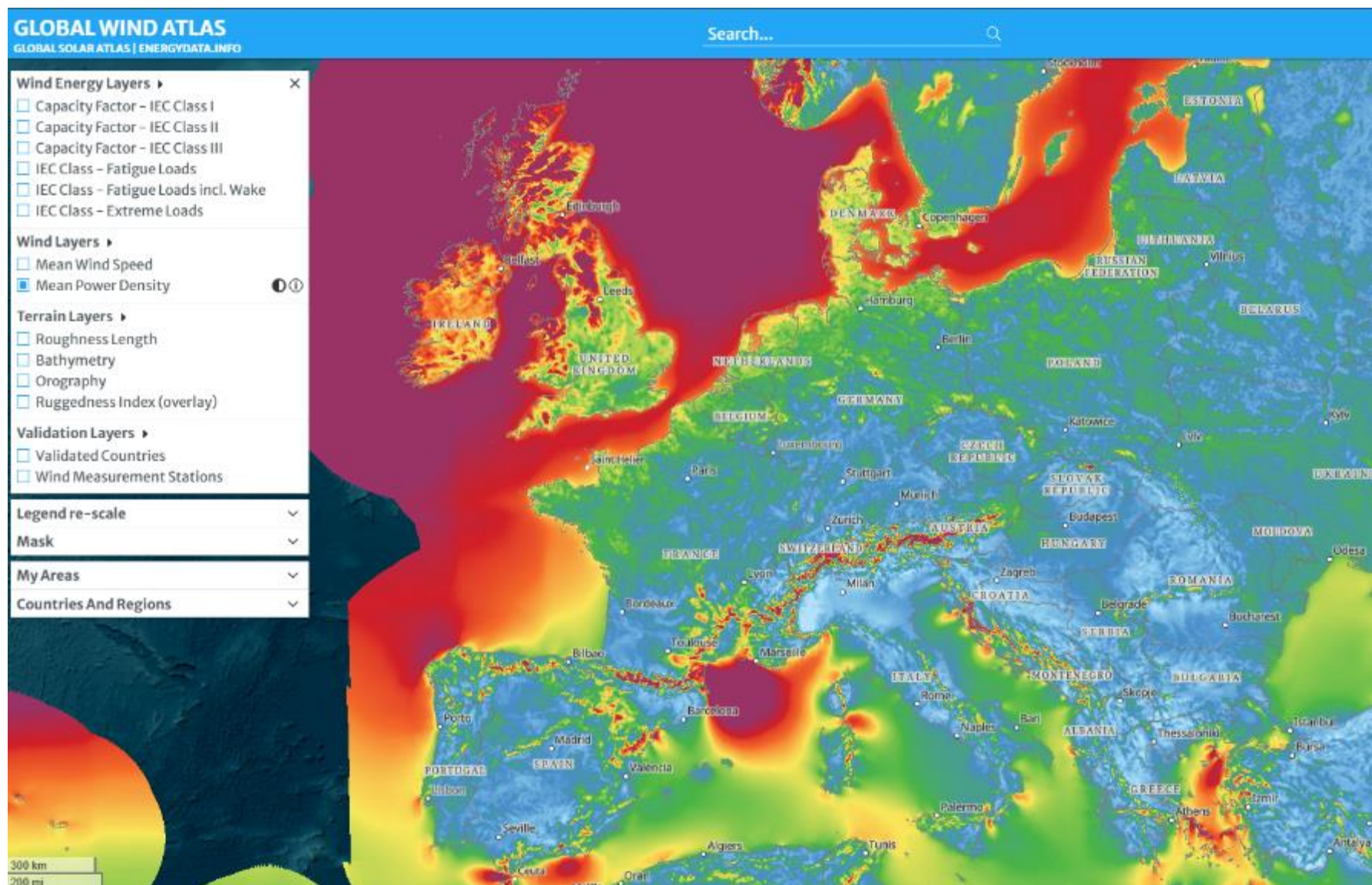
Roberto Mezzalama, Turin, Italy

2025/11/04

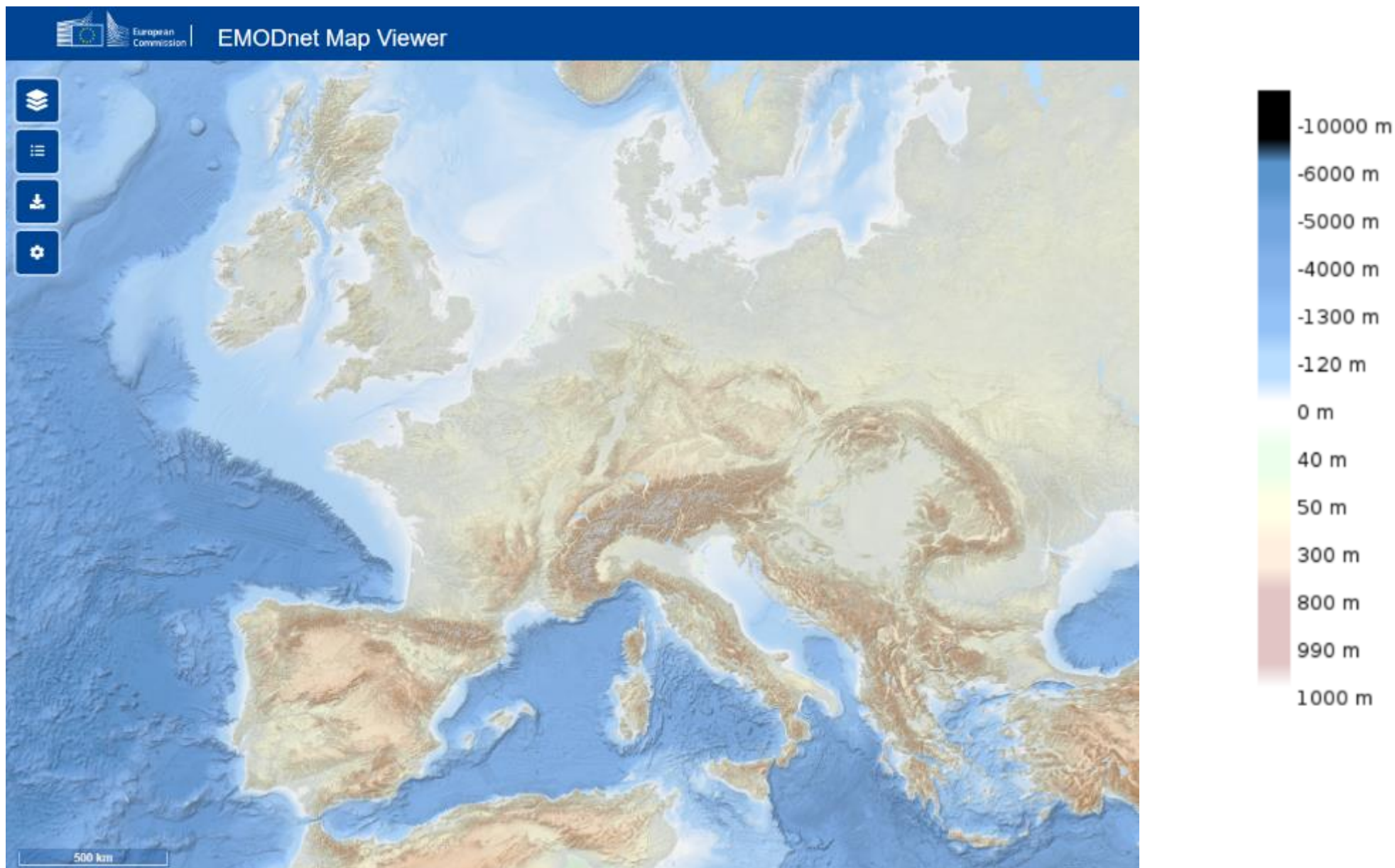
Setting the context

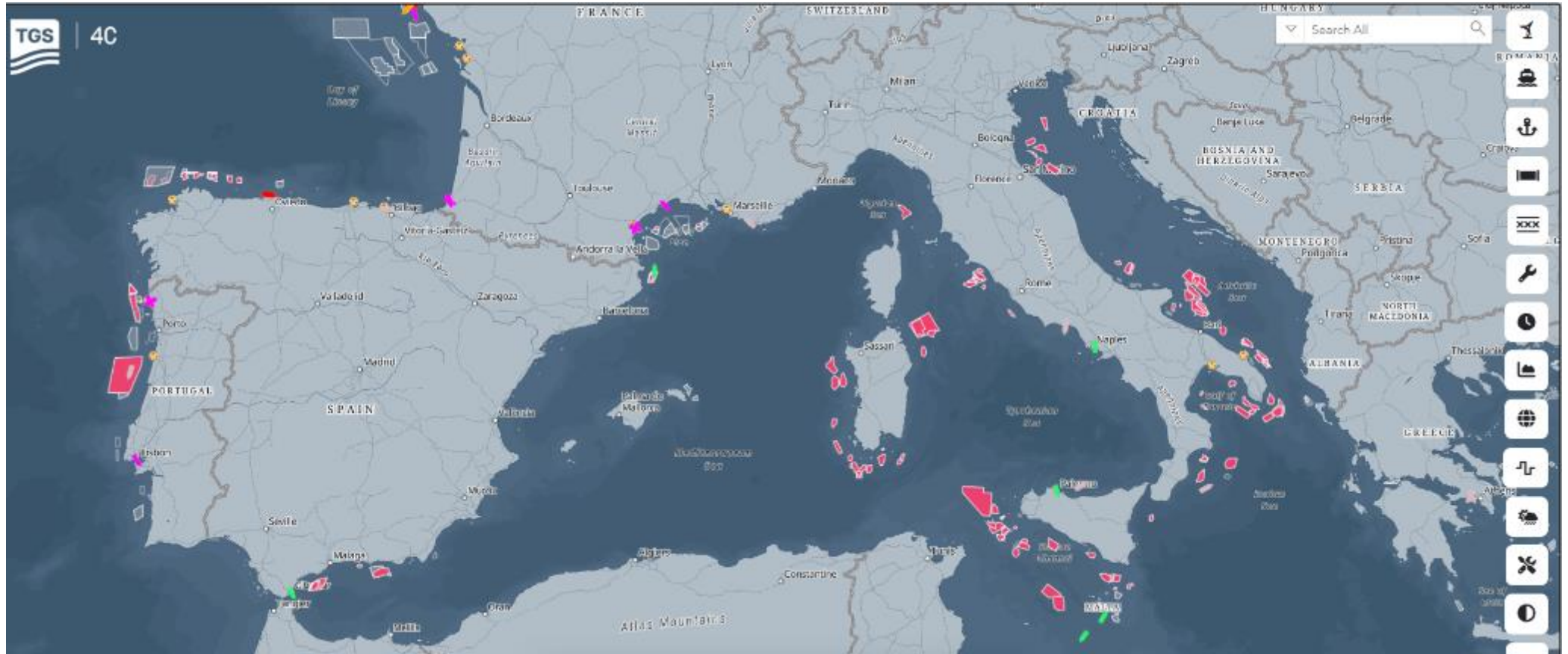
2024/03/06

Available wind resources



Bathymetry





<https://map.4coffshore.com/offshorewind/>

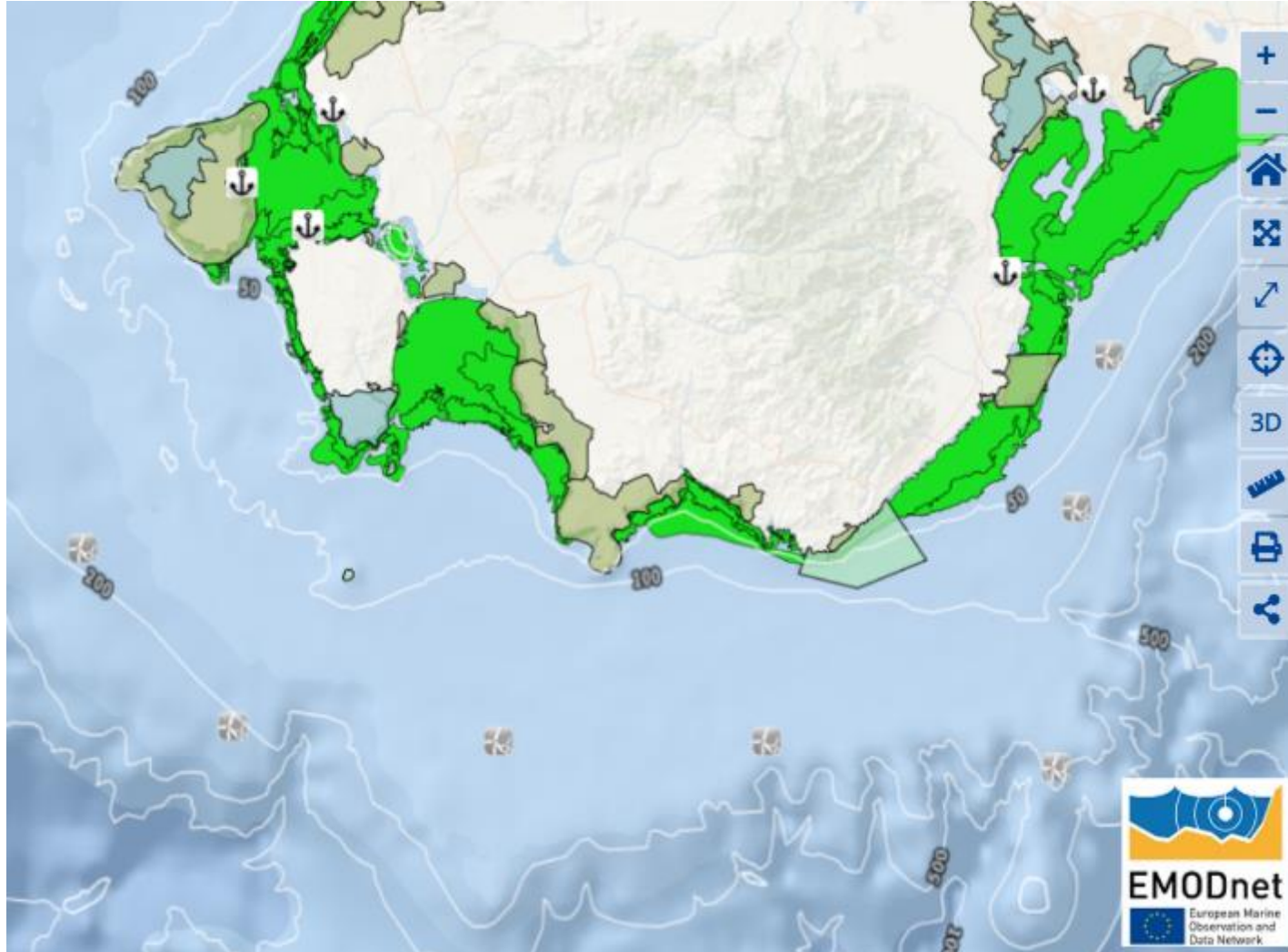
Overview of the planning and bidding systems for OWF in the UK (focus on round 5)

- Definition of Project Development Areas through a multi-stage spatial design process
- Completion of a plan-level habitats regulations assessment to consider the protected areas and species in the bidding process
- Pre-consent surveys to inform early-stage engineering design, financing and environmental assessment
- Design recommendations for the grid connections in cooperation with ESO and NGET to support Holistic Network Design
- Leasing process designed in a fair, transparent and objective manner.

Overview of the planning and bidding system for OWF in Italy

