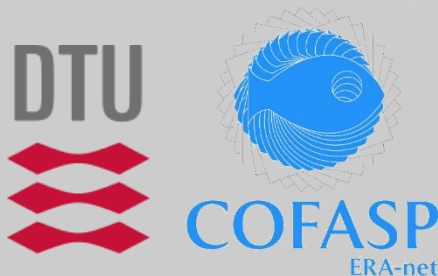


MODELLING SPATIAL INTERACTIONS AMONG FISH COMMUNITIES, FISHERS AND OTHER MARINES ACTIVITIES

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IIFET 2018, Seattle, US,
Session on Marine Spatial Planning
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Why the time and space dimensions are so important?

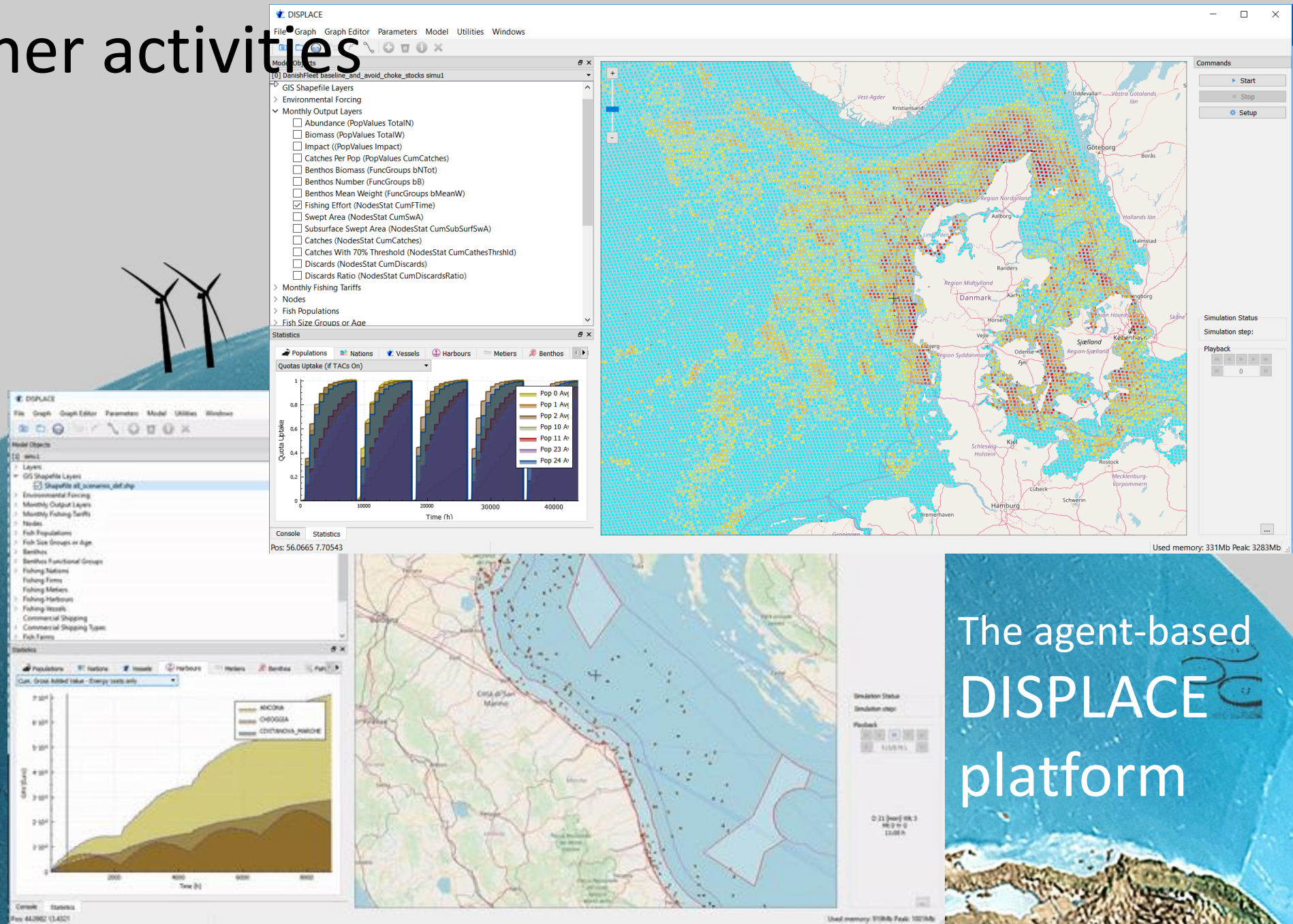
We gather data & tools for capturing the interlinked dynamics, the joint production and the technical interactions between activities
=> the DISPLACE platform anticipate unintended consequences

