

Analyzing environmental effects of future scenarios in the Black Sea

BRIDGE-BS Webinar Series «Black Sea Towards 2050»

Webinar 1: «The future of the Blue Economy», 16 April 2025

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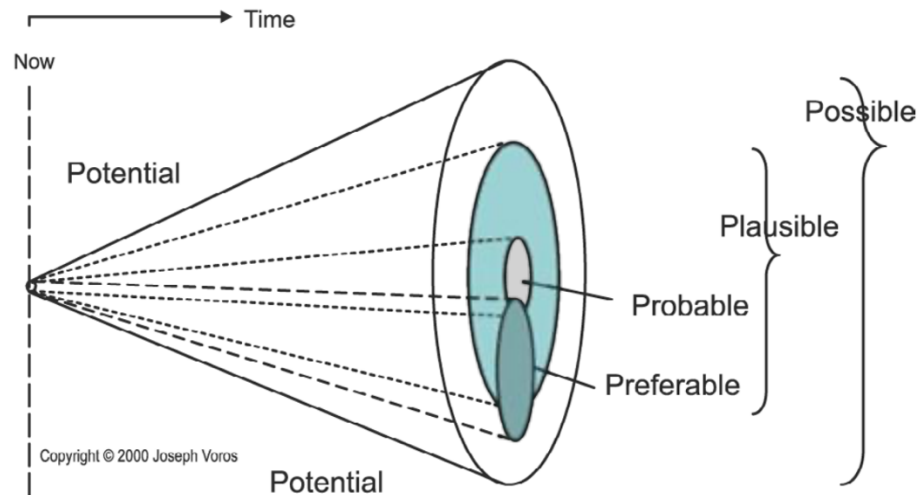
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Exploring sustainable futures – “Desired Scenarios”

*Desired Scenarios are **future realistic states** of marine and terrestrial **uses** influencing marine **ecosystems** and **resources** and targeting the development of a **sustainable blue economy**, under projections of **climate change**.*

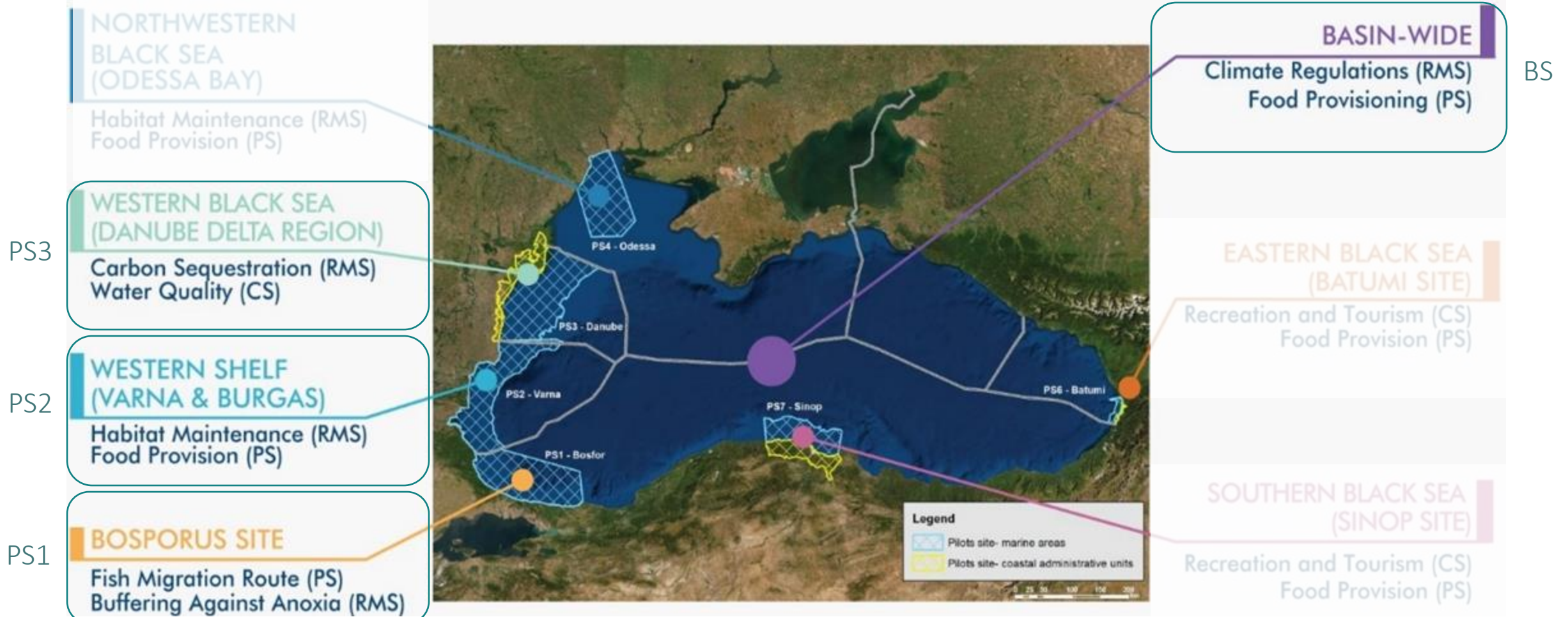


The “futures cone”

Predictive: What will happen, on the condition that the likely development unfolds or on the condition of some specified events?

