



ENPI
CBCMED
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN



RISK ASSESSMENT ANALYSIS ON OFFSHORE PLATFORMS IN SOUTH EAST MEDITERRANEAN (RAOP-MED)

*Analysis of Socioeconomic Data and Development
of Integrated Sensitivity Maps*



Scope of work

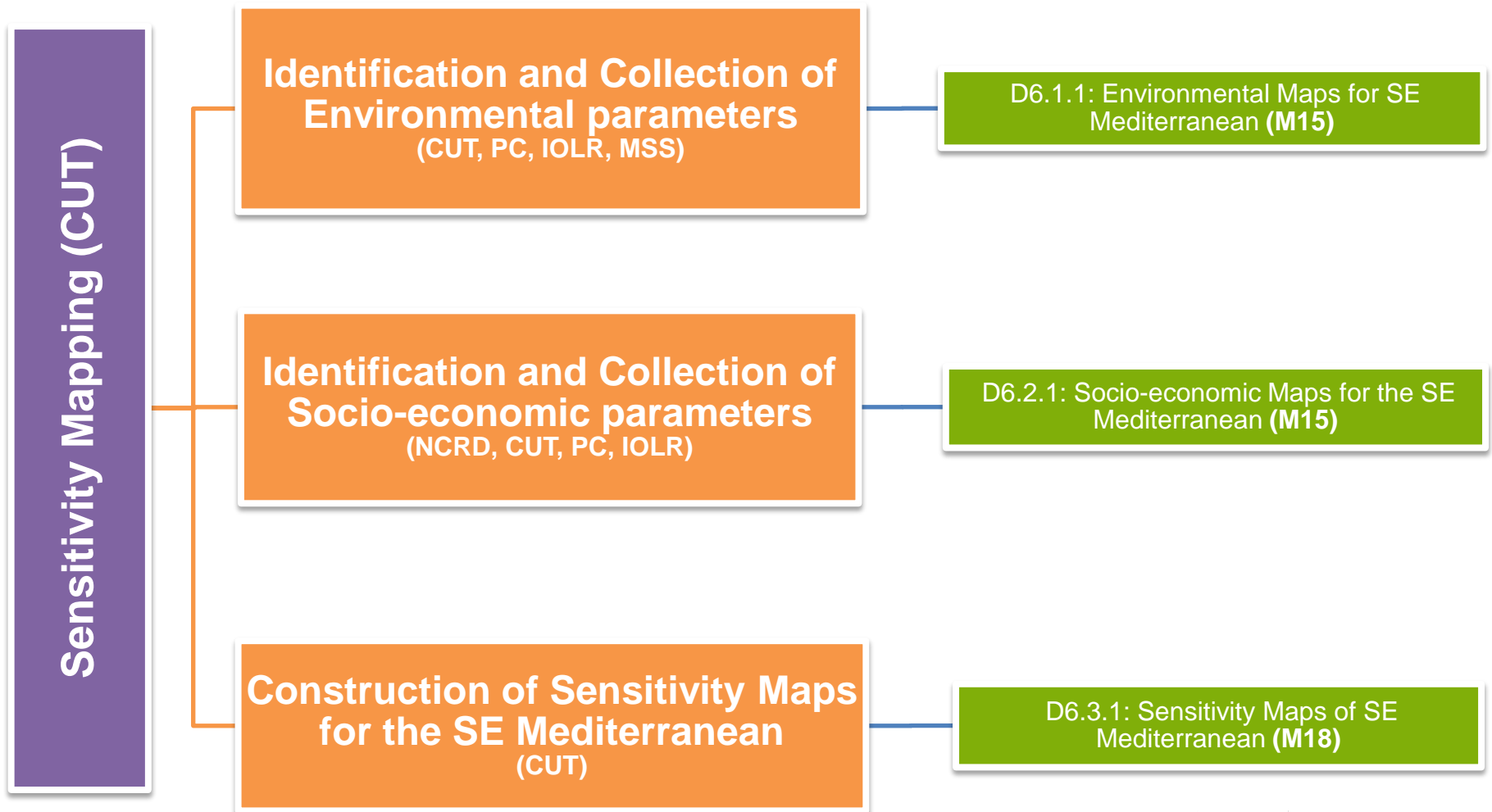
Identification and collection of all the main environmental parameters that are required for the development of Environmental Maps

Identification and collection of all the main socioeconomic parameters that are required for the development of Socioeconomic Maps

Synthesis/integration of Environmental and Socioeconomic Maps for the complete Sensitivity Mapping for the whole South-East Mediterranean

Combination of Sensitivity Maps with Oil Spill Probability Occurrence data in order to develop Integrated Risk Assessment Maps

The work falls within WP6 of the project



Tools for GIS and Sensitivity Maps



QGIS (previously known as "Quantum GIS")

QGIS is a cross-platform free and open-source desktop geographic information system (GIS) application that provides data viewing, editing, and analysis capabilities.

Allows users to create maps with many layers using different map projections.

Maps can be assembled in different formats and for different uses.

QGIS allows maps to be composed of raster or vector layers.

Typical for this kind of software the vector data is stored as either point, line, or polygon-feature.

Different kinds of raster images are supported and the software can perform image geo-referencing.

QGIS provides integration with other open-source GIS packages, including PostGIS, GRASS, and MapServer to give users extensive functionality.



Tools for GIS and Sensitivity Maps



OpenStreetMap (OSM)

OpenStreetMap (OSM) is a collaborative project to create a free editable map of the world

Rather than the map itself, the data generated by the OpenStreetMap project is considered its primary output.