Fishermen locate in space, have some cost to reach the grounds and operate the fishing, choose species among the available and depending on market demand, policies, environmental influences etc.

Fish do not evenly distribute, move along the growth, responding to change in envt conditions (food, predators, mates, etc.)



Individual vessel-based bioeconomic model combined to spatial population dynamics and other activities



DISPLACE, a support for MSE

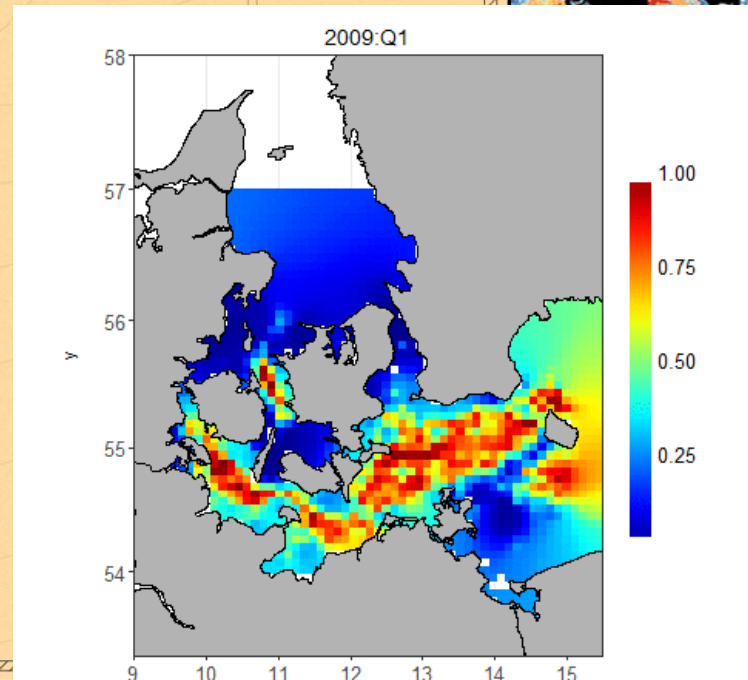
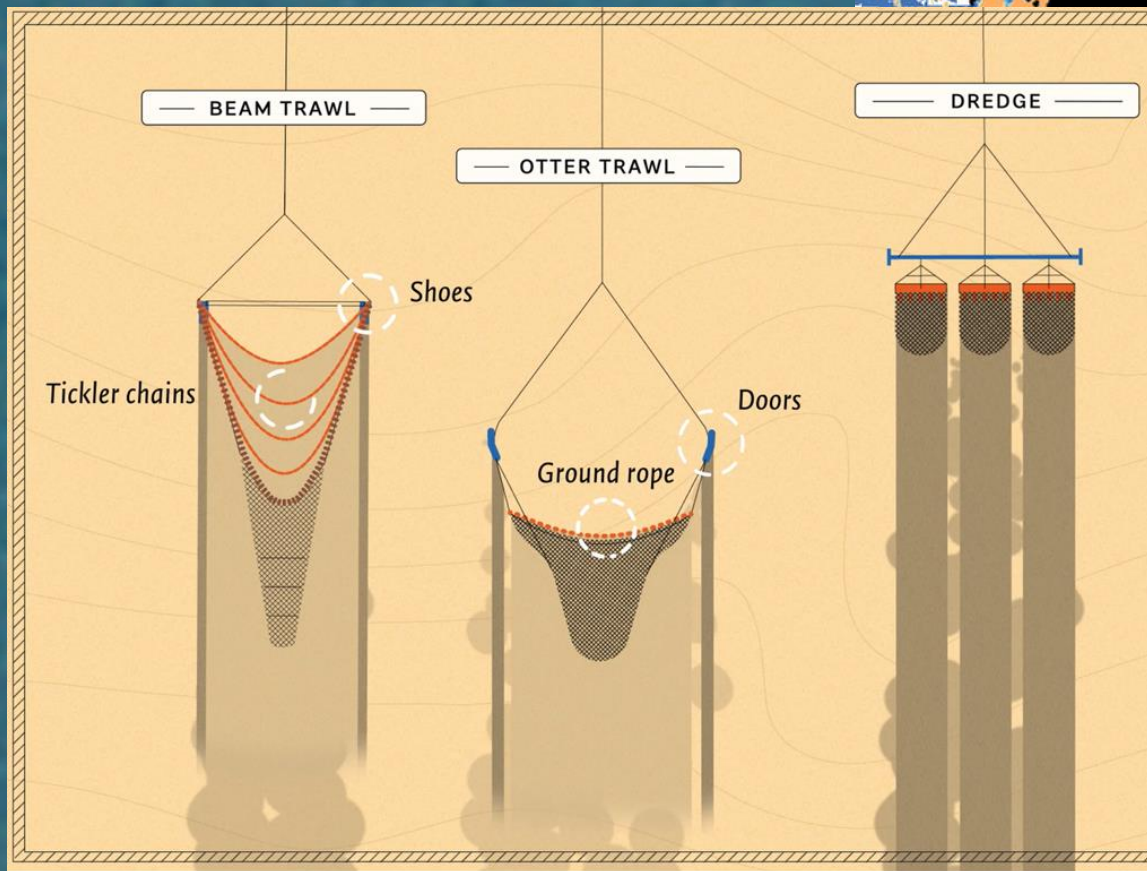
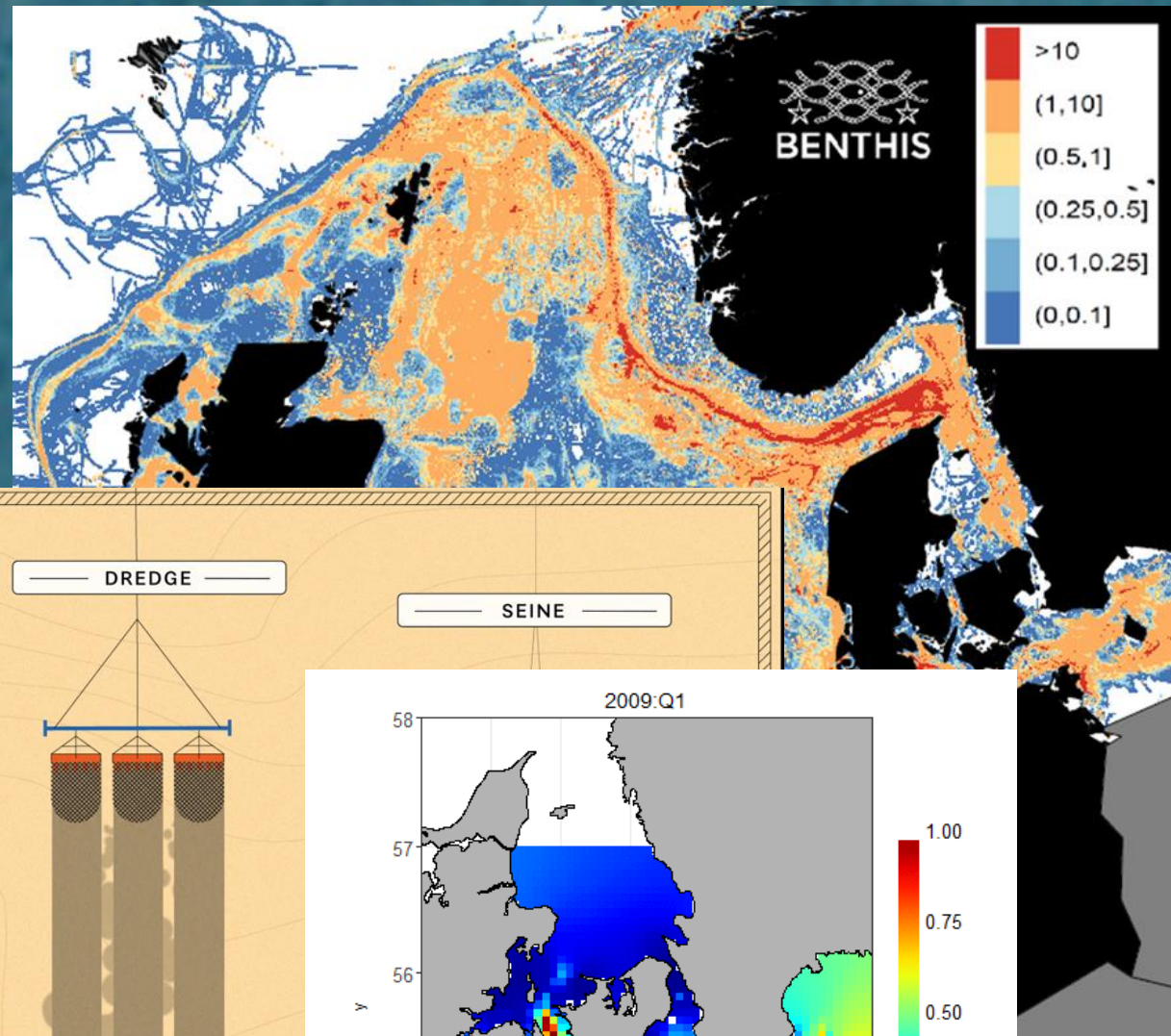
In Management Strategy Evaluation (MSE) we create mathematical models of the fisheries system & represent each step of the management process with its own set of equations