Explorative: What can happen to the development of external factors or what can happen if we act in a certain way?

Spatial domain of Desired Scenarios



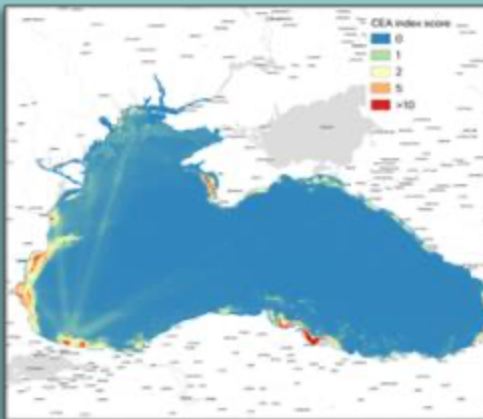
Developing Desired Scenarios for 2050

1
2 3
Regional scale
(Pilot Sites)



➤ Future visions at PS scale emerging from 3 rounds of **Living Labs**

Basin scale
(Black Sea)



➤ Sustainable Blue Economy
Imaginarities for the Black Sea “Ecotopia” and “Unity in Adversity”



Maritime Transport



Fisheries



Marine Aquaculture



Land-Based Activities

➤ Information on **status and trends of maritime sectors** from literature, local experts, MSP plans, etc.