Data is available for use in both traditional applications, like its usage by Craigslist, OsmAnd, Geocaching, MapQuest Open, JMP statistical software, and Foursquare to replace Google Maps, and more unusual roles, like replacing default data included with GPS receivers

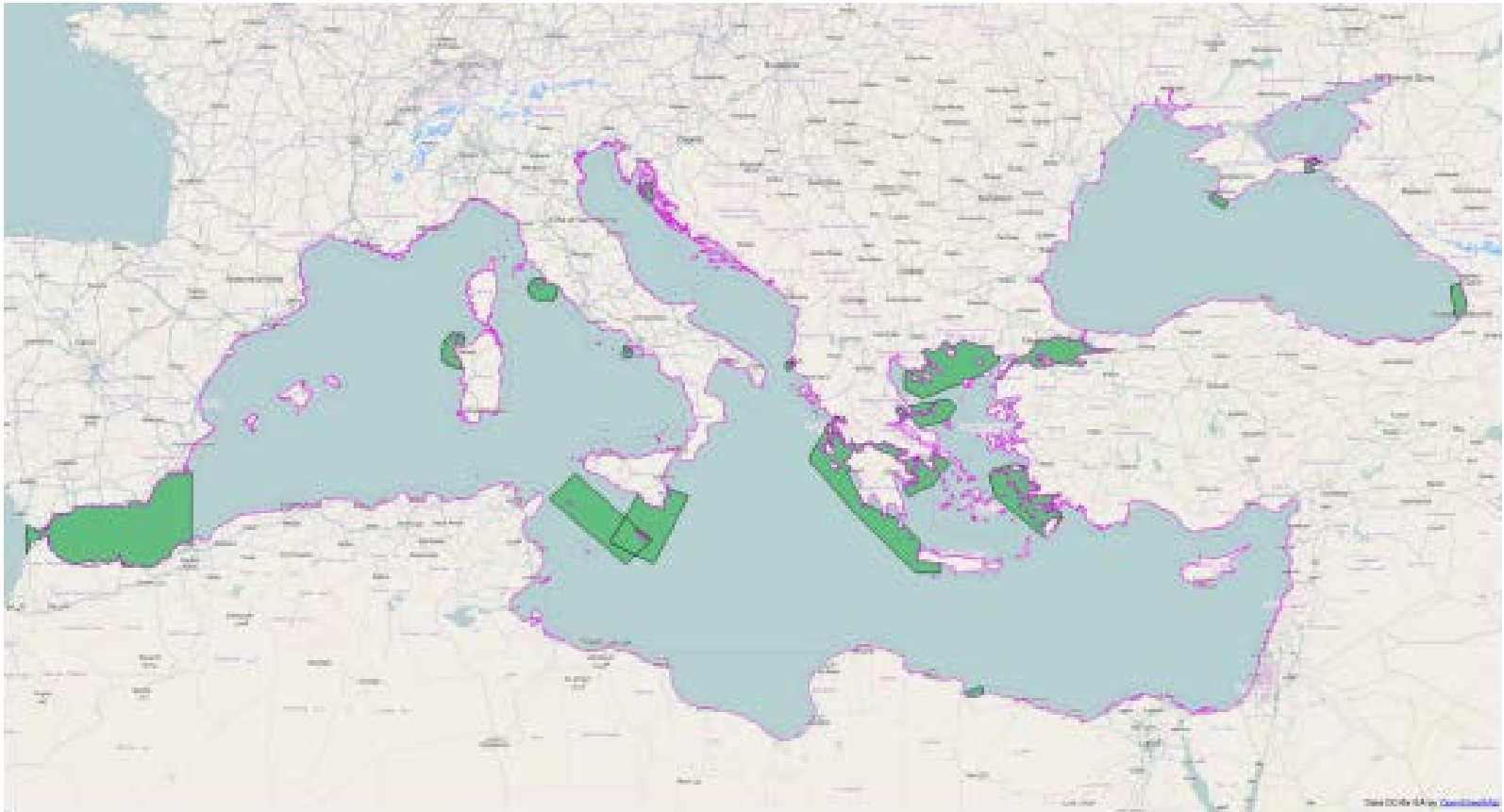
Environmental Parameters

Identified Environmental Parameters

Code	Description
E0	Shoreline type
E1	Areas of special importance for cetaceans in the ACCOBAMS area
E2	Coralligenous areas
E3	Ecologically or Biologically Significant marine Areas (EBSAs)
E4	Fisheries restricted areas
E5	Potential Special Protected Areas of Mediterranean Importance (SPAMIs)
E6	Sea grass areas
E7	Natura areas
E8	PELAGOS Sanctuary for Mediterranean Marine Mammals
E9	Prospective Special Protected Areas of Mediterranean Importance (SPAMIs)
E10	Seabird distribution data in the Mediterranean sea
E11	Potential fishery areas in SPAMIs
E12	Specially Protected Areas of Mediterranean Importance (SPAMIs)

Environmental Maps

Environmental Mapping: Parameter E1 (cetaceans)



