Marine Protected Areas networks in the eastern Mediterranean for the conservation of biodiversity and for the restoration of fishery resources

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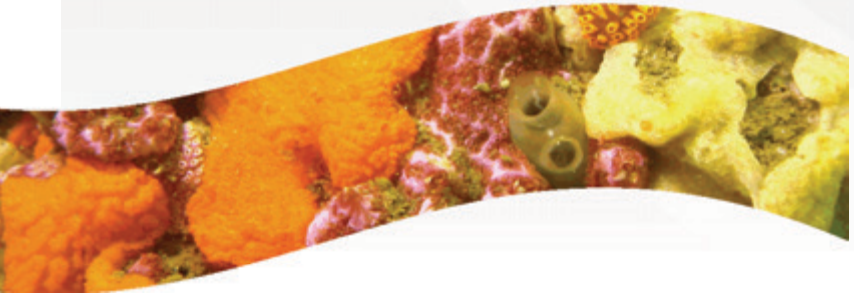
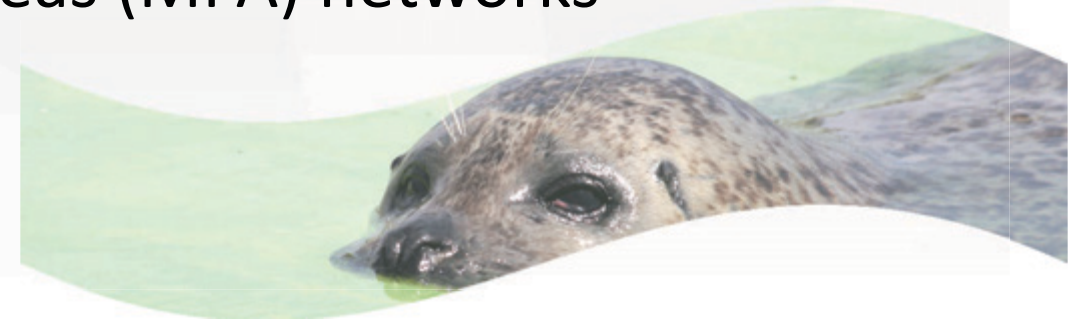
Background

- Human use of the sea increases
- Home of vulnerable marine habitats & species
- Majority of the main fish stocks in the Eastern Mediterranean seem to be overexploited
- Need for conservation and restoration
  - Marine Spatial Planning
  - Marine Protected Areas (MPA) networks





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marisca

Marine Spatial Planning in the Aegean Sea for the protection and conservation of biodiversity

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INSTITUTE OF MARINE RESEARCH

PROTOMEDEA
protecting mediterrannean east

Towards the establishment of Marine Protected Area Networks in the Eastern Mediterranean

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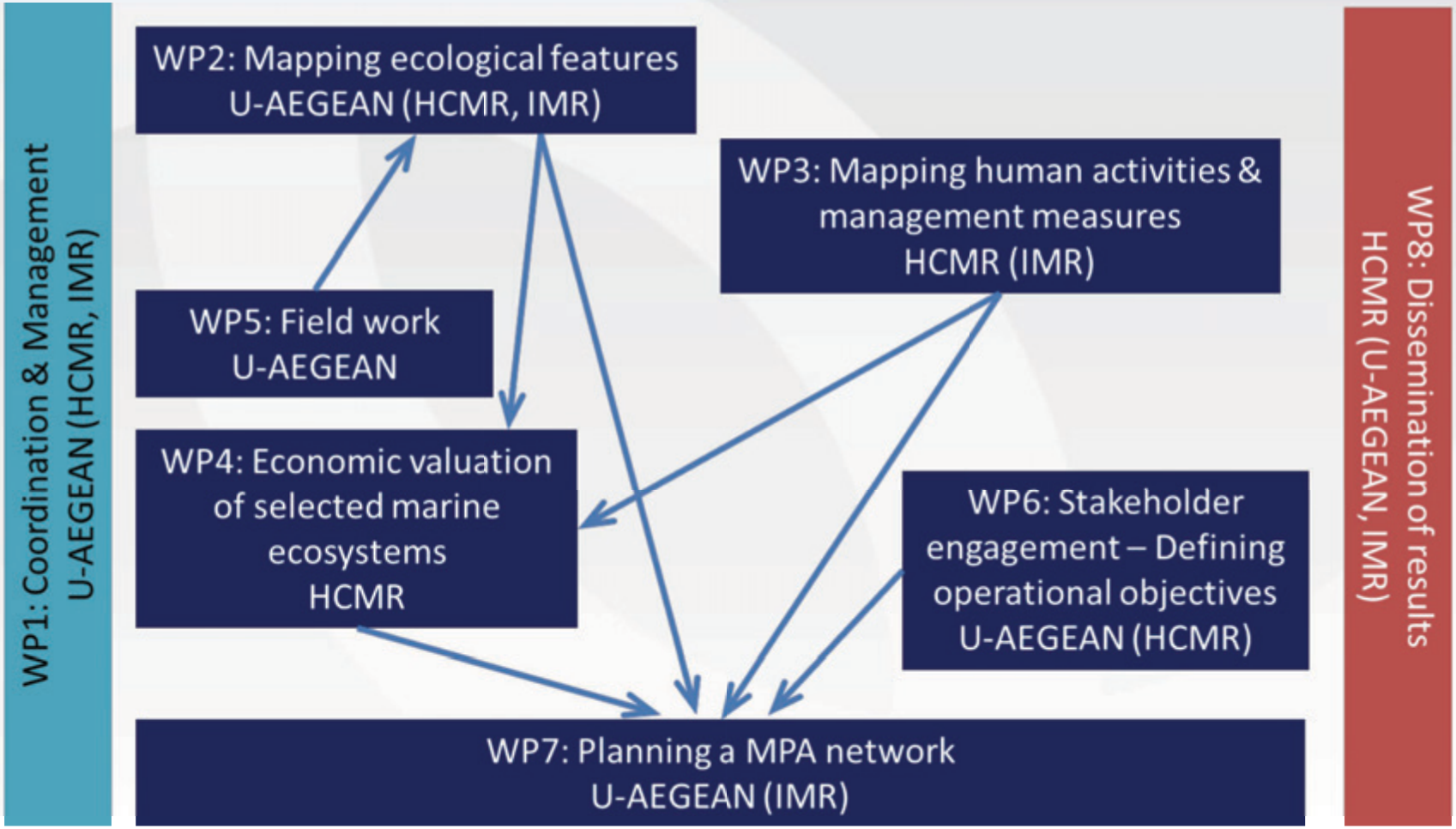
MARISCA in a nutshell