- General objectives for the national energy system are defined by the National Energy and Climate Plan (PNIEC): a very limited target was set for OWF (2.100 MW against an estimated 200.000 MW potential).
- The Maritime space strategic planning is in an early stage, despite Italy having the largest territorial water in the EU27
- A request for expression of interest has been issued in 2021 by the Ministry of Environment and Energy and 64 EOI have been submitted
- Marine areas' concessions have been granted to interested parties, with no consideration of cumulative impacts and access to the grid
- No supporting mechanisms or guidelines have been put in place to facilitate the design and consenting process
- The bidding process has not started and the bidding criteria have not been disclosed so far.

Effects of the lack of planning



Natura 2000 sites

- A: SPA (Special Protection Areas)
- B: SCI (Special Conservation Interest)
- C: Both SPA and SCI

Wind Farms (Points)

- Approved
- Dismantled
- Planned
- Production
- Under Construction
- Test site

Seagrass cover in Europe (2023)

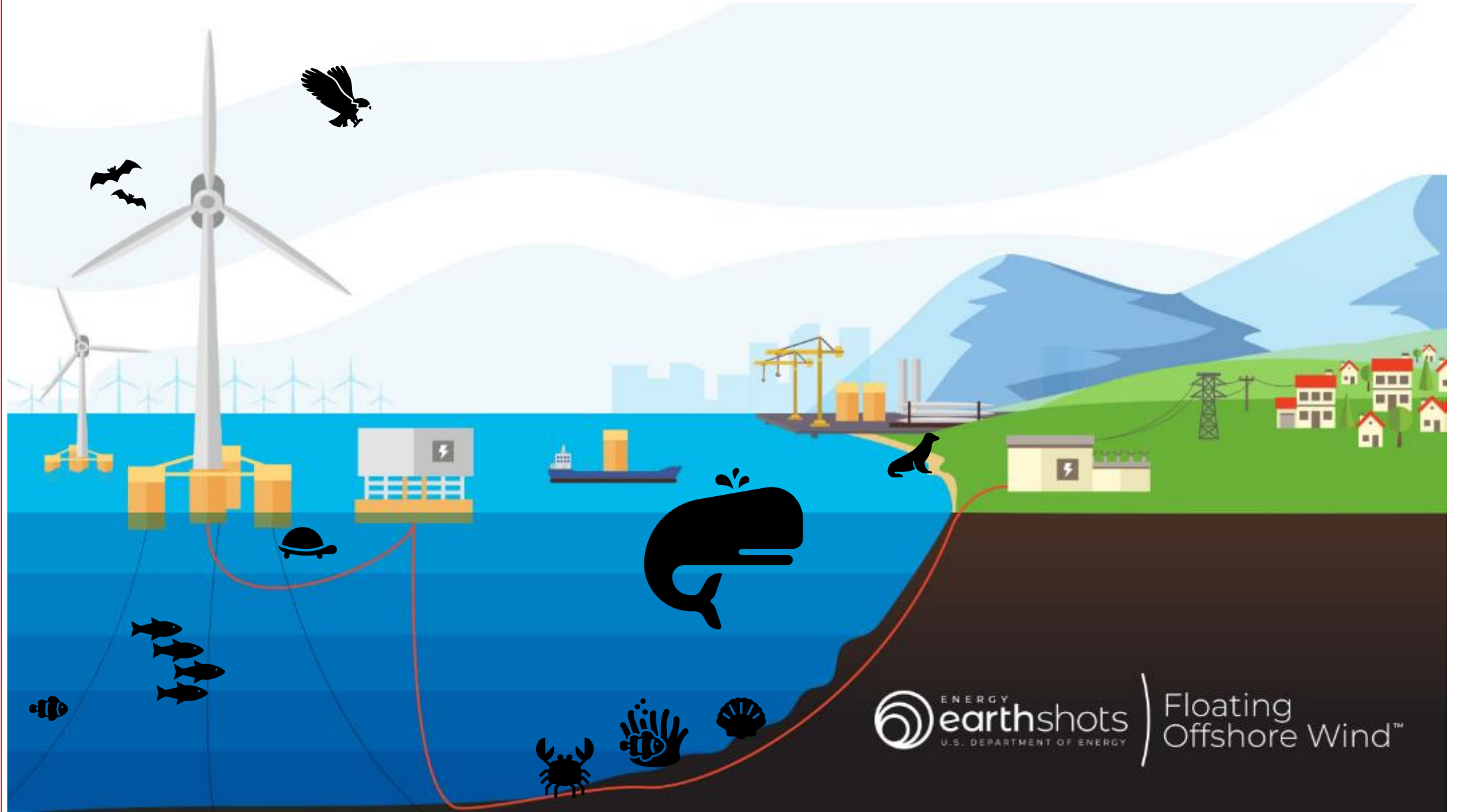
Seagrass cover (Essential Ocean Variable)