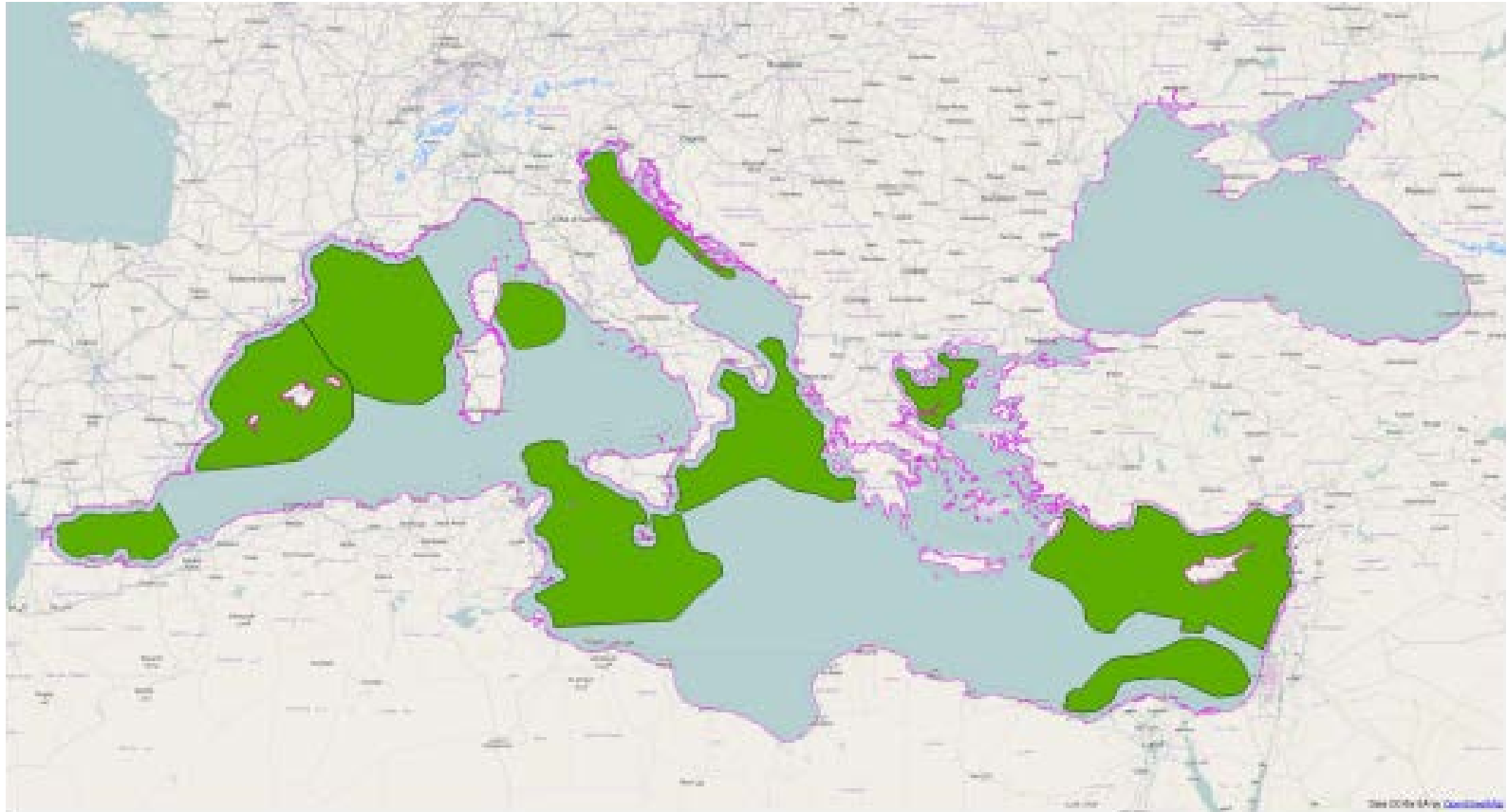
Environmental Maps

Environmental Mapping: Parameter E2 (Coralligenous areas)



Environmental Maps

Environmental Mapping: Parameter E3 (EBSAs)



Environmental Maps

Environmental Mapping: Parameter E7 (Natura areas)