➤ **Climate change** projections from BRIDGE-BS models



Coastal and Maritime Tourism

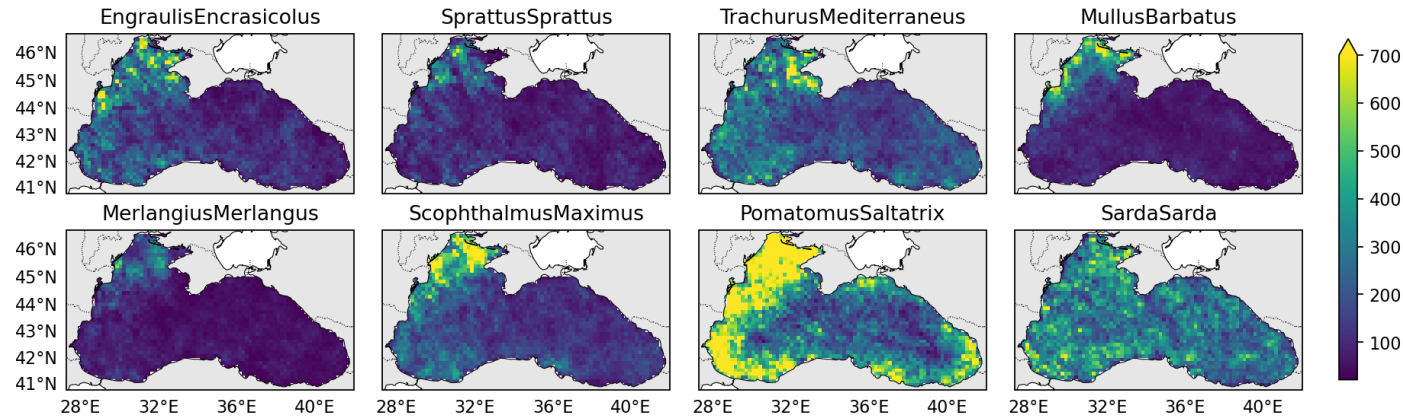


Marine Renewable Energy

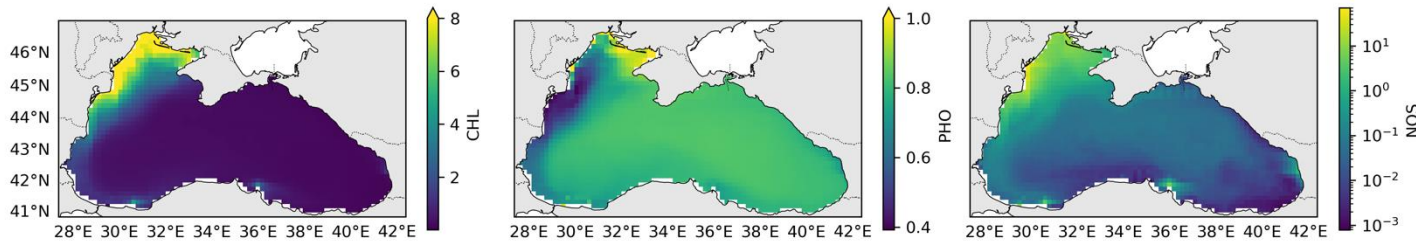


Marine Protection and Conservation

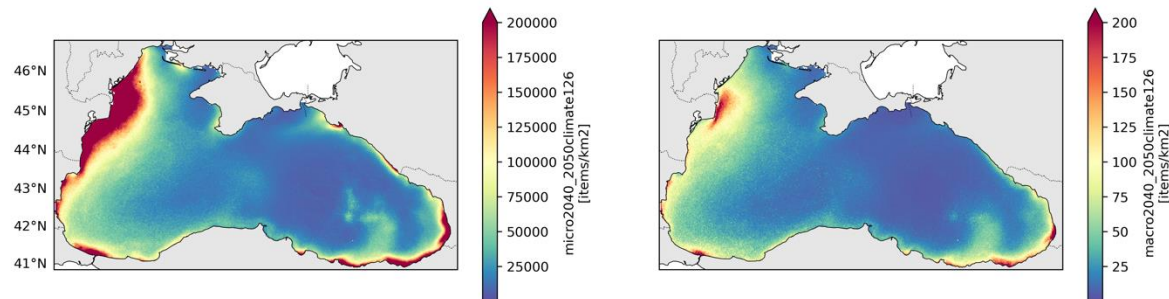
Including climate change projections (SSP1)