The background is a dark blue gradient with a pattern of small, white, stylized wind turbines scattered across it. In the top right corner, there are large, red, geometric shapes that look like stylized letters or abstract forms.

Section name

Environmental and social issues



Onshore connections

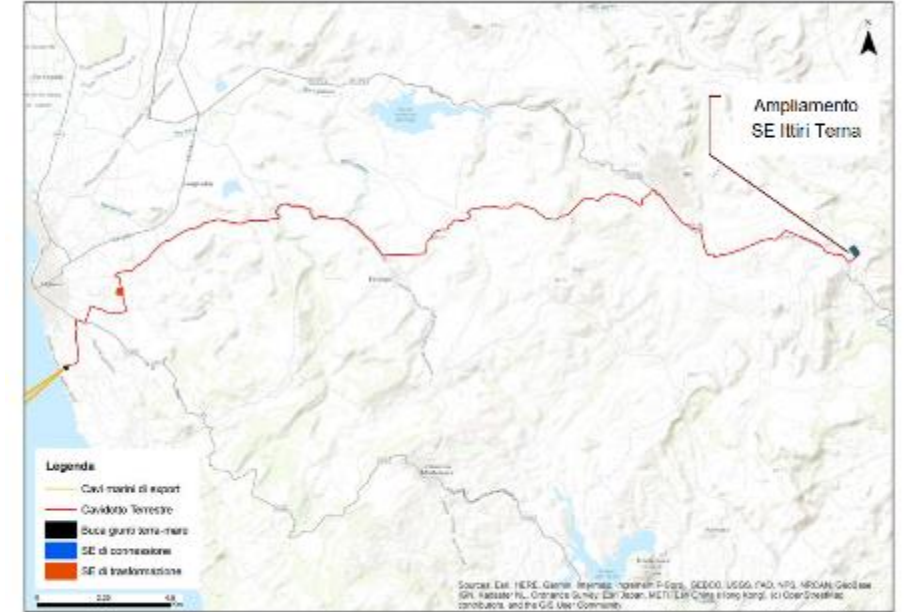


Figura 38: Inquadramento delle opere di connessione onshore.

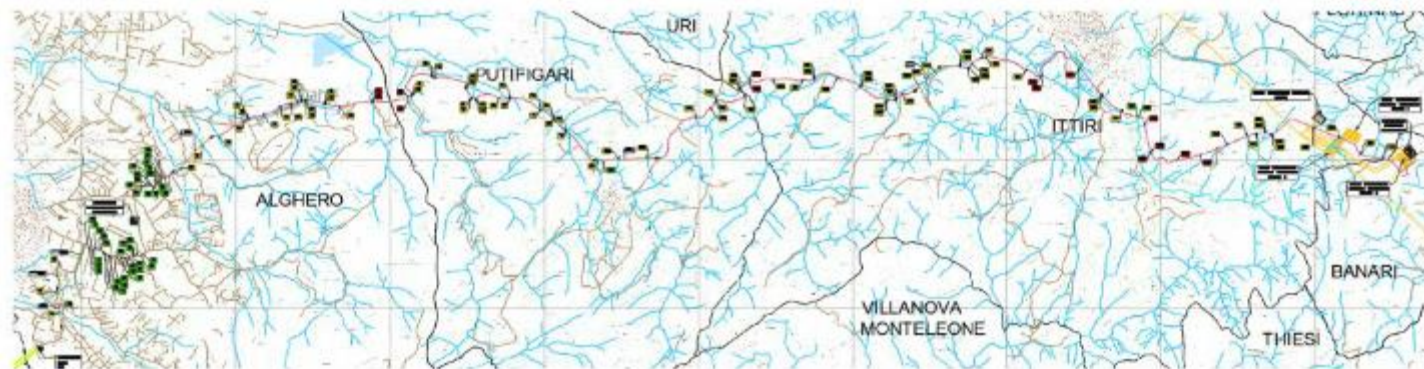


Figura 68: Ubicazione su CTR delle interferenze individuate.

Port infrastructures

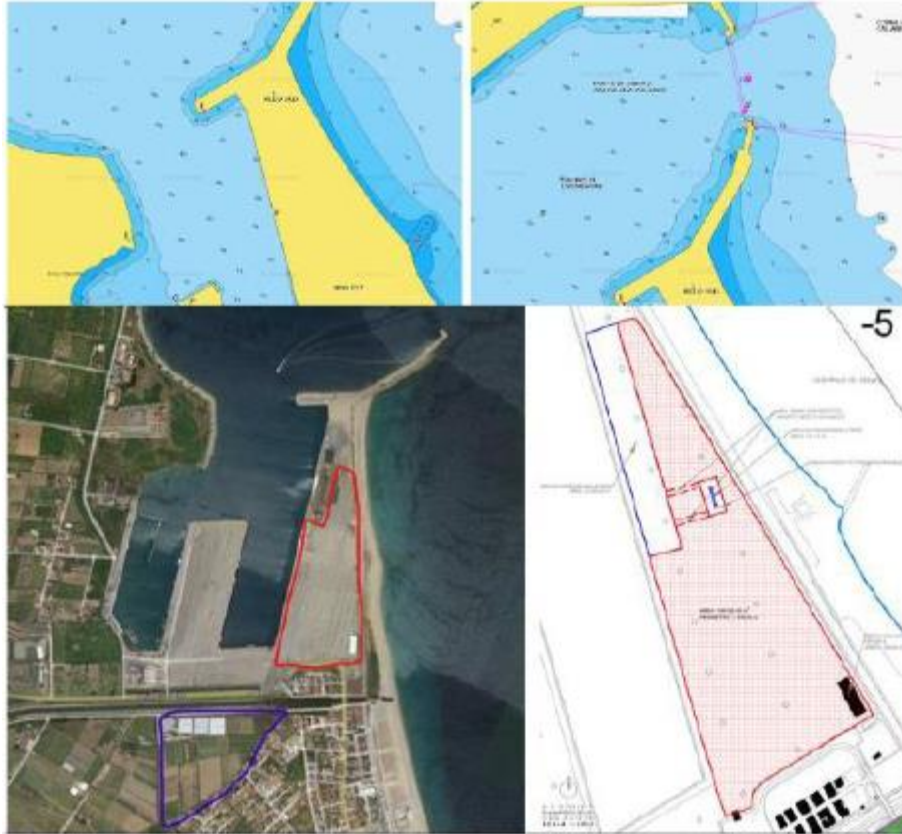
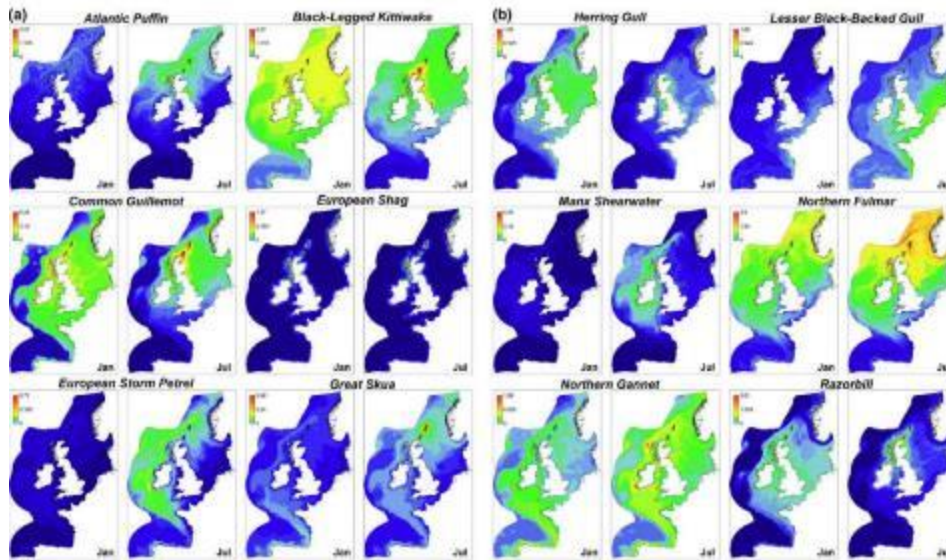
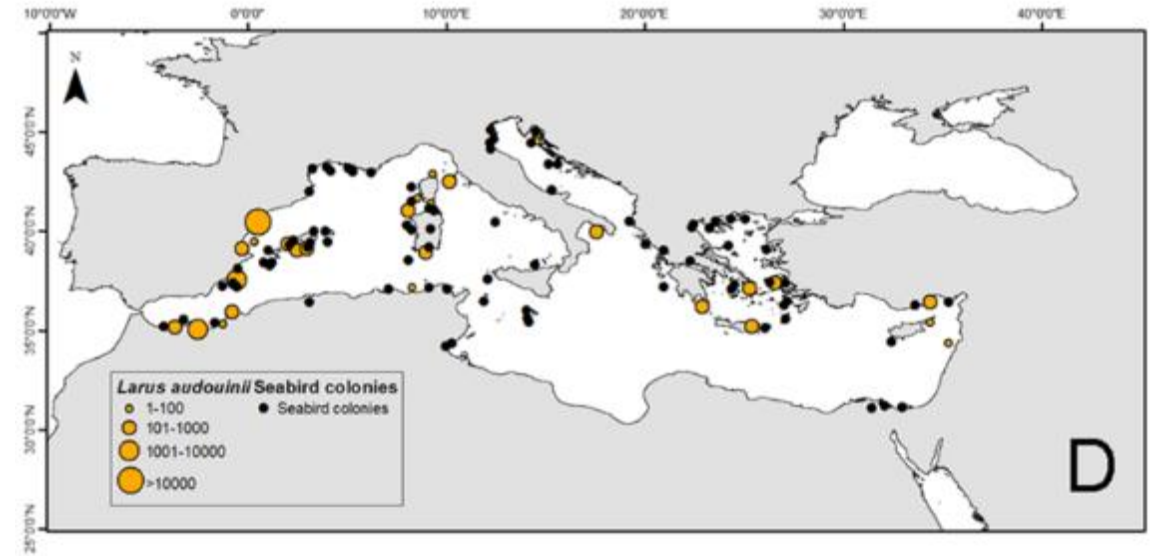