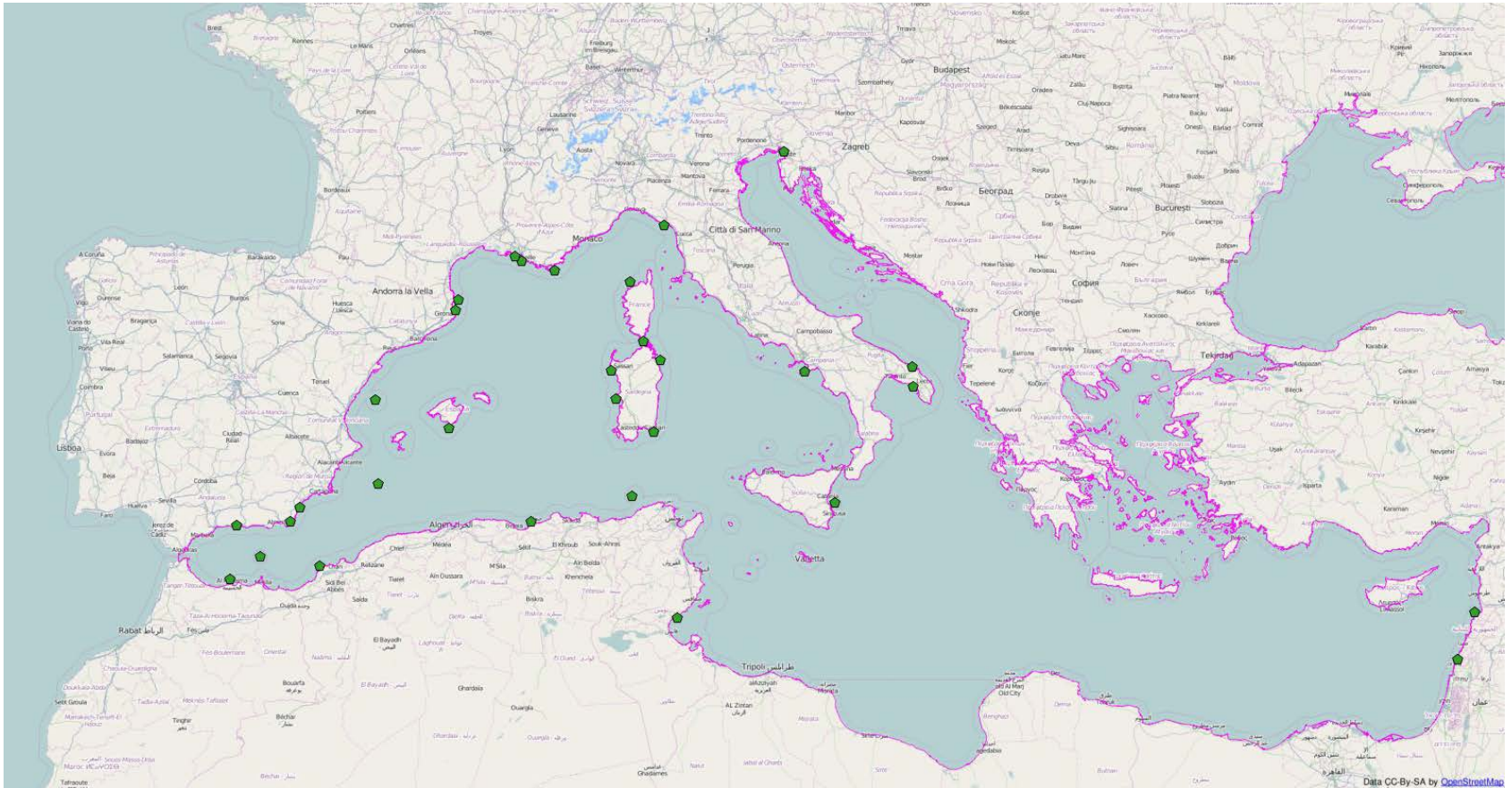
Environmental Maps

Environmental Mapping: Parameter E10 (seabird distribution)



Environmental Maps

Environmental Mapping: Parameter E12 (SPAMIs)



Socioeconomic Parameters

Identified Socioeconomic Parameters

Code	Description
S1	Desalination plants in the Mediterranean sea
S2	Power plants in the Mediterranean sea
S3	Leisure ports in the Mediterranean sea
S4	Commercial ports in the Mediterranean sea
S5	Hotels
S6	Contribution of Travel & Tourism to Total GDP