- **Fish** biomass and distribution of 8 species of commercial interest



- **Nutrient** input from land-based activities



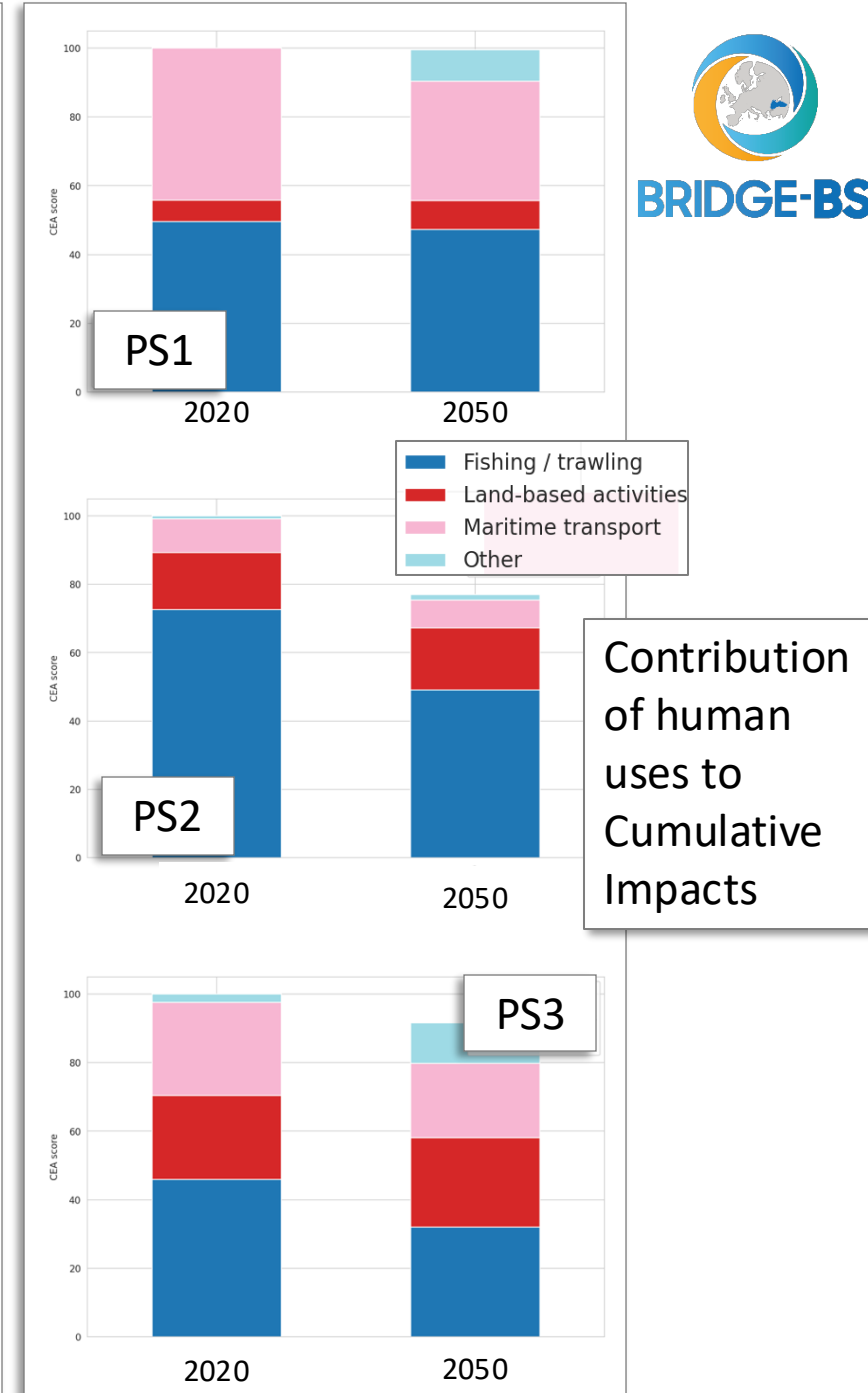
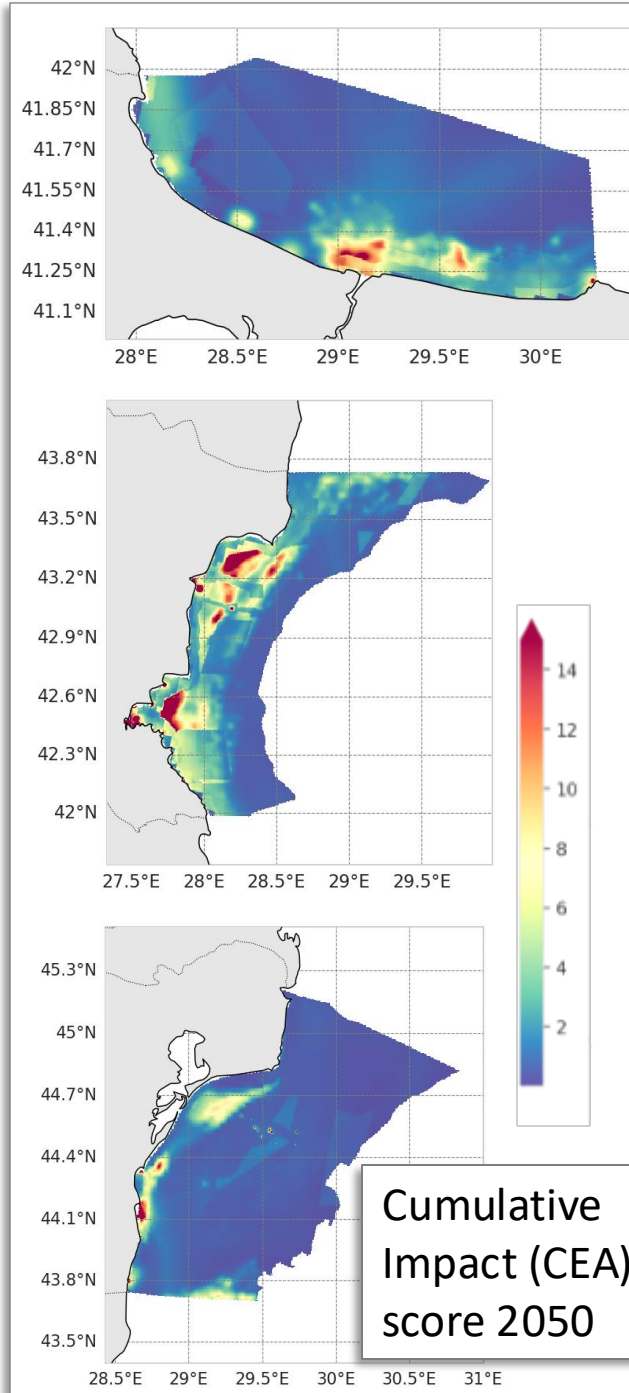
- **Input and distribution of marine plastics** from rivers and coastal cities