Figure 48: Layout port of Corigliano



Birds



Bird species densities- Spatial variation in predicted densities (animals per km) (Waggitt *et al.*, 2019)

Birds

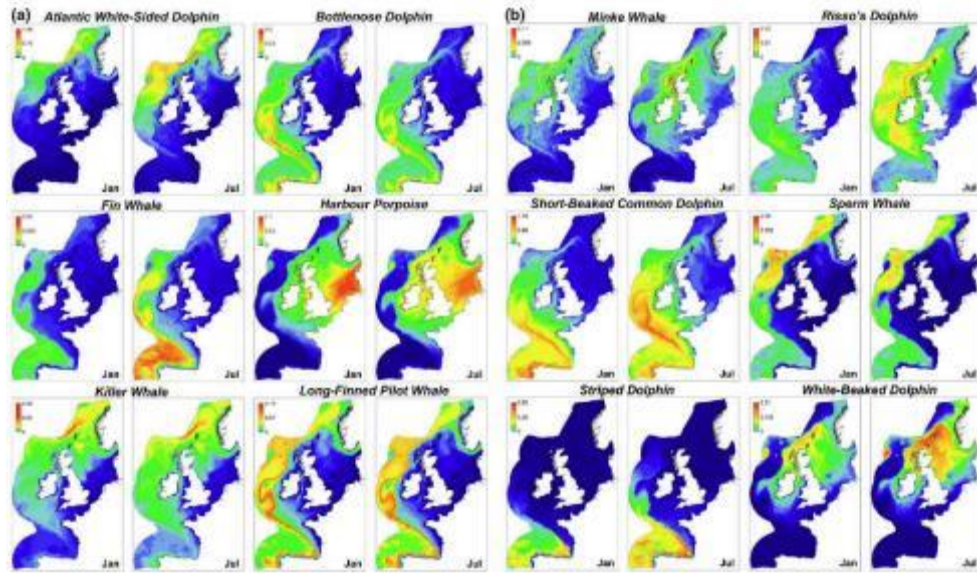
Impacts:

- Direct temporary habitat loss / disturbance.
- Direct temporary intertidal habitat loss / disturbance / displacement.
- Indirect impact due to effects on prey species and habitats.
- Operational disturbance and displacement from the array.
- Collision risk.
- Entanglement with mooring lines.
- Accidental pollution.
- Barrier effects.

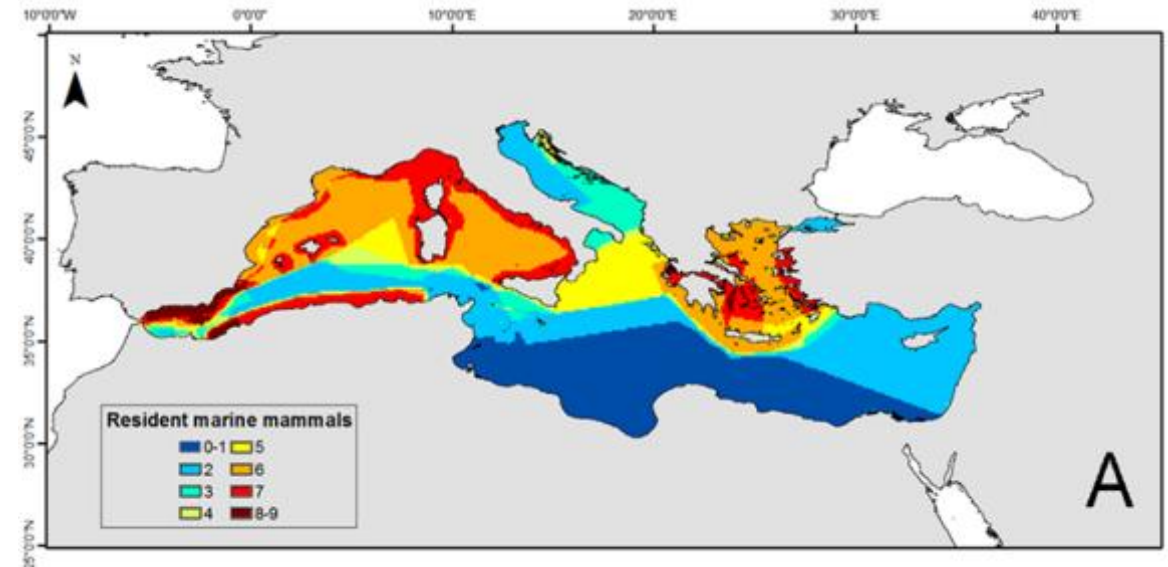
Mitigation strategies:

- Minimum blade tip clearance.
- Blade colouring
- Development and adherence to a Project Environmental Monitoring Plan.
- A Construction Environmental Management Plan to be implemented by the contractor.
- The development of and adherence to a decommissioning programme.

Marine mammals



Marine mammal densities - Spatial variation in predicted densities (animals per km) (Waggitt *et al.*, 2019)



Marine mammals

Impacts:

- Increased underwater noise during installation.
- Increased above-water noise during installation.
- Indirect effects of underwater noise on marine mammal prey species.
- Increased vessel presence and traffic leading to disturbance.
- Habitat change due to offshore windfarm structures e.g. effecting foraging patterns.
- Entanglement in lines and cables e.g. mooring lines and inter-array cables.
- Disturbance of habitat from sea-floor attachment causing secondary impacts to marine mammal prey species.
- Effects from electromagnetic field from cables.
- Detonation of unexploded ordnance could result in direct trauma, auditory damage causing TTS / PTS.

Mitigation strategies:

- Development of and adherence to an agreed Marine Mammal Mitigation Protocol.
- Slow start for piling
- Development and adherence to a Project Environmental Monitoring Plan.
- A Construction Environmental Management Plan to be implemented by the contractor.
- The development of and adherence to a decommissioning programme.
- Development of and adherence to and agreed UXO Management Plan.