- 3 partners/2 countries
- 25 scientists
- 13 months
- 8 Work Packages (WPs)



MARISCA in a nutshell

main goal

to plan a network of MPAs/management zones

Contribution towards:

- MSP directive (2014/89/EU) – March 2021 deadline
- MSFD directive (2008/56/EC) – strategies, incl. MPA networks
- Habitats and Birds Directives (92/43/EEC & 2009/147/EC)

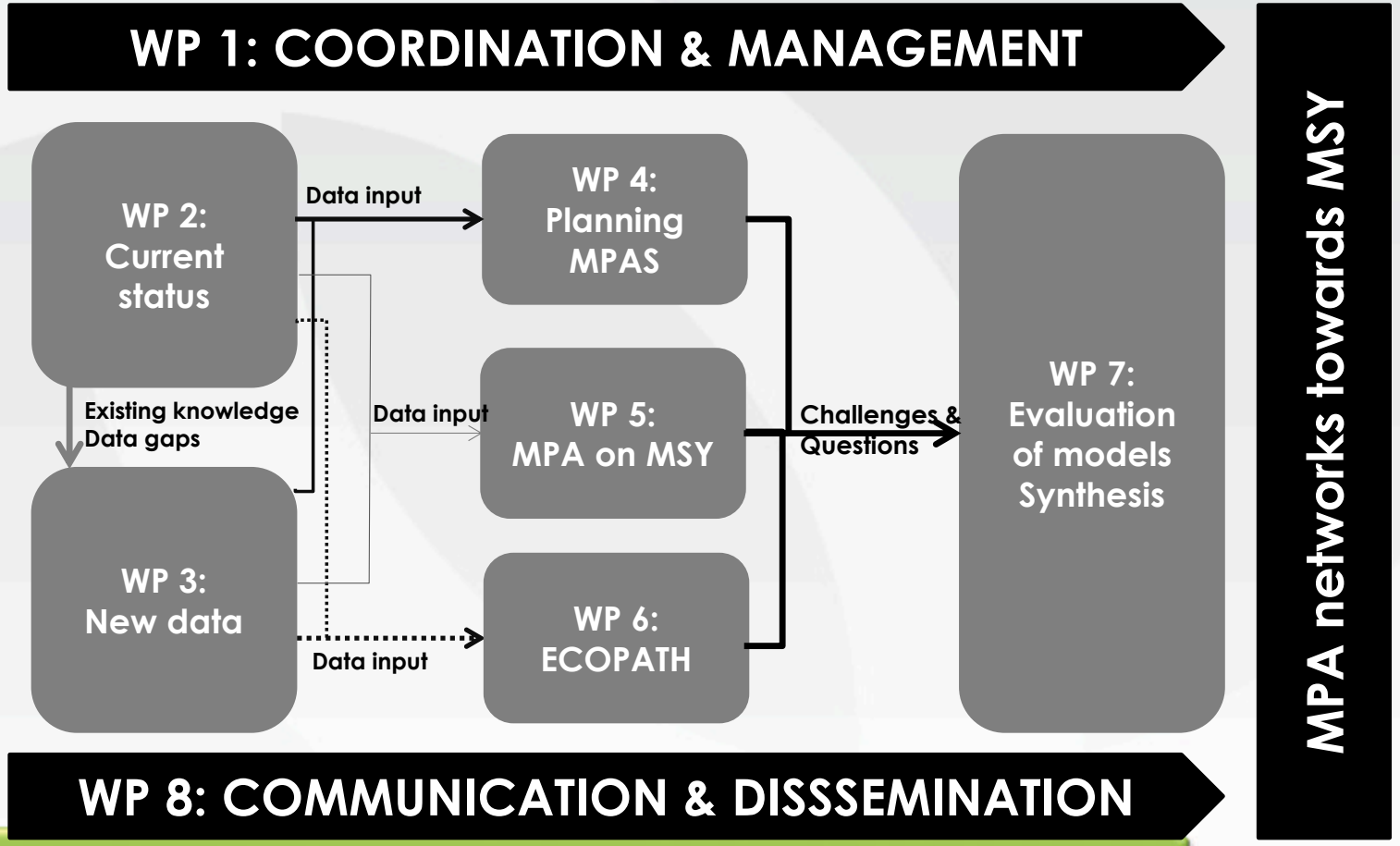
Maritime Spatial Planning in the Aegean Sea for the conservation and protection of biodiversity

MARISCA in a nutshell

- Mapping ecological features
- Estimating cumulative impacts of human activities
- Valuation of marine ecosystems
- Collecting new data through field work
- Involving stakeholders
- Designing a MPAs network in the context of MSP

PROTOMEDEA in a nutshell

- 7 partners/3 countries
- 35 scientists
- 36 months
- 8 WPs



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PROTOMEDEA in a nutshell

Objective

"to plan a network of MPAs in the Aegean Sea and Cyprus, that will take into consideration the protection of **ecological features of conservation importance** and **essential fish habitats**, **important areas for fisheries**, as well as the **socio-economic impact/cost** of additional fisheries restrictions, under a **participatory bottom-up procedure**"

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PROTOMEDEA in a nutshell

- mapping of existing MPAs and planning of proposed MPA networks
- mapping of essential fish habitats
- examination of the effect of MPA in achieving MSY objectives of the CFP
- development of ECOPATH models in selected case studies
- what-if-scenaria of MPA impacts on MSY -Ecopath/Ecospace models will be evaluated
  - consultation with stakeholders

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Data input

- Use of existing knowledge
- Collection of new data
  - collection of data to confirm / controlled low reliability data
  - verification of spatial distribution models
  - visual / sampling confirmation with field data (ground-truth) for remote sensing analysis
  - Through means of
    - Aerial photography
    - Side scan sonar
    - Underwater visual census
    - Fishing trials