Cumulative Effects Assessment



Key findings – Most impactful human activities

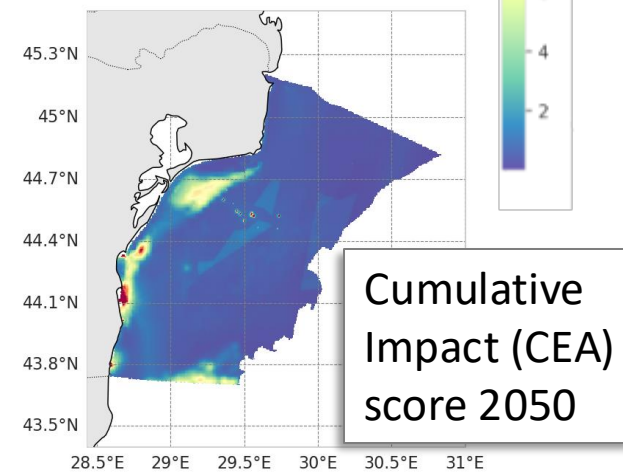
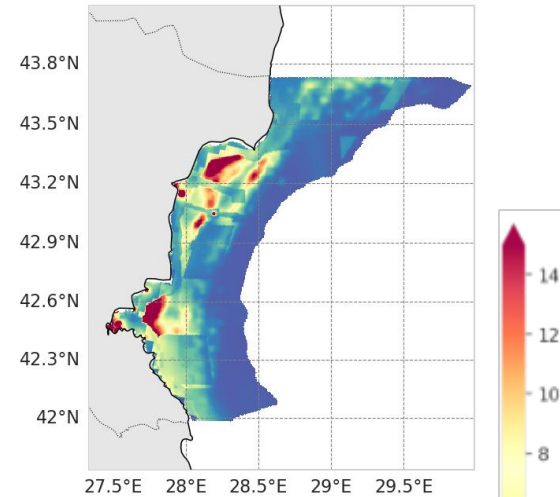
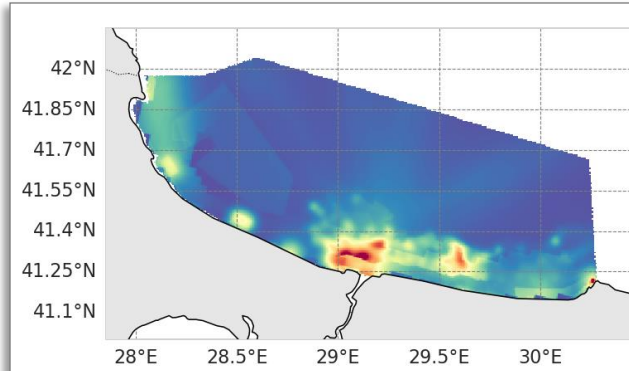
- A “**green shipping**” approach decreases impacts caused by maritime transport
- New protected areas and a trawling ban near the coast decrease impacts due to **fisheries**
- Expected increase in nutrient input increases impacts caused by **land-based activities**
- New **aquaculture** and **offshore-wind farms** (“other”) produce localised impacts



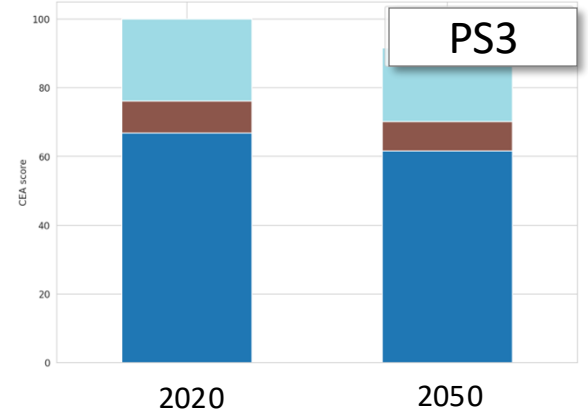
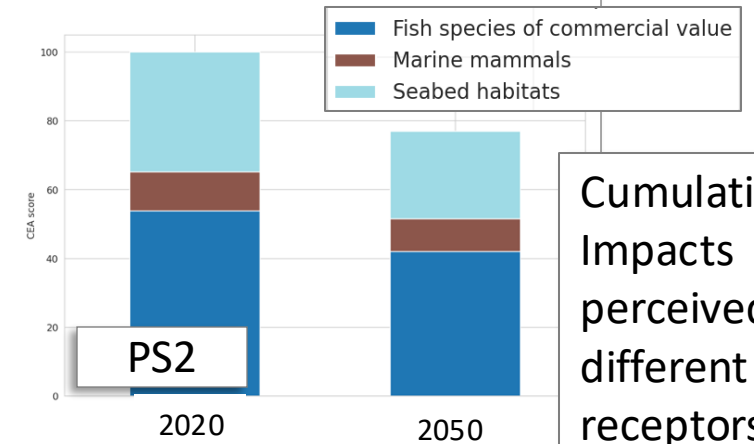
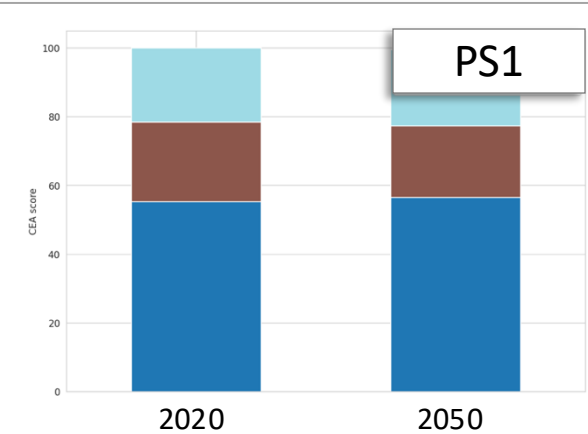
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Key findings – Most impacted environmental receptors