Fish ecology

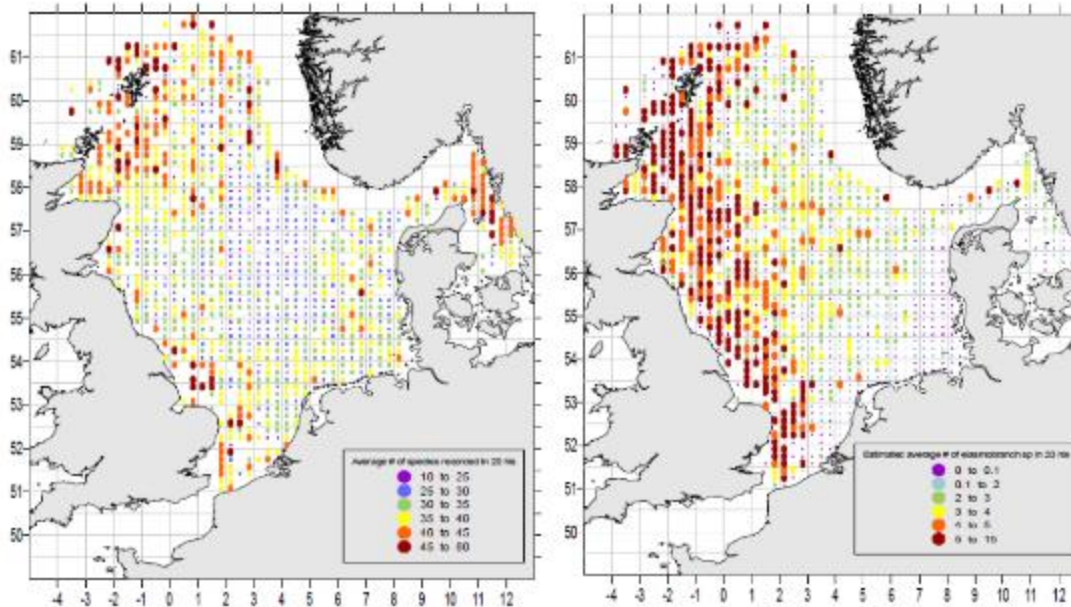
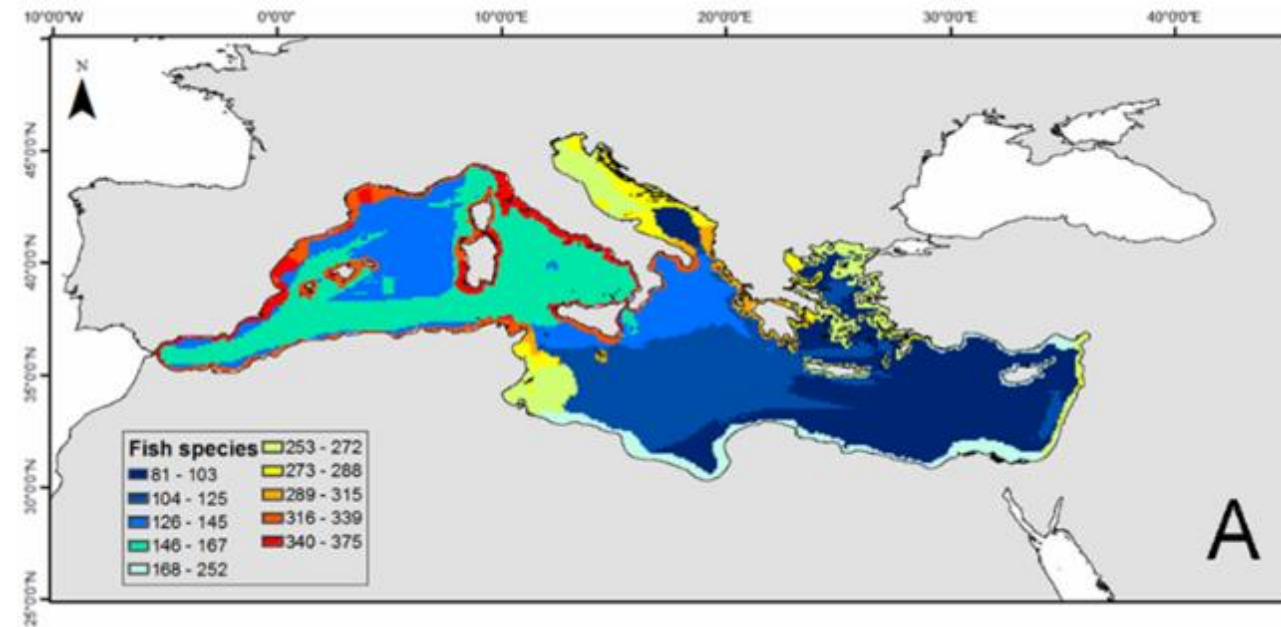


Figure 3: Spatial variation in species richness, expressed as average number of species recorded in 20 hauls, based on IBTS (all quarters, 1977-2004): A (left panel) – entire fish community; B (right panel) – elasmobranchs only (sharks and skates). From ICES-FishMap (2005).



Fish ecology

Impacts :

- Habitat loss and/or disturbance effects on potential feeding and spawning patterns.
- Smothering of species from the placement of infrastructure in the marine environment.
- Underwater noise and vibration included UXO clearance causing behaviours changes, mortality, injury or auditory masking.
- Loss/increase of suitable substrate.
- Increased likelihood of Fish Aggregating Devices effects from the floating units.

Mitigation strategies:

- Development and adherence to a Scour Protection Management.
- Development and adherence to a Project Environmental Monitoring Plan.
- Mitigation and control of invasive species measures.
- A Construction Environmental Management Plan to be implemented by the contractor.
- Development and adherence to a Marine Pollution Contingency Plan.
- Detailed Cable Burial Risk Assessment.
- Avoidance of key sensitive habitats and micro-siting.
- Use of 'low-order' techniques such as deflagration for UXO disposal, where possible and required.

Benthic habitats



Benthic habitats

Impacts on benthic habitats:

- Temporary habitat disturbance of seabed habitat.
- Temporary increased suspended sediment in deposition.
- Direct and indirect seabed disturbance leading to the release of sediment contaminants.
- Long-term habitat loss.
- Increased risk of introduction of spread of marine INNS.
- Colonisation of hard substrates on floating structures.
- Accidental pollution events.
- EMF generated by array and export cables.
- Potential impacts on designated sites.

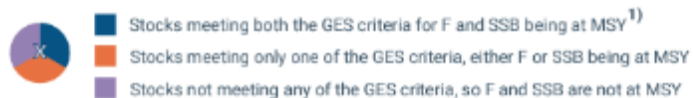
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Fisheries

State of European commercial fish and shellfish stocks (for which stock assessments were conducted between 2019-2022), in relation to the Good Environmental Status criteria for fishing mortality and reproductive capacity per marine region

Number of assessed stocks (X) for which adequate information is available to determine



Notes:

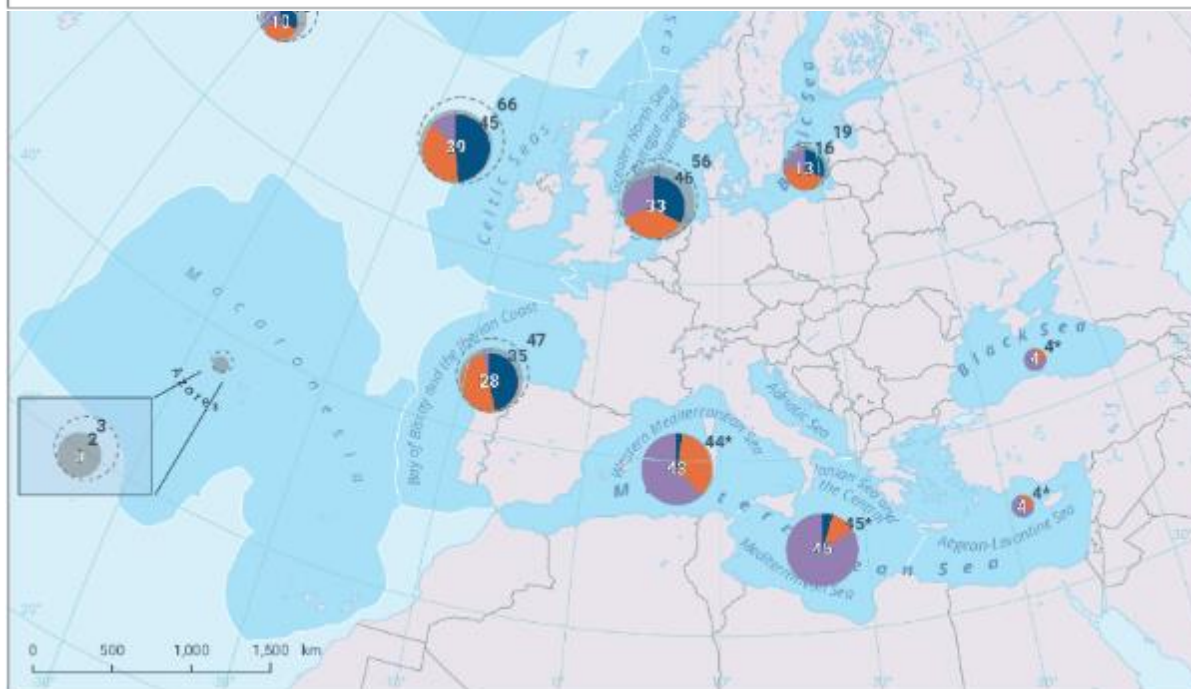
- 1) GES: Good Environmental Status
F: Fishing mortality
SSB: Spawning Stock Biomass
MSY: Maximum Sustainable Yield

* Unknown total number of stocks (Z)