Mapping of Ecological features

GIS layers ⇨spatial distribution of:

- **Habitats**
  - as in the Habitats Directive + additional habitats of conservation value

    (e.g. *Posidonia oceanica* beds, Reefs, Coralligenous communities)

- **Species**
  - protected species according to European & national legislation and international agreements, e.g.

    all cetaceans

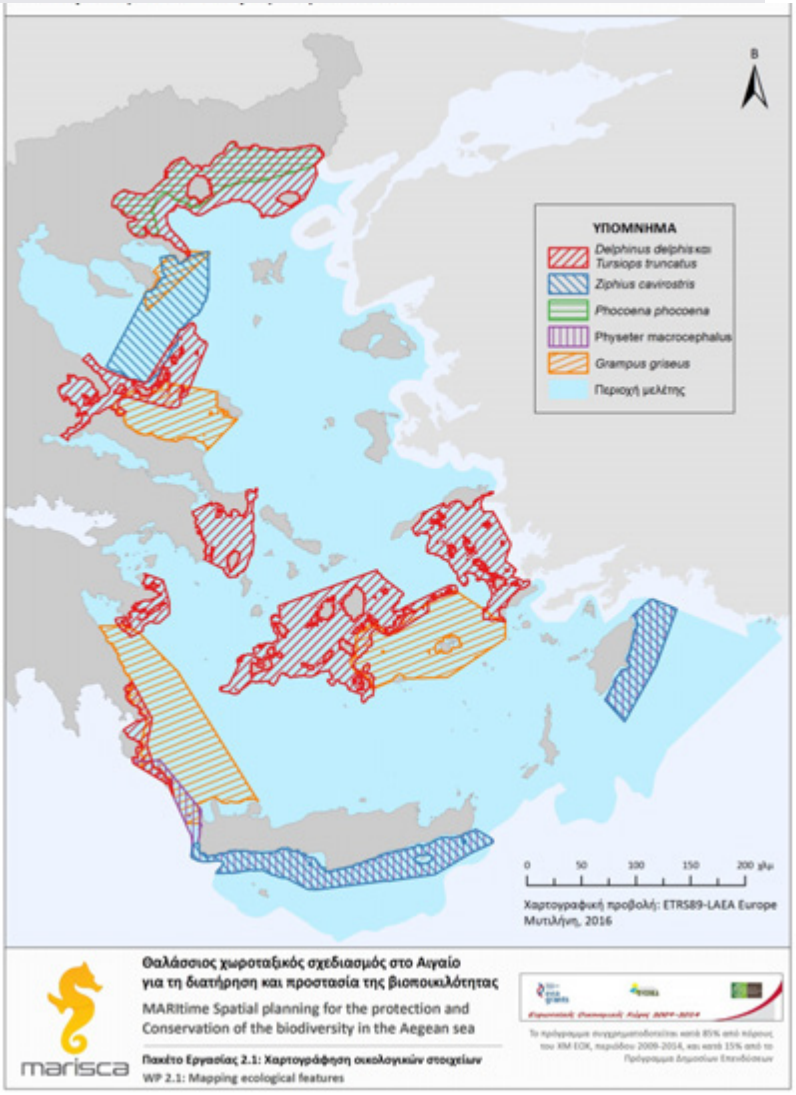
    monk seal *Monachus monachus*

    marine turtle *Caretta caretta*

    fan mussel *Pinna nobilis*

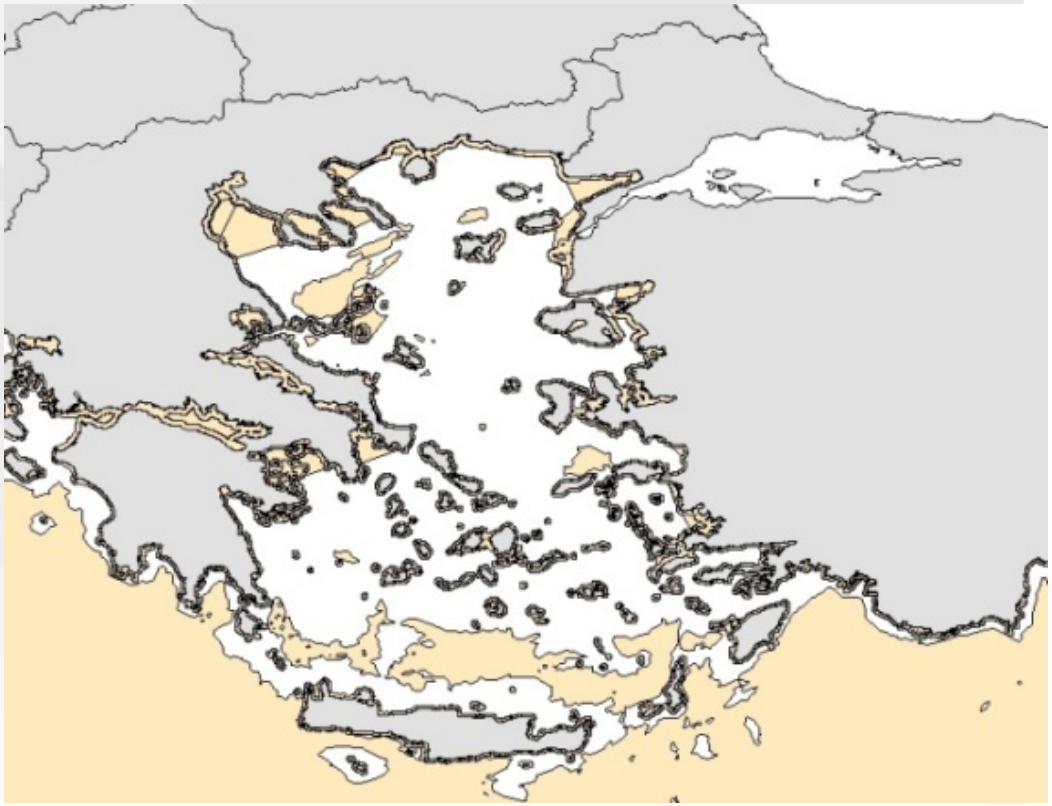
    date mussel *Lithophaga lithophaga*

    sea horses *Hippocampus* spp.