- **Fish species of commercial value** were and remain most impacted
- Impacts on fish decrease significantly, esp. in PS2
- Slight decrease in impacts on **marine mammals**
- Significant decrease in impacts on **seabed habitats**, particularly in PS2



Cumulative
Impact (CEA)
score 2050

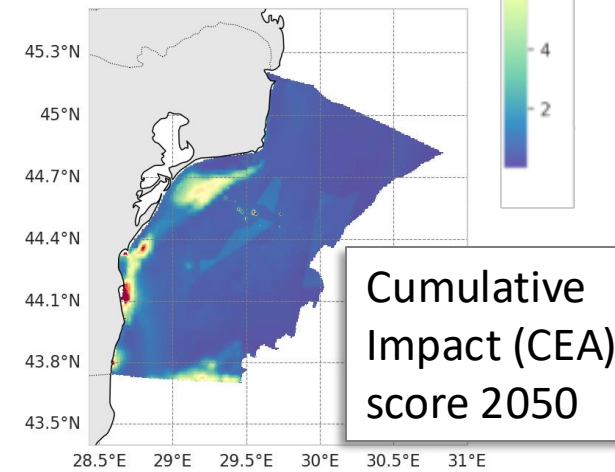
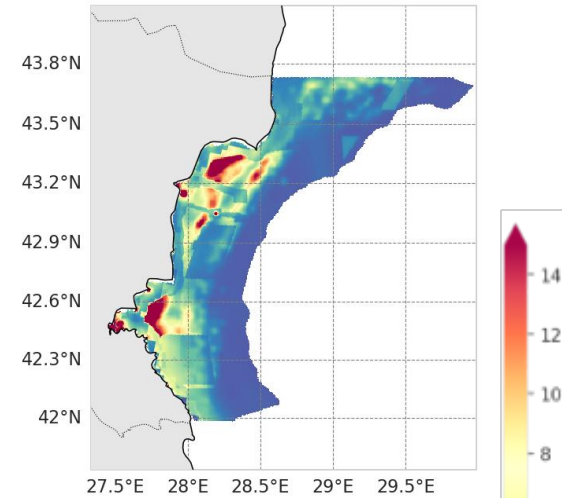
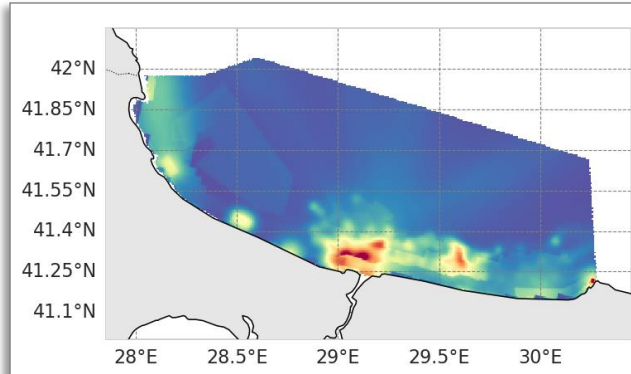


Cumulative
Impacts
perceived by
different
receptors

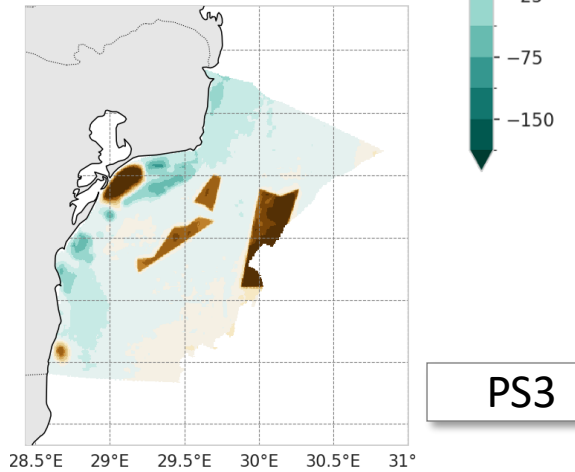
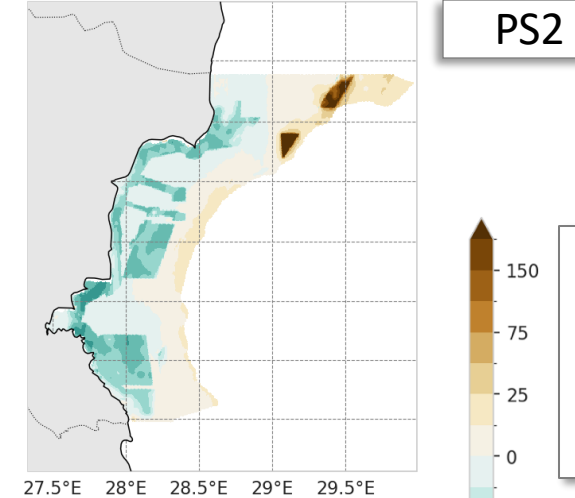
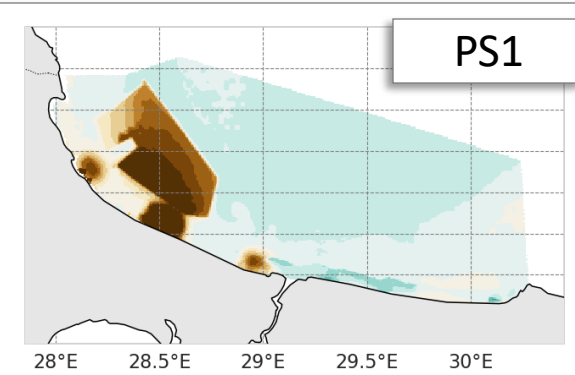