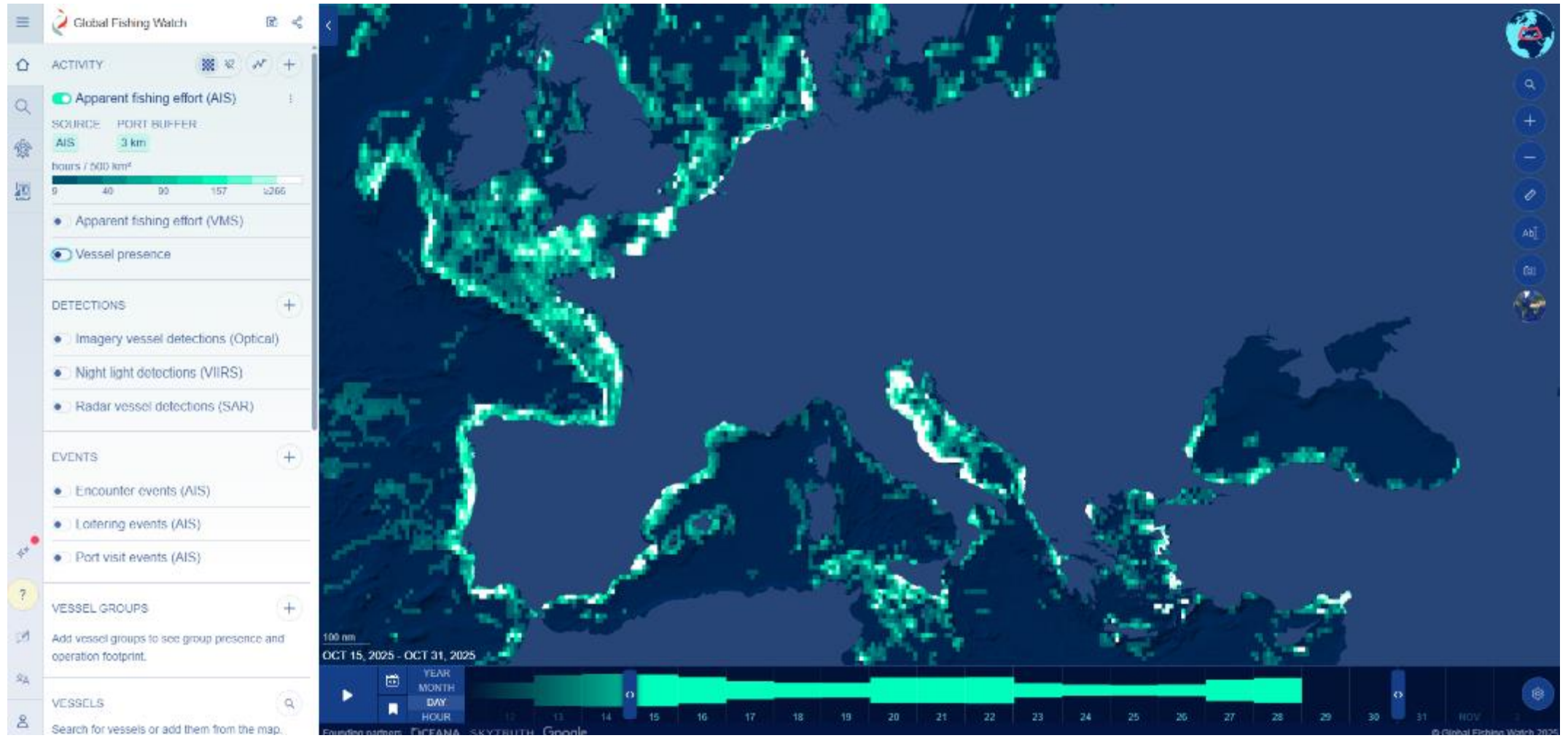
Total number of assessed stocks



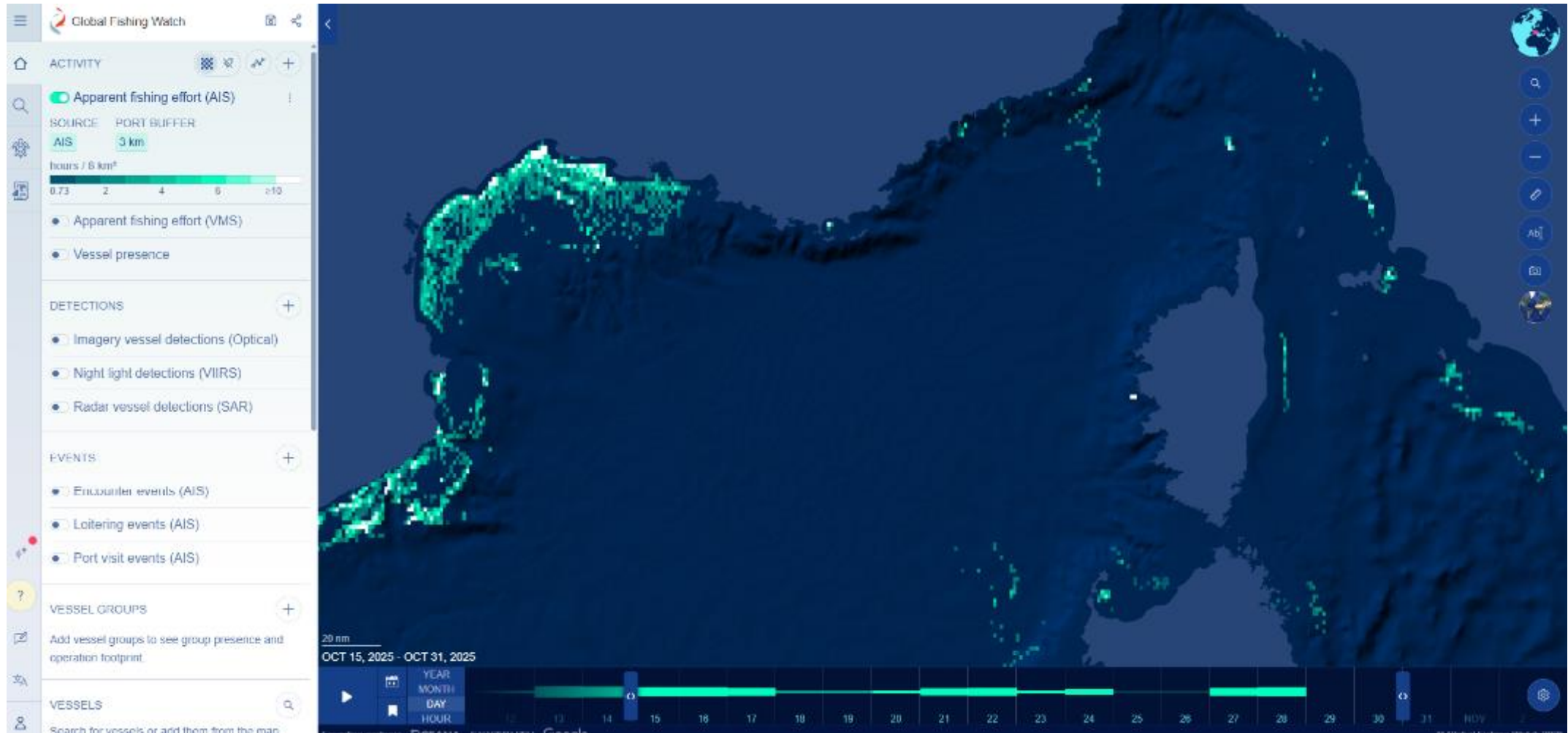
Total number of stocks



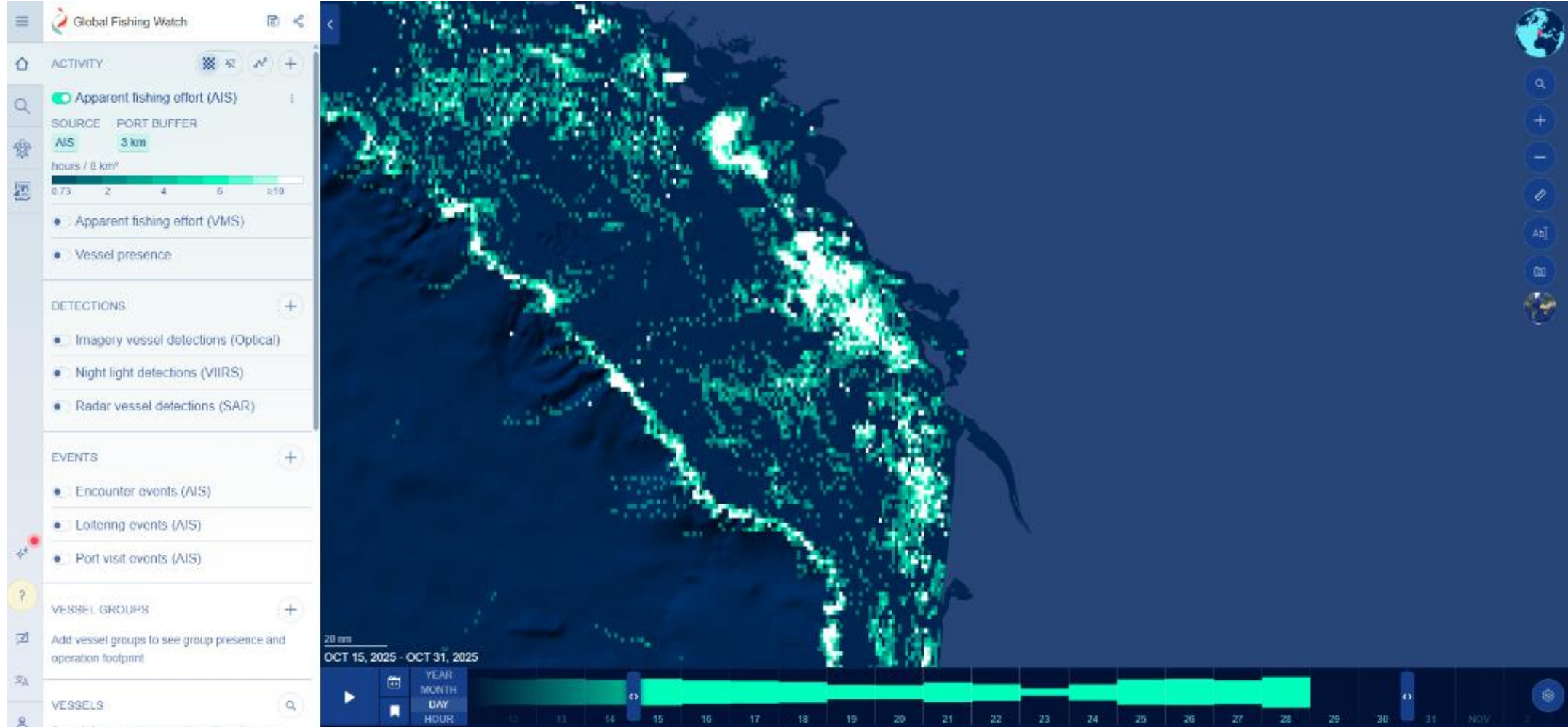
Fishing effort



Fishing effort – North Tyrrhenian



Fishing effort – Atlantic France



Fisheries

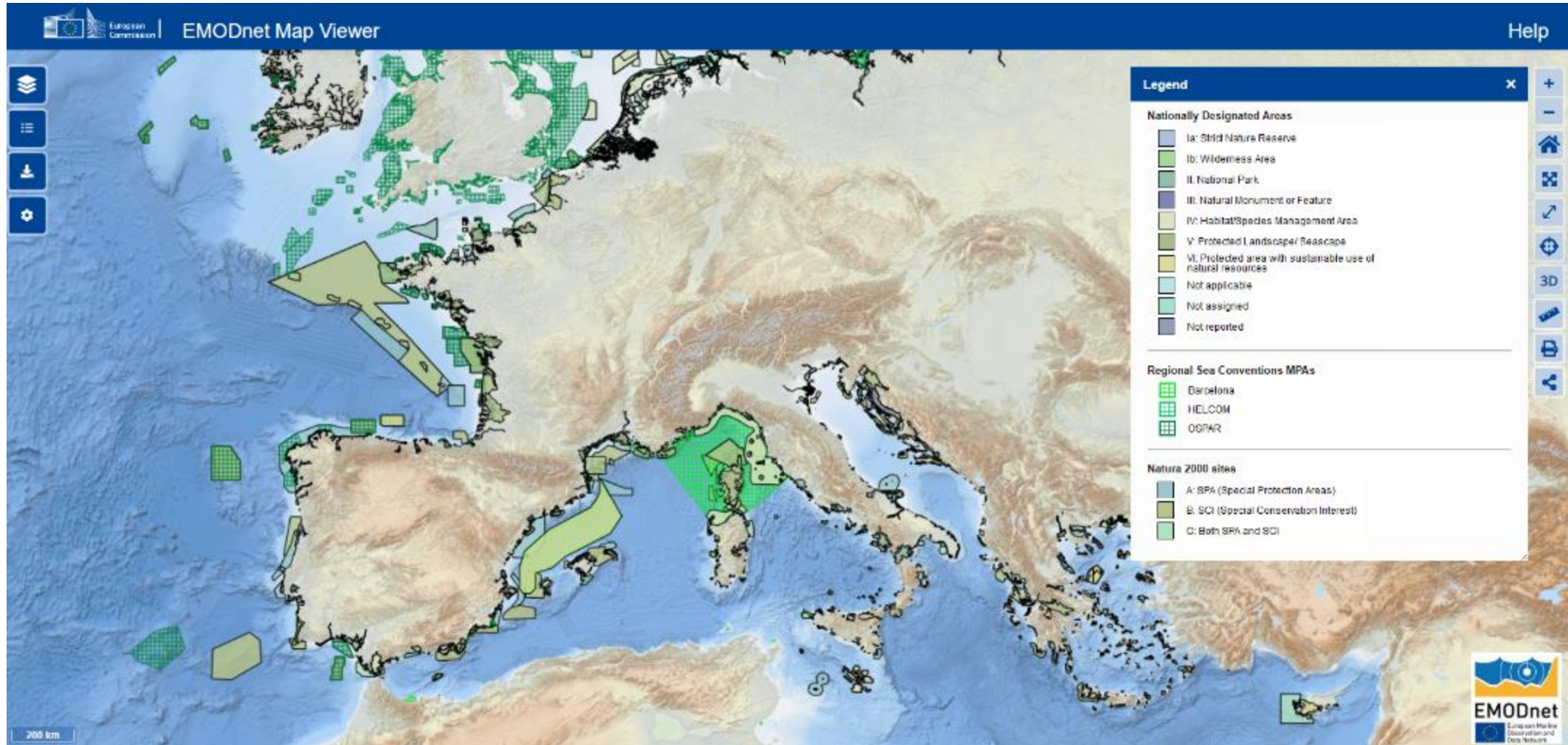
Impacts:

- Reduction in access to or exclusion from established fishing grounds.
- Displacement of fishing activity leading to gear conflict and increased fishing pressure on adjacent grounds.
- Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity.
- Increased vessel traffic associated within fishing grounds leading to interference with fishing activity.