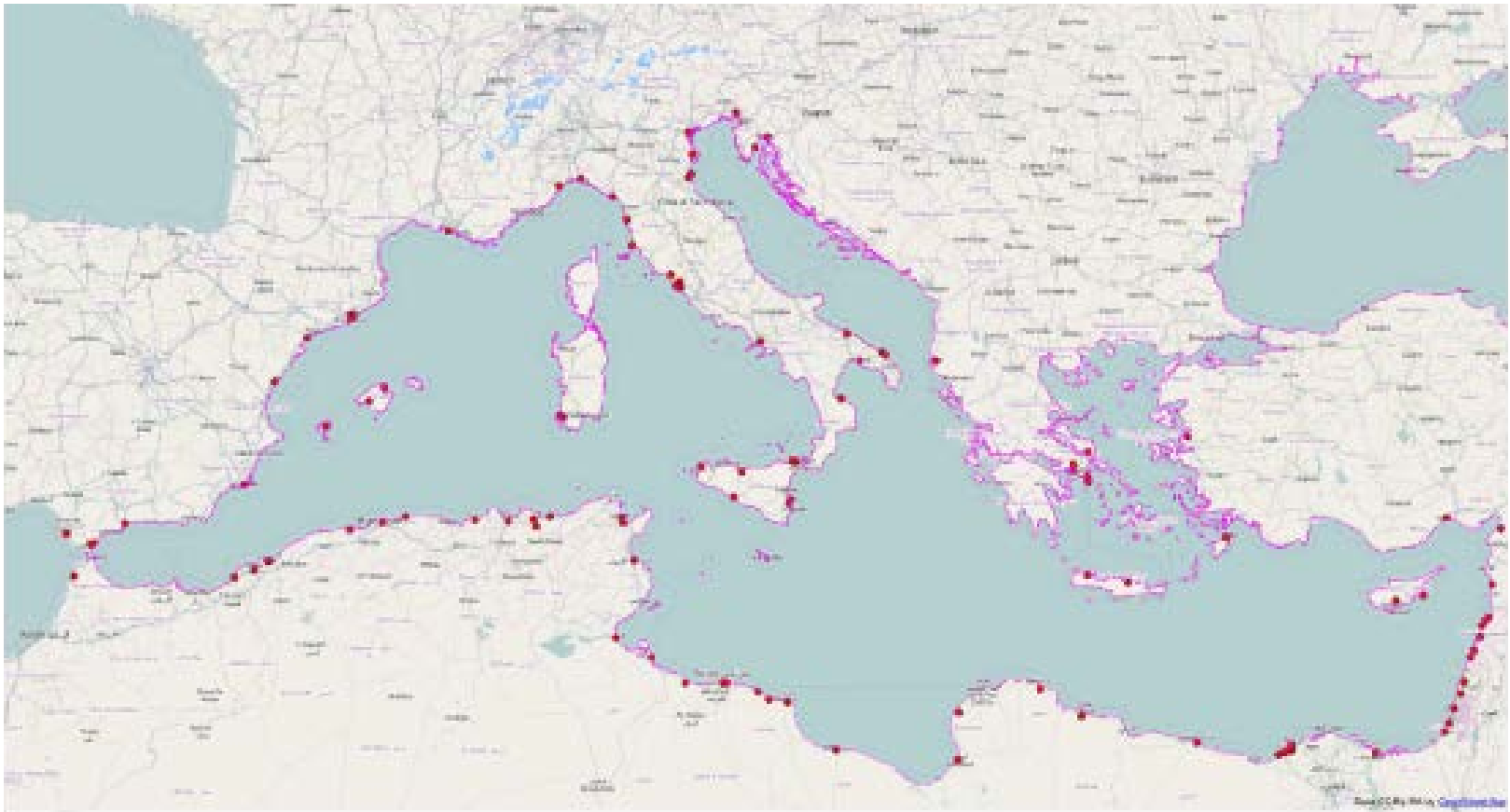
Socioeconomic Maps

Socioeconomic Mapping: Parameter S1 (Desalination Plants)



Socioeconomic Maps

Socioeconomic Mapping: Parameter S2 (Power Plants)



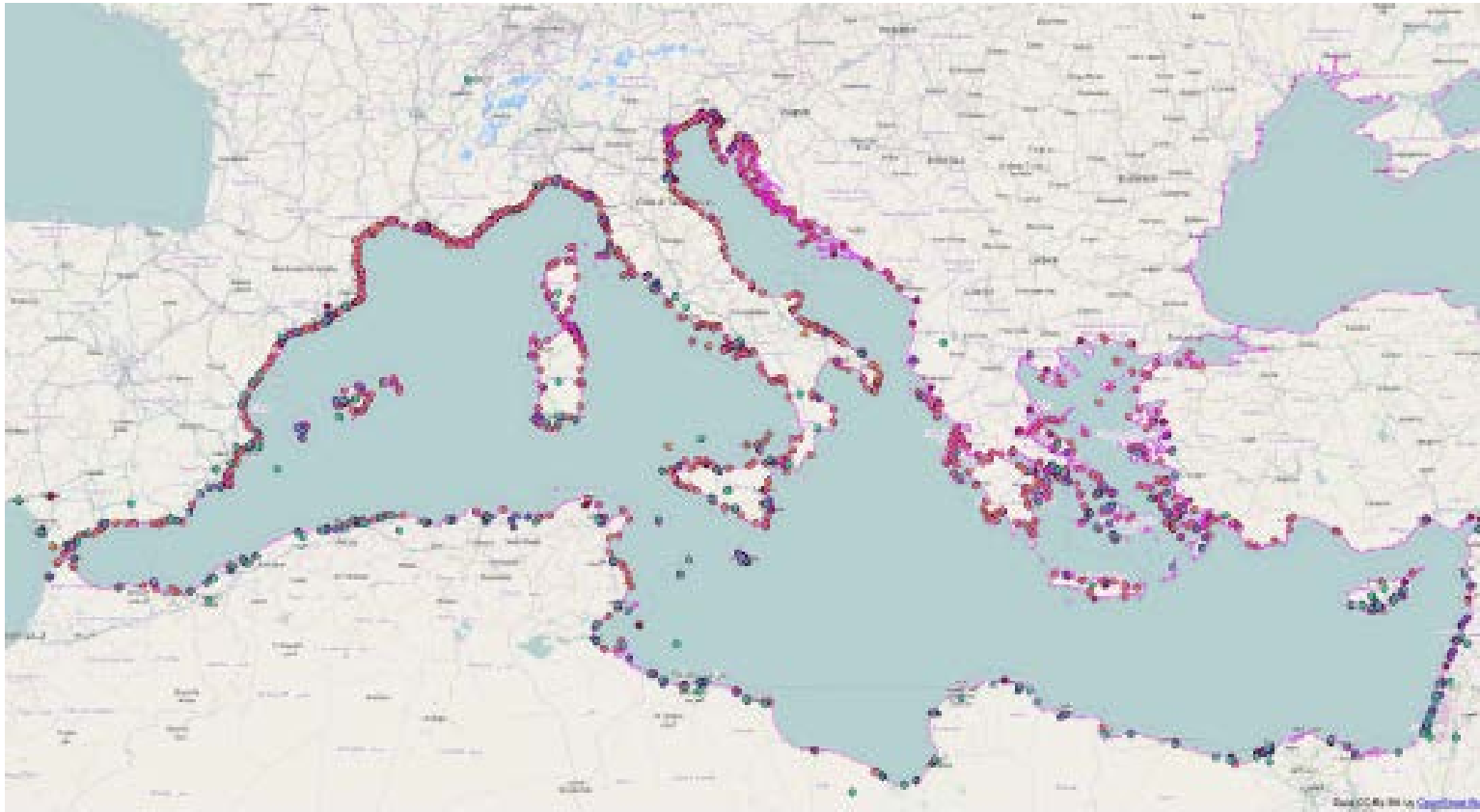
Socioeconomic Maps

Socioeconomic Mapping: Parameter S4 (Commercial Ports)



Socioeconomic Maps

Multi-parameter Maps



- Desalination Plants
- Power Plants
- Commercial Ports

Sensitivity Modeling

Sensitivity Mapping: Mathematical model

$$E = \frac{\sum_{i=1}^{12} (WF_{E_i} \cdot e^{-\frac{CDE_i \cdot X}{5}}) + SLT \cdot e^{-X}}{13}$$

$$S = \frac{\sum_{j=1}^6 (WF_{S_j} \cdot e^{-\frac{CDS_j \cdot X}{5}})}{6}$$

$$IESI = \frac{E + S}{2}$$

E: Environmental Index

S: Socioeconomic Index

IESI: Integrated Environmental Sensitivity Index

SLT: Shoreline code (values from 1-10)