Key findings – Comparison with 2020

- New activities cause localised increase in CEA (dark brown)
- However, their impacts are compensated by positive change in other sectors
- CEA in 2050 is lower than in 2020 in all PSs
- Overall, the tested **Desired Scenarios are more sustainable** than the current situation for all PSs (in terms of cumulative impacts)



Cumulative
Impact (CEA)
score 2050



PS1

PS2

PS3

Percentual
difference
with 2020
CEA score



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Key findings – Different visions at Black Sea scale

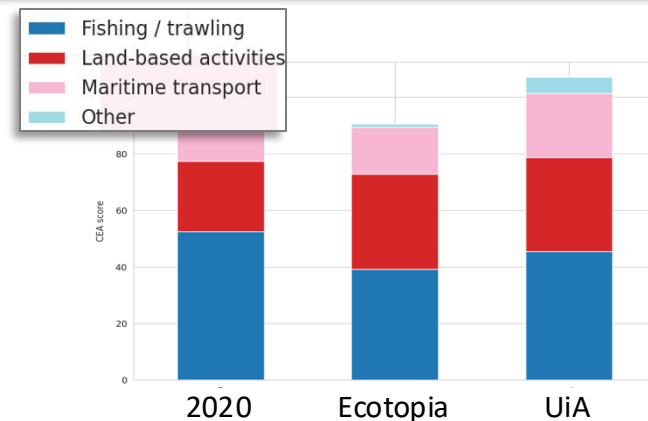
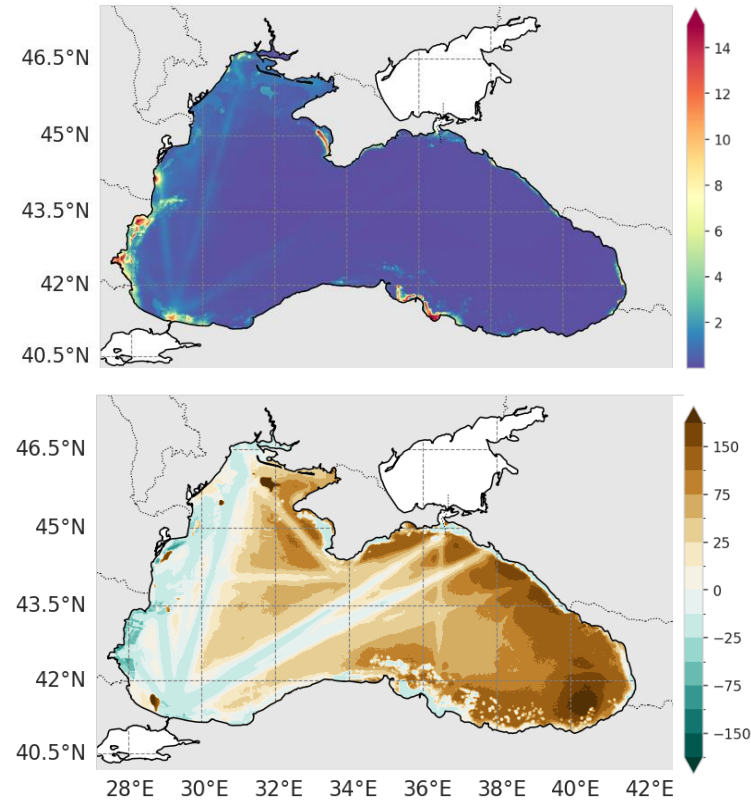
Ecotopia appears as more effective pathway towards reaching MSFD objectives of Good Environmental Status, achieving improved seabed integrity and conservation.

✓ Significant reduction of fishing activities.