- Physical presence of infrastructure and potential exposure of that infrastructure leading to gear snagging.

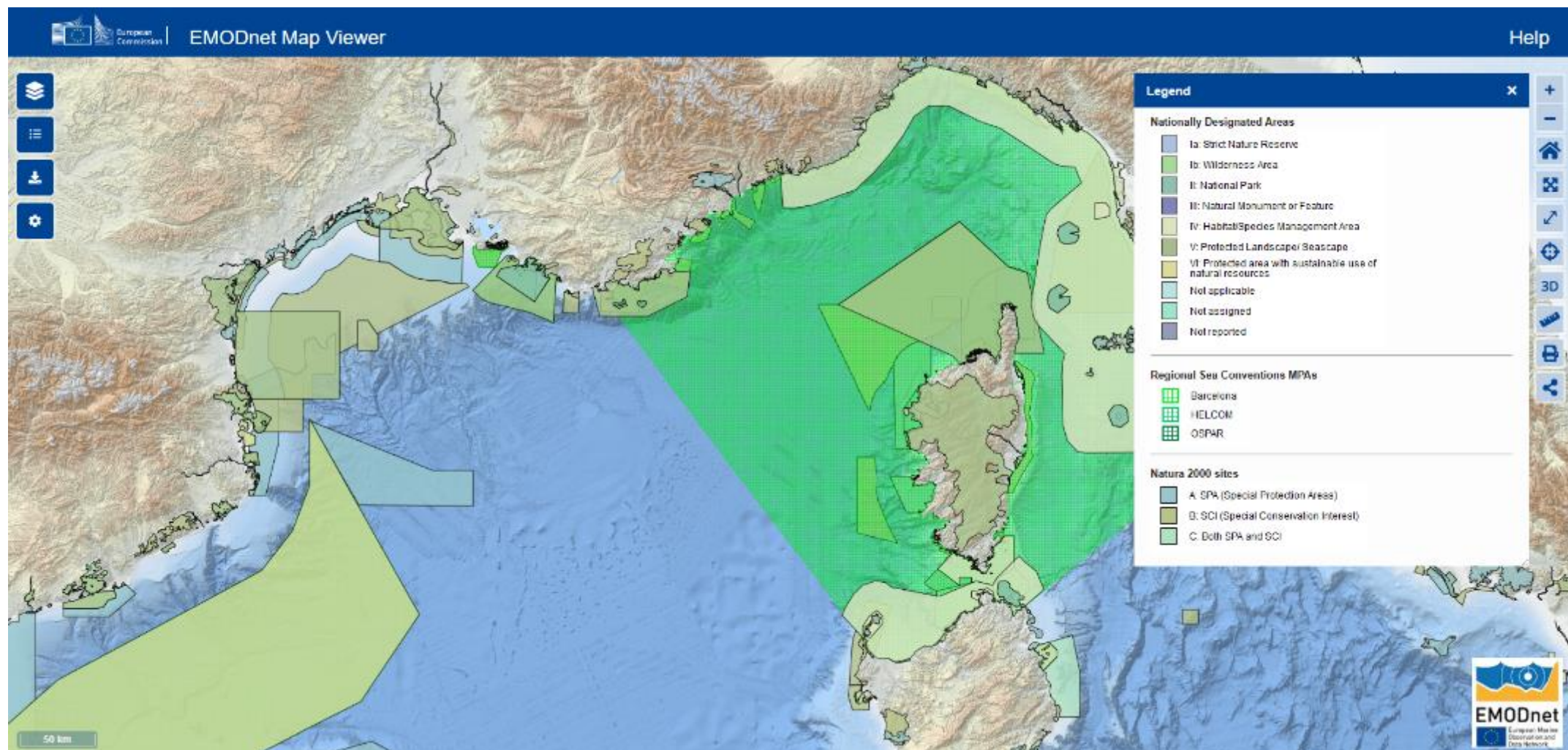
Mitigation strategies:

- Development of and adherence to a Fisheries Management and Mitigation Strategy.
- Participation in any fisheries working group to assist with liaison between Projects and the fishing community.
- Adherence to best practice guidance with regards to fisheries liaison and procedures in the event of interactions between the Project and fishing activities.
- Appointment of a Company Fisheries Liaison Officer (CFLO). The CFLO will support ongoing liaison and ensure clear communication between the Project and commercial fisheries.