Mapping of current MPA status

- GIS layers of the spatial distribution of:
- existing MPAs in the study areas



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Mapping of current MPA status

GIS layers of the spatial distribution of:

- Essential fish habitats

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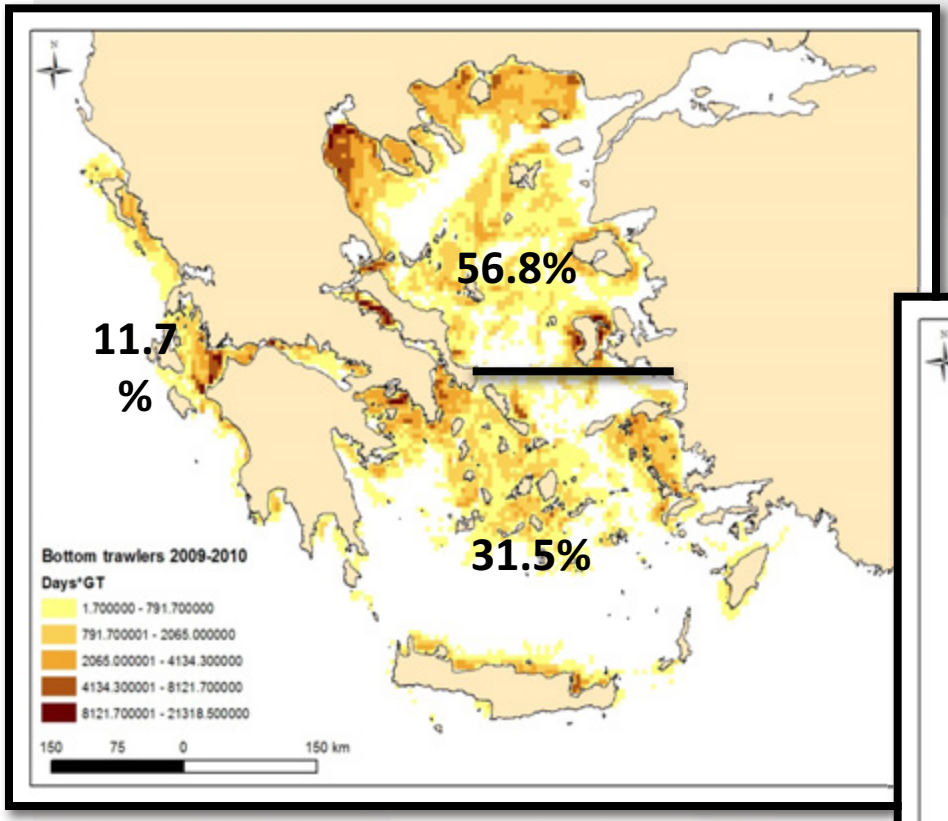
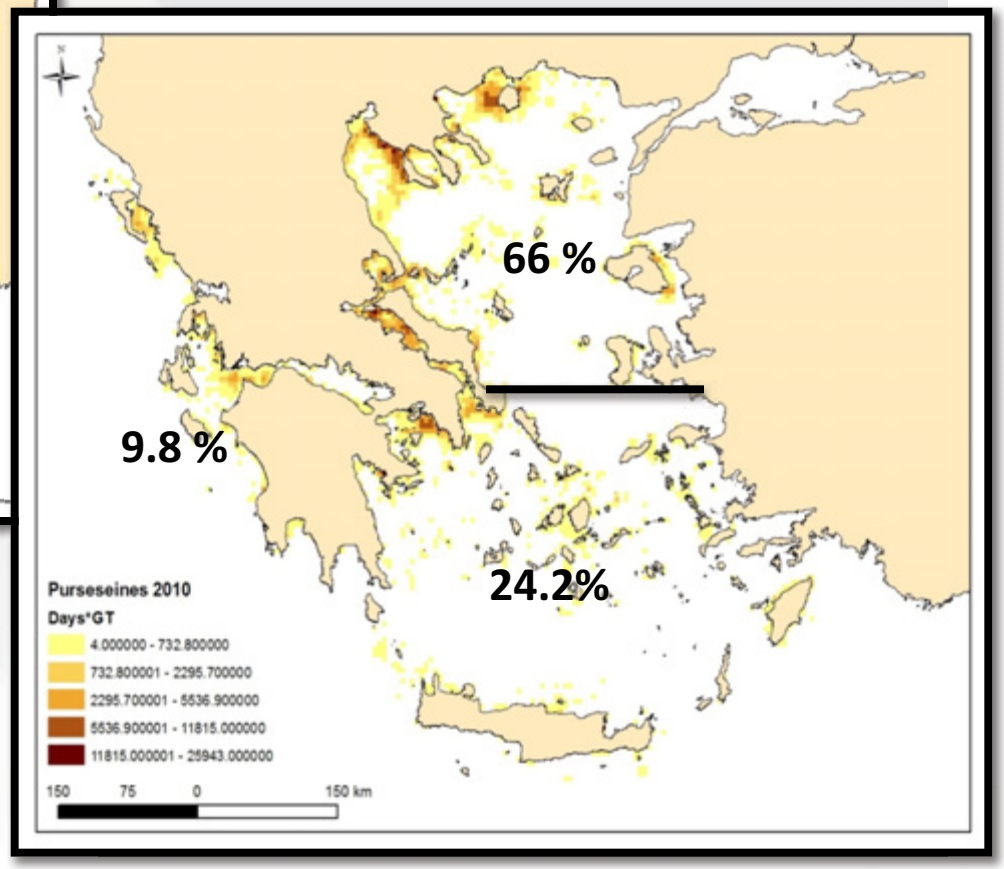
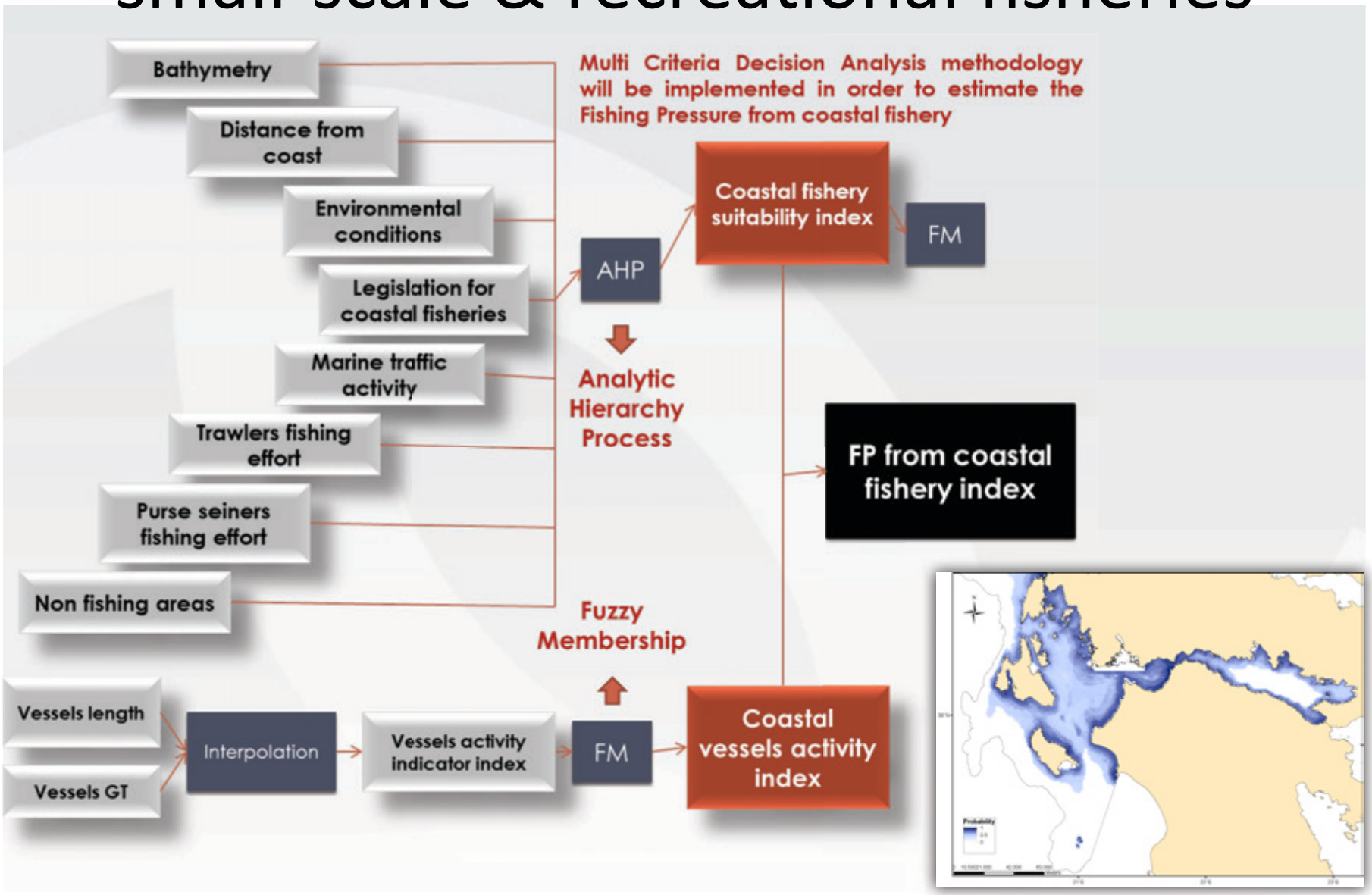
mapping of fishing effort bottom trawlers & purse seiners