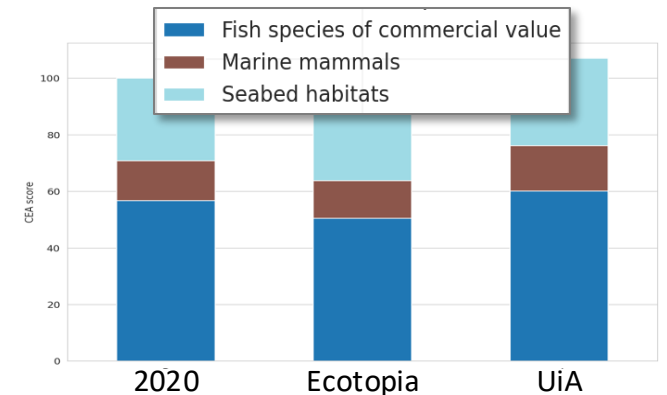
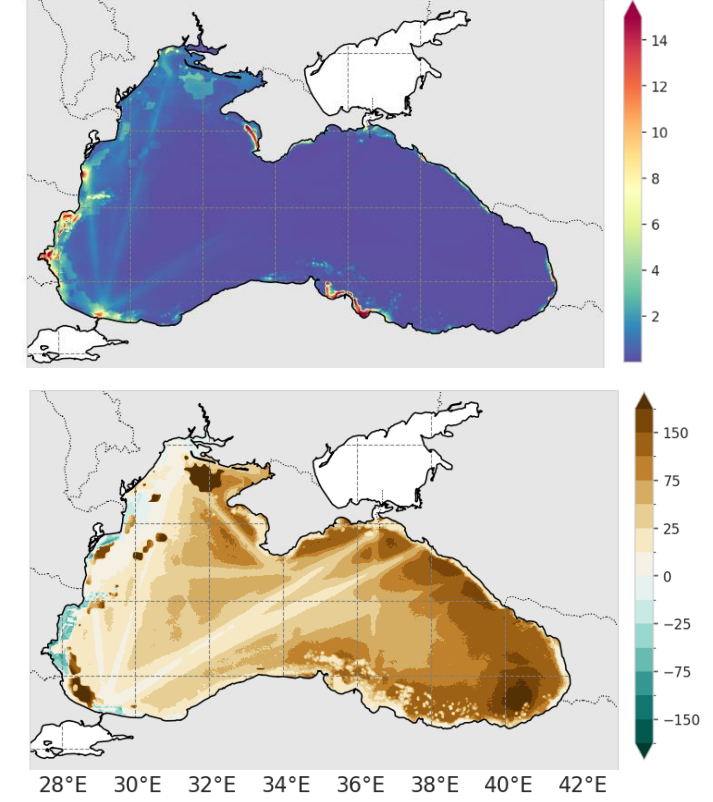
✓ Implementation of MPA network across the basin.

✗ Nutrient input from land-based activities remains major issue.






Ecotopia
CEA ↘ compared to 2020



Unity in Adversity
CEA ↗ compared to 2020



Key findings – Management measures

	Green-shipping	More sustainable practices in maritime transport largely decrease CEA.
	Trawling bans	Prioritization of small-scale fisheries and implementation of trawling ban decrease CEA.
	New MPAs	Restricting fishing activities leads to positive outcomes but more protected areas needed to reach EU biodiversity targets.
	New OWFs	Localised increase in impacts on marine mammals and fish, small increase in total CEA
	New Aquaculture	Localised increase in impacts though no significant increase in total CEA

Feeding the 2030 Blue Roadmap for the Black Sea (BRIDGE-BS outcome)

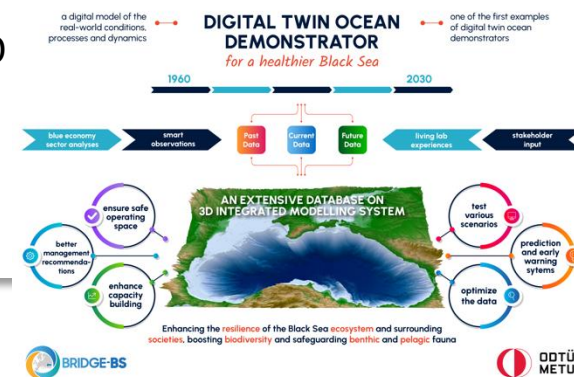
- Contributing scenario-based insights to the co-design and co-creation of the Roadmap.
- Supporting the identification of actions and measures across key thematic axes: multiple stressors, adaptive management, and ecosystem services & resilience.

Informing Adaptive Management Recommendations for the Black Sea (BRIDGE-BS outcome)

- Delivering targeted, area- and ecosystem service-based recommendations.
- Supporting sustainable planning and policy implementation for MSP and MSFD.
- Integrating stakeholder perspectives into the formulation of adaptive strategies.

Contributing to the Digital Twins of the Ocean (DTO) for the Black Sea (Strategic capitalization)

- Integrating cumulative impact and scenario-based analyses into the Black Sea DTO demonstrator.
- Bringing a **Marine Spatial Planning user-centred perspective** to the design and functionalities of the DTO, ensuring relevance for planning processes and policy users.



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