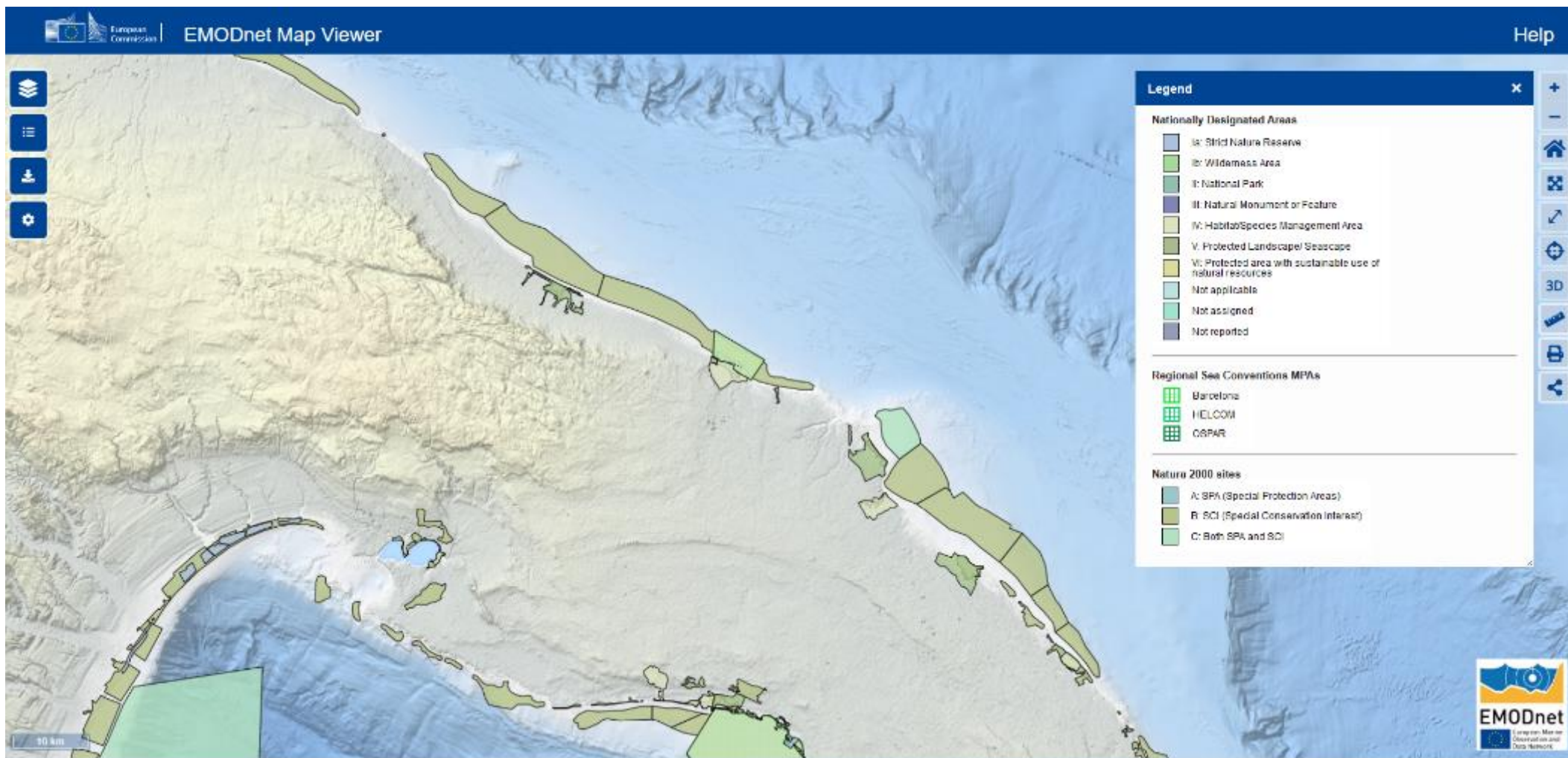
Protected areas

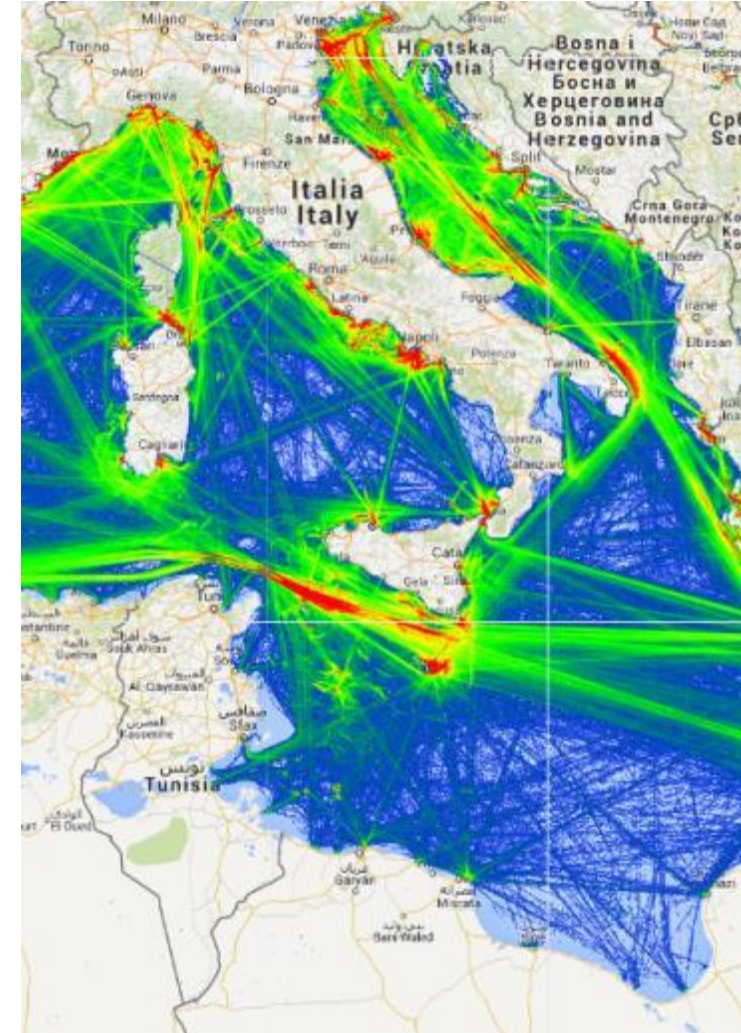
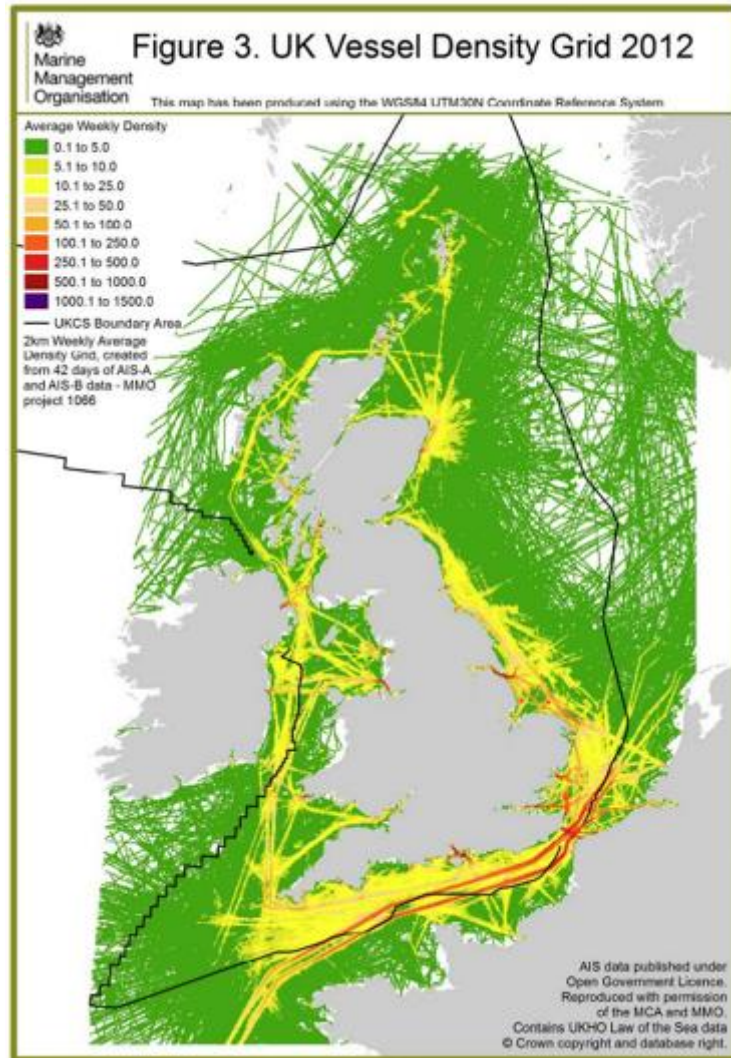


Protected areas – North Tyrrenian



Protected areas – Central Apulia





Shipping

Impacts on shipping and navigation

- Increased vessel to vessel collision risk resulting from displacement around the construction, O&M and decommissioning area.
- Presence of partially constructed O&M and decommissioning surface structures will create new collision risk to vessels under power.
- Impact access to ports.
- Presence of sub surface infrastructure e.g., cable protection or mooring may lead to an increase in under keel interaction risk or may lead to an increase in anchor and fishing gear interaction risk.
- Loss of floating unit may lead to additional collision risk.
- Interference with navigation, communications and position fixing equipment (EMF effects).
- Reduction of Search and Rescue capability.

Mitigation strategies for shipping

- Application for and use of Safety Zones during construction, maintenance and decommissioning.
- Marine Pollution Contingency Plan to be developed.
- Development of and adherence to a Lighting and Marking Plan.
- Development of and adherence to a Navigation Safety Plan and Vessel Management Plan.
- Development and adherence to a Development Specification and Layout Plan.
- Compliance with regulatory expectation on moorings for floating wind and marine devices.
- Compliance with MCA MGN 654.
- Appropriate marking of Projects on Admiralty and aeronautical charts.

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Closing remarks

Key issues during permitting

- Relevant issues perceived by the public
 - Impact on tourism
 - Visual impact
 - Impact on fisheries
 - Lack of economic benefits
- Emerging issues for regulators
 - Impacts on microclimate / local oceanography
 - Release of pollutants/health risks
 - Navigation safety risks
 - Landing and onshore infrastructures

Key uncertainties

- Effects of large-scale Fish Aggregating Device effects
- Impact on benthic communities
- Impact of fish bans on fish stocks – spillover effect
- Attraction of piscivorous species – fish and mammals
- Increased risk of collision
- Potential change in migratory behaviors (tuna – cetacean)
- Electromagnetic field effects (interarray cables)
- Cumulative impacts



Thank you

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