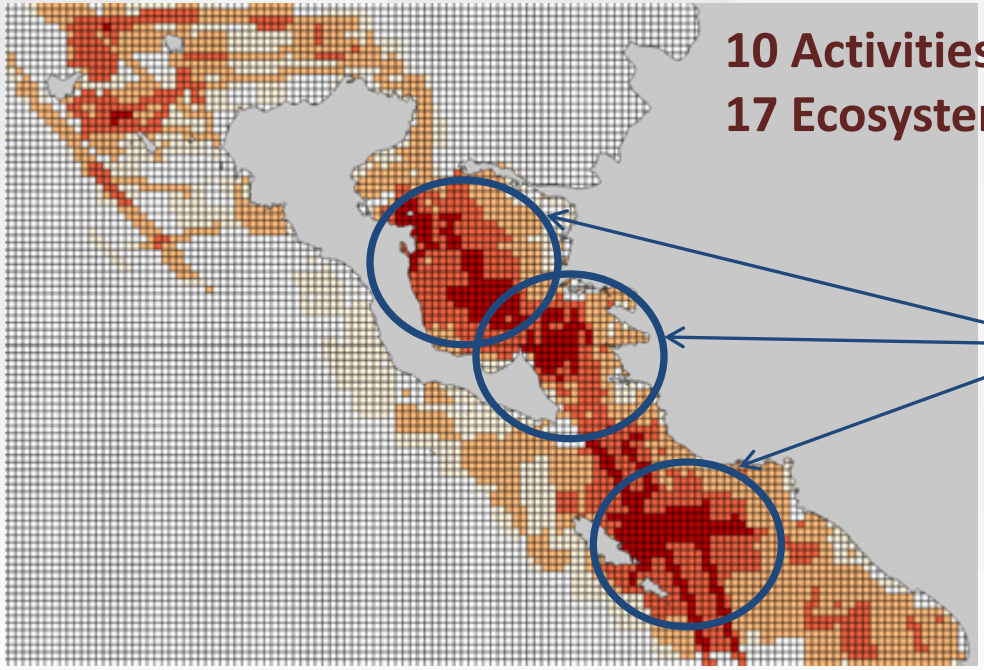


mapping of fishing effort
small-scale & recreational fisheries



Maps of cumulative impact of human activities

- Collection of spatiotemporal data for :
  - existing human activities
  - future human activities
  - management plans and measures