X: distance from the point of interest in km

WFE_i: integrated weight factor of Environmental Parameter i

WFS_j: integrated weight factor of Socioeconomic Parameter j

CDE_i: Change with Distance Factor of Environmental Parameter i

CDS_j: Change with Distance Factor of Socioeconomic Parameter j

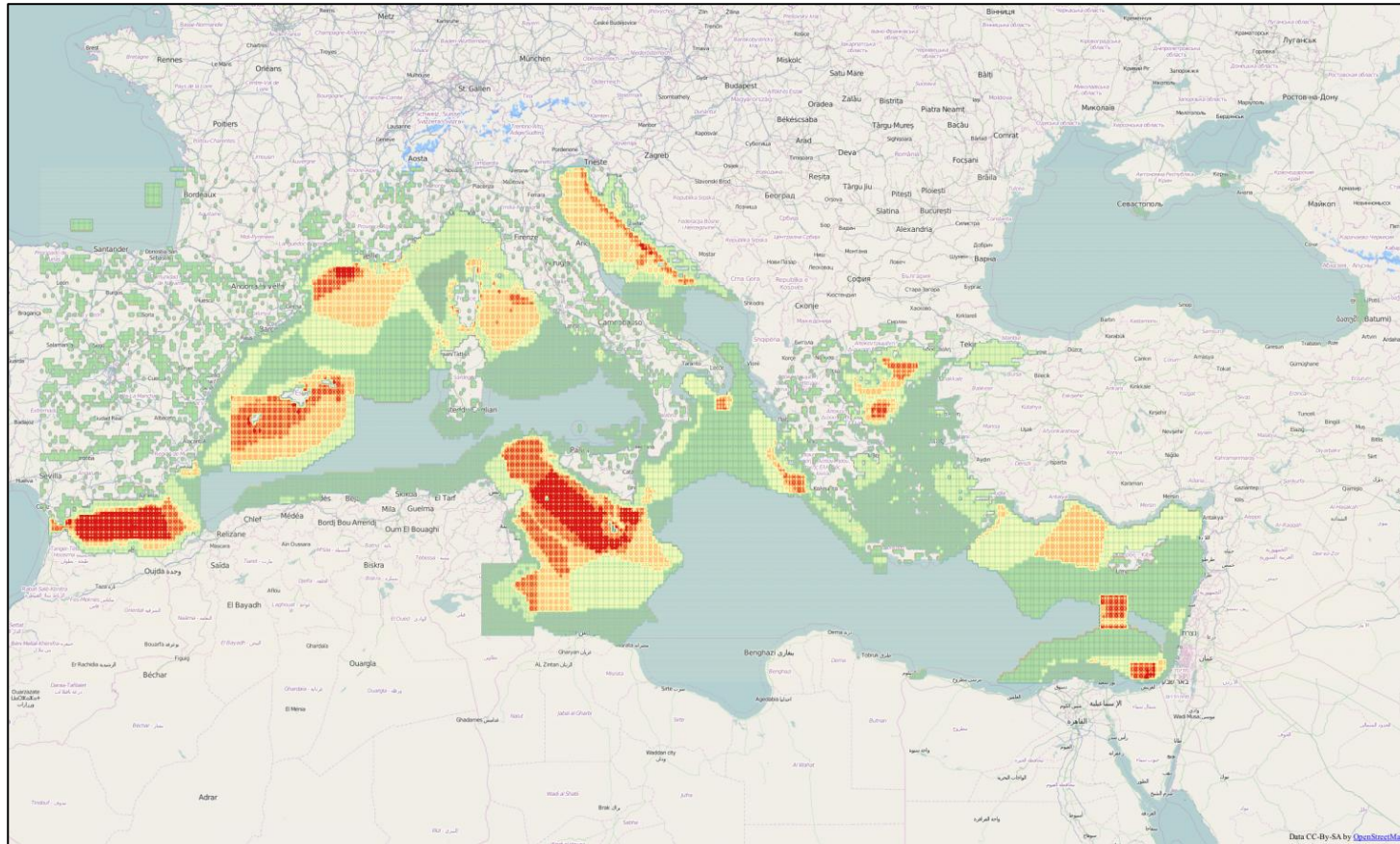
Sensitivity Modeling

Sensitivity Mapping: Weight Factors

Code	Description	WF 1	WF 2	AVG WF	CD
E1	Areas of special importance for cetaceans in the ACCOBAMS area	7.10	8.10	5.75	3.60
E2	Coralligenous areas	6.70	7.20	4.82	3.10
E3	Ecologically or Biologically Significant marine Areas (EBSAs)	7.90	8.70	6.87	3.30
E4	Fisheries restricted areas	7.10	8.70	6.18	3.90
E5	Potential Special Protected Areas of Mediterranean Importance (SPAMIs)	6.80	7.80	5.30	3.70
E6	Sea grass areas	6.64	7.36	4.89	4.00
E7	Natura areas	7.82	8.36	6.54	3.73
E8	PELAGOS Sanctuary for Mediterranean Marine Mammals	7.10	7.70	5.47	4.00
E9	Prospective Special Protected Areas of Mediterranean Importance (SPAMIs)	7.00	7.36	5.15	3.73
E10	Seabird distribution data in the Mediterranean sea	6.82	7.18	4.90	2.36
E11	Potential fishery areas in SPAMIs	7.18	8.00	5.75	3.64
E12	Specially Protected Areas of Mediterranean Importance (SPAMIs)	8.00	8.00	6.40	3.70
S1	Desalination plants in the Mediterranean sea	6.82	7.27	4.96	3.55
S2	Power plants in the Mediterranean sea	7.18	6.55	4.70	3.82
S3	Leisure ports in the Mediterranean sea	6.55	5.64	3.69	4.36
S4	Commercial ports in the Mediterranean sea	7.55	4.73	3.57	4.45
S5	Hotels	7.55	7.18	5.42	4.09
S6	Contribution of Travel & Tourism to Total GDP	8.18	7.73	6.32	4.00