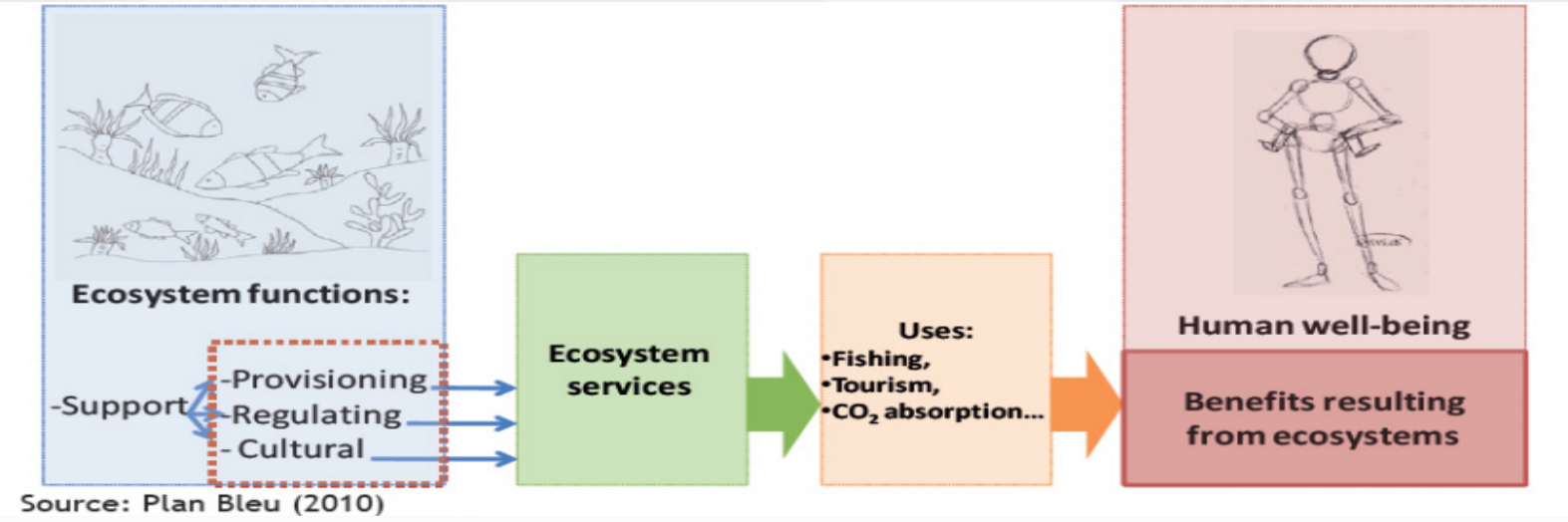
ADRIPLAN
(DG MARE project)

2013-2015

Valuation of marine ecosystems

- asses the value of ecosystem services of selected habitats/species
- value transfer method
- asses the cost of ecosystem degradation

"The economic assessment is the process of estimating, in monetary terms, the increase or the expected decline in well-being resulting from the use of a good or service" (Romero, 1994)



Relation between ecosystems and individuals

MSY/Bio-economic models

- Determining technical and scientific indicators to evaluate the effect of MPAs network towards MSY objectives
- Short, medium and long term forecast of MSY
- MSY/Bio-economic models
  - examination of the impact of MPAs on the overall fishery production
  - effects of different spatial and temporal fishery closures on the stocks of commercial important species, as well as, on those of sensitive species (e.g. elasmobranchs)
  - assessment of the medium term economic impact of various spatial and temporal fishery closures on the fisheries

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Ecopath/Ecosim/Ecospace models

What are models used for?

- Lyne Morisette contacted registered EwE users:

  325 models constructed or under construction

  – 42% ecosystem structure;
  – 30% fisheries management;
  – 11% theoretical ecology;
  – 6% protected area evaluations

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Ecopath/Ecosim/Ecospace models