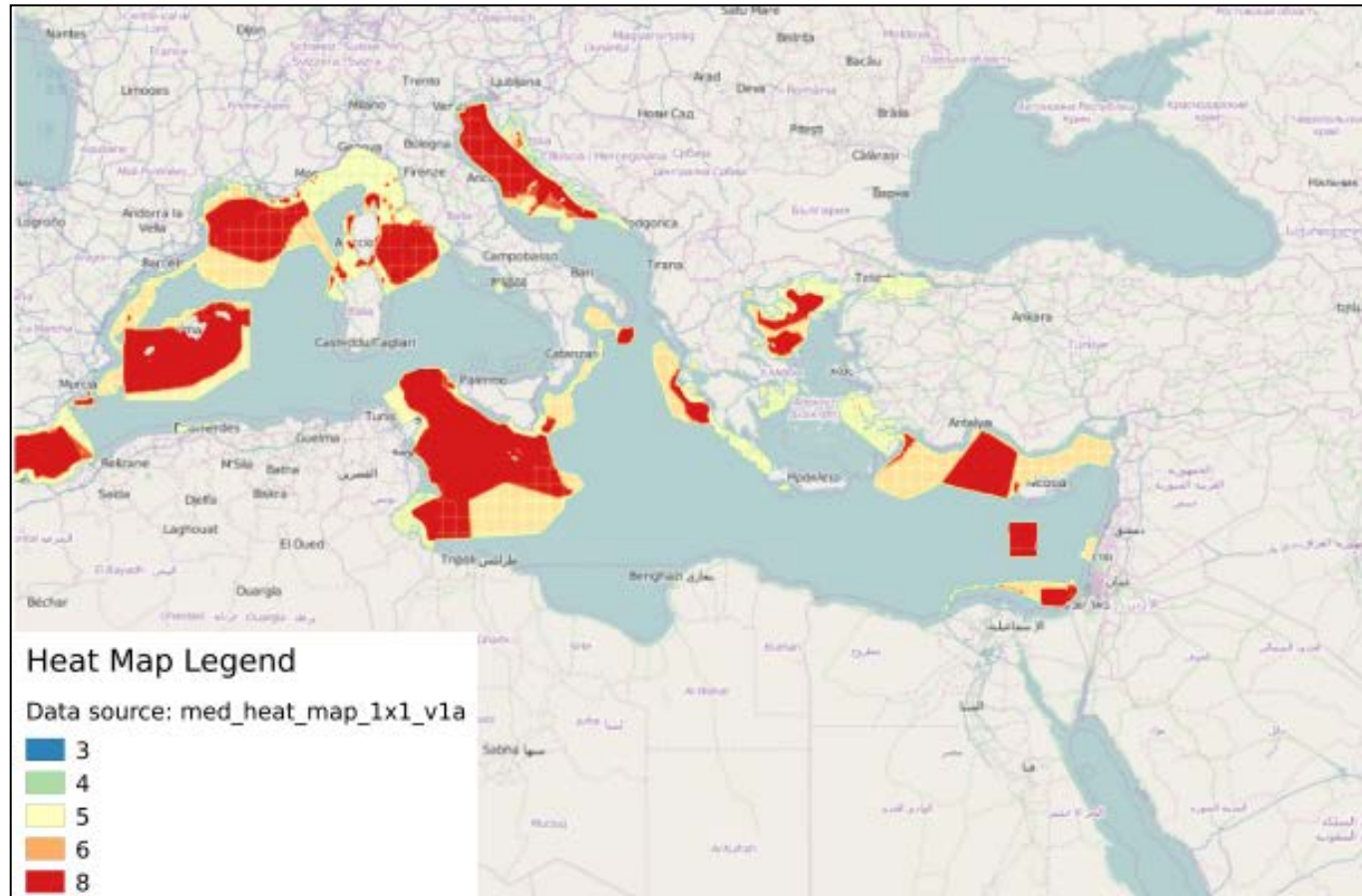
Integrated Sensitivity Maps

Sensitivity Maps: Low resolution (10X10 km)



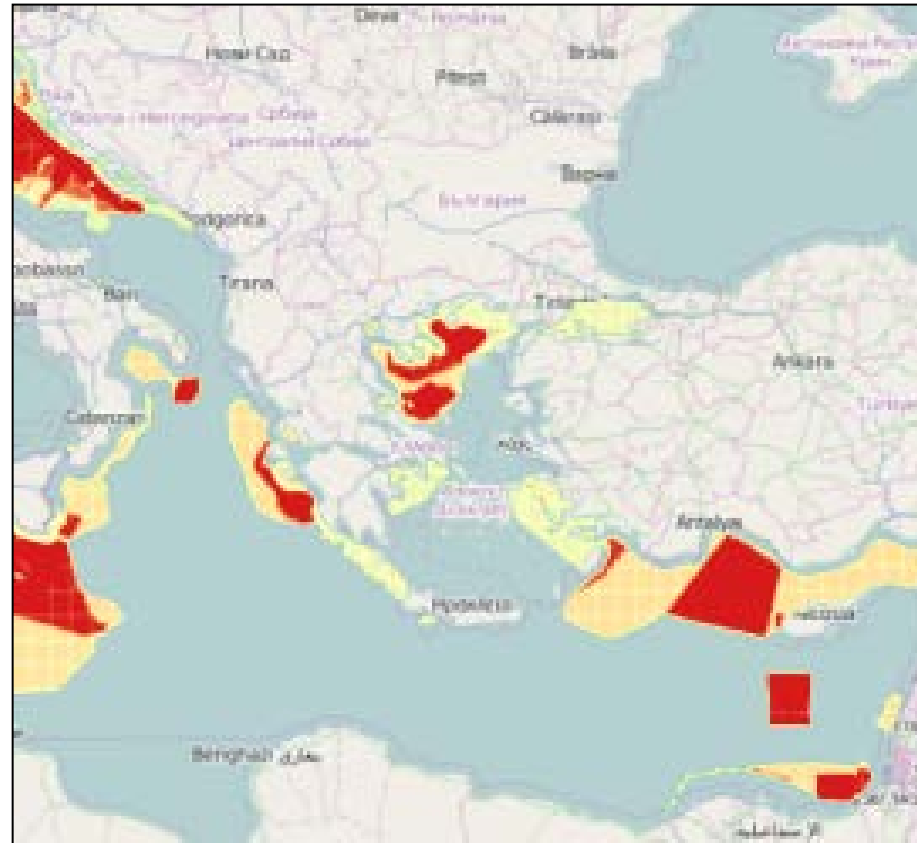
Integrated Sensitivity Maps

Sensitivity Maps: High resolution (1X1 km)



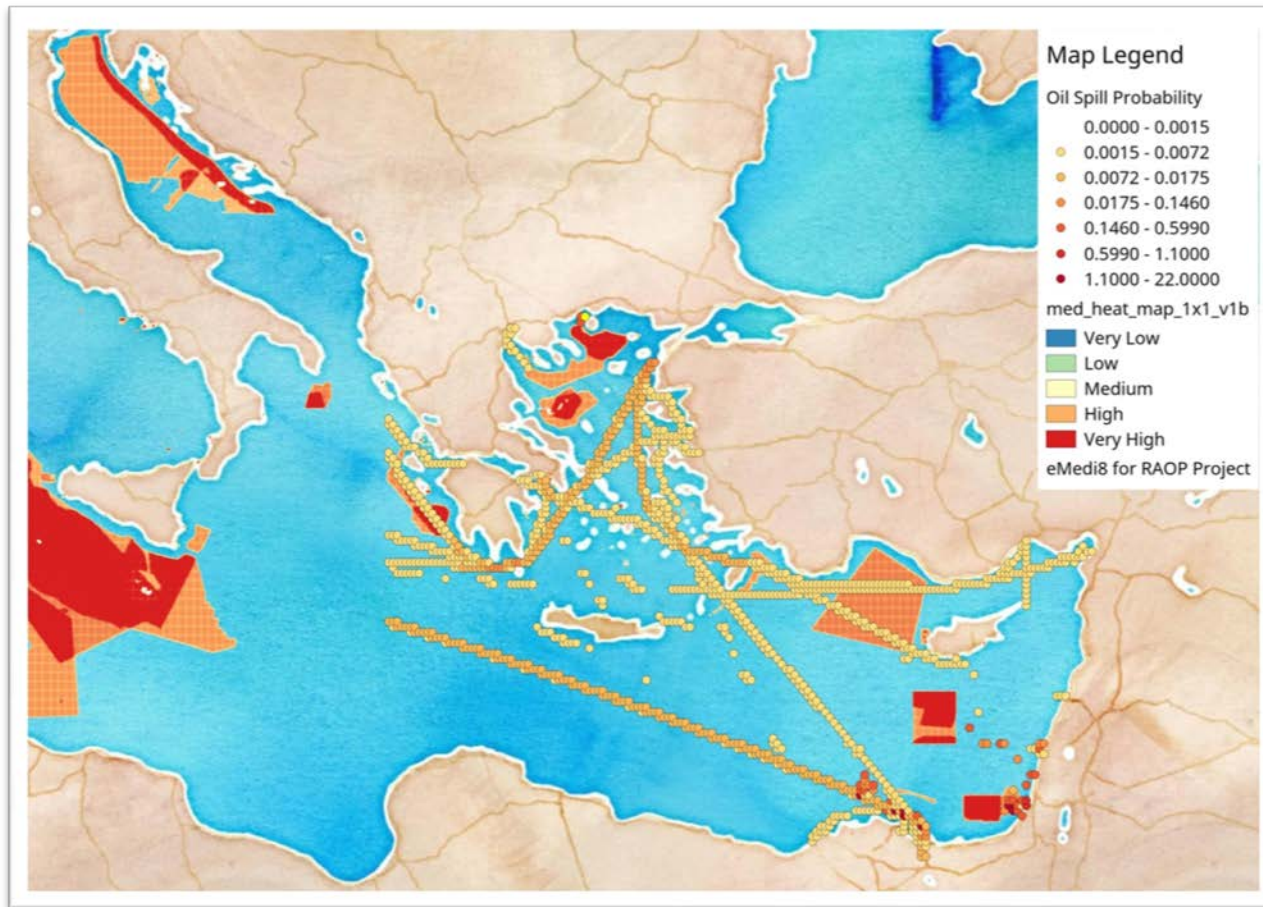
Integrated Sensitivity Maps

Sensitivity Maps



Integrated Risk Assessment Maps

Typical Risk Assessment Map





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Thank you!