Thermaikos Gulf

Inner

LOW EFFORT AREA

Area : 336 km^2

Mean depth : 21 m

Max depth : 45 m

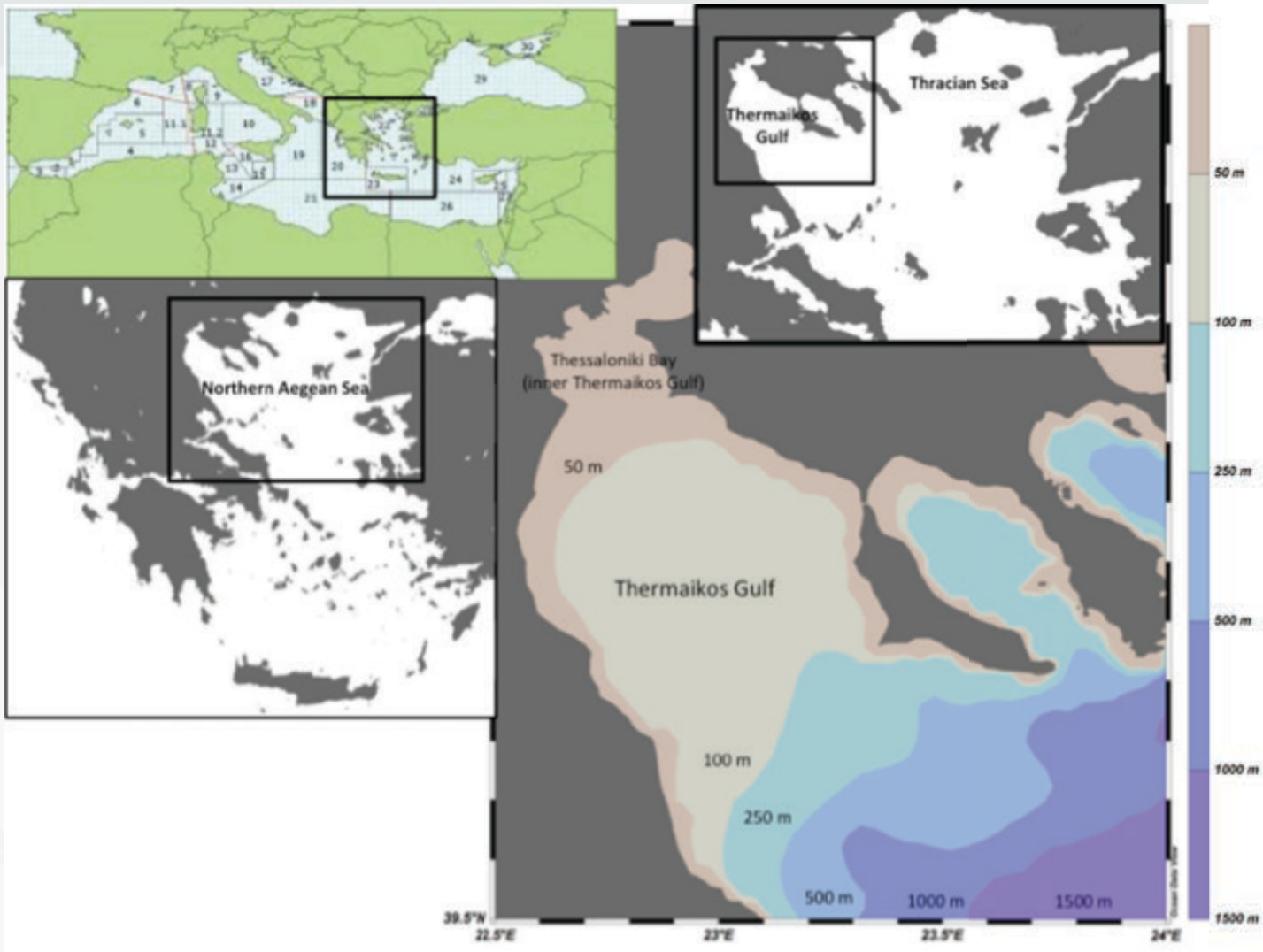
Outer

HIGH EFFORT AREA

Area : 3500 km^2

Mean depth : 75 m

Max depth : 250 m



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Ecopath/Ecosim/Ecospace models

Pagasitikos Gulf

LOW EFFORT AREA

Area : 520 km^2

Mean depth : 70 m

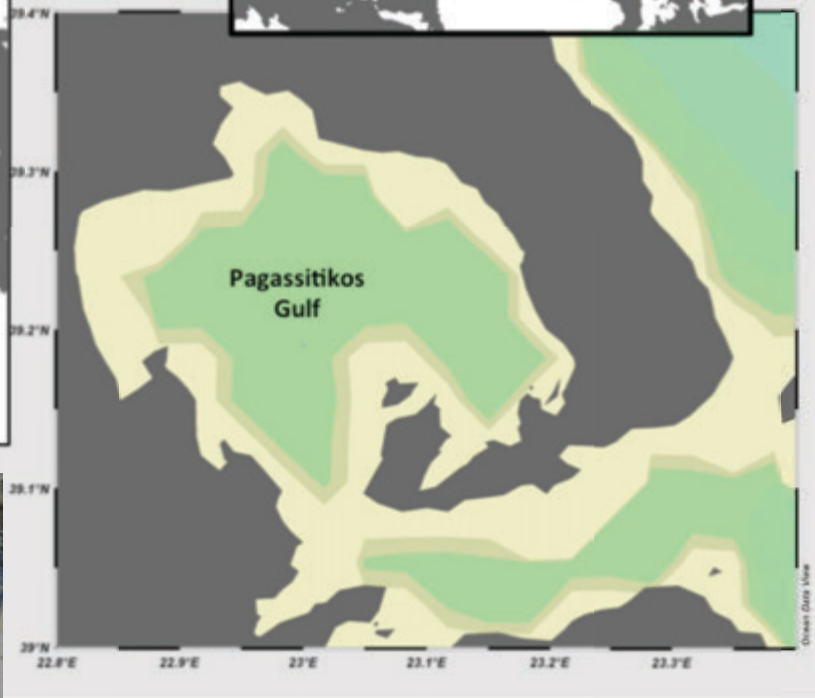
Max depth : 108 m

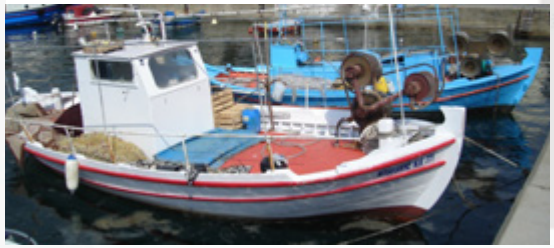
Spawning/nursery area

for over 90 fish species

Trawls and boat seines

Prohibited since 1966





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MPA network maps

- Systematic Conservation Planning
- SCP involves working through a structured, transparent and defensible process of decision making
- C onnectivity
- A dequacy
- R epresentativeness
- E fficiency

MPA network maps

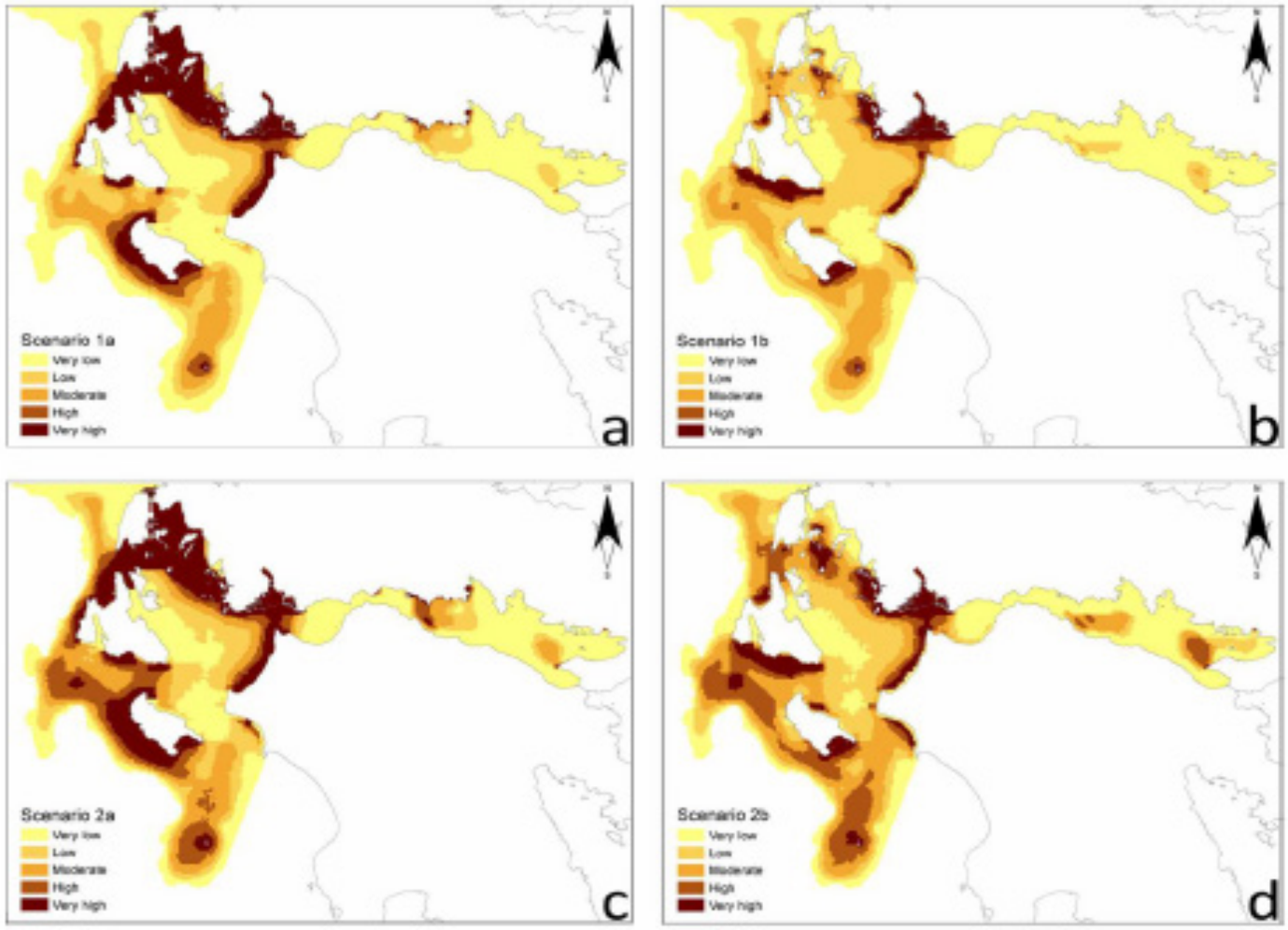
MARXAN

- Identifies priority areas
- Identifies MPA networks

MARXAN WITH ZONES

- Zones conservation areas with different levels of protection
- Zones for multiple uses

MPA network maps



MESMA
Monitoring and Evaluation of Spatially Managed Areas

Ionian Sea case study

Giakoumi et al. 2012, Aquatic Conservation: Marine & Freshwater Ecosystems

Stakeholder involvement

- stakeholders especially locals affected by the implementation of a new MPA
- impacted by restrictions or may benefit from the results
- they need to be involved

- typical stakeholders:
  - managers
  - people
  - groups living or operating in the area that might have some defined use of the area
  - recreationalists, fishermen, tourist related businesses, conservation organisations, municipalities and other governing/managing organisations

Outcome

proposed networks of protected areas and zones with restrictions on human activities, in order to

conserve biodiversity

and restore fisheries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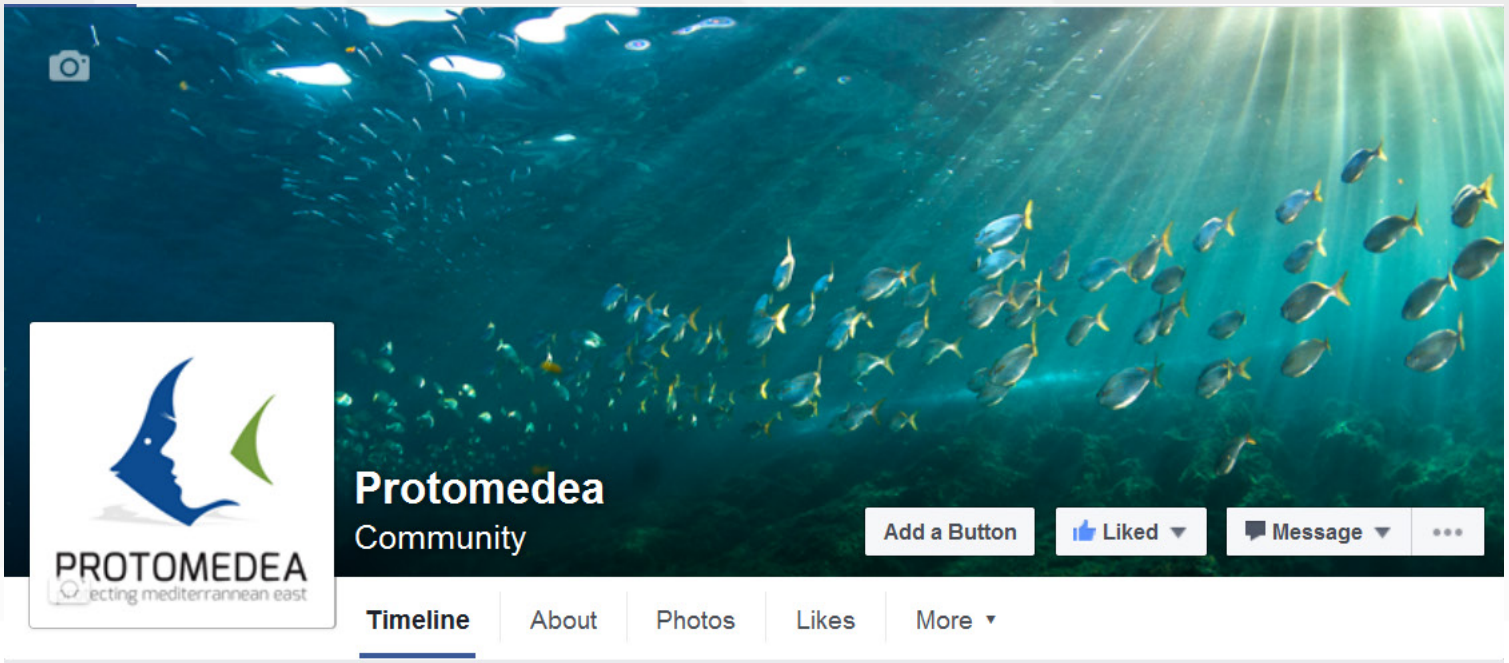
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