We then create feedback to the fish population model by using the results of the management decision in the fishing model.

We can make each of our computer worlds slightly different to represent our uncertainty about the real world system dynamics.



Using & generating fishing intensity, spatial footprint & Population fields



DISPLACE

A spatial model of fisheries to help sustainable fishing and maritime spatial planning

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How individual fishermen's micro-decision-making affects the overall performance of fisheries

July 1, 2015
microdecision, mission
decision trees, cause and
consequences, fisheries;
spatial effort, DISPLACE

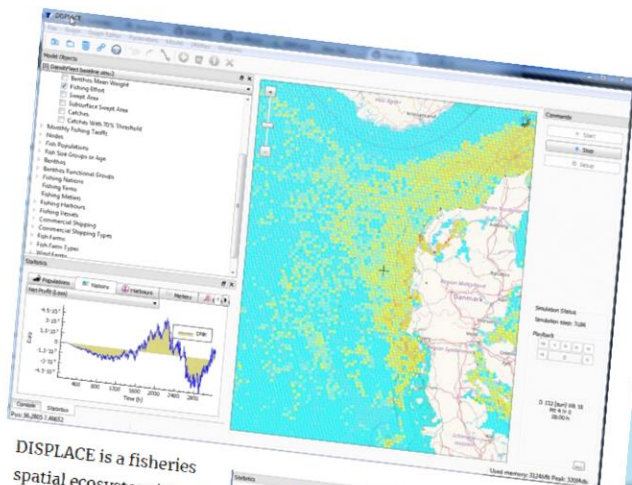
Fishermen's micro-decision-making is challenged by fishery management and marine spatial plans and affects the overall performance of fisheries. Because of individual fishermen's decision-making, the spatial distribution of fishing gears, place and individual footprint

Growing network of fisheries modelling using DISPLACE

By analyzing fishers' decision making consequences and predicting likely responses of fisheries to spatial management options, the DISPLACE modelling approach is assessing whether actual fishing opportunities and management measures (e.g. regulation of gears, spatial effort, etc.) perform well by ensuring sustainable fishing to the value chain without affecting important fisheries. In this context DISPLACE now provides scenario-based projections of the amount of income generated by national fisheries and their finer fleet segments level economics and fishing effort over months, quarters and years as long as national data are available.

National fishing fleet economic performance and sustainable use of the ocean

August 31, 2017
displaced fishing effort,
economics, fleet
performance, Socio-
ecological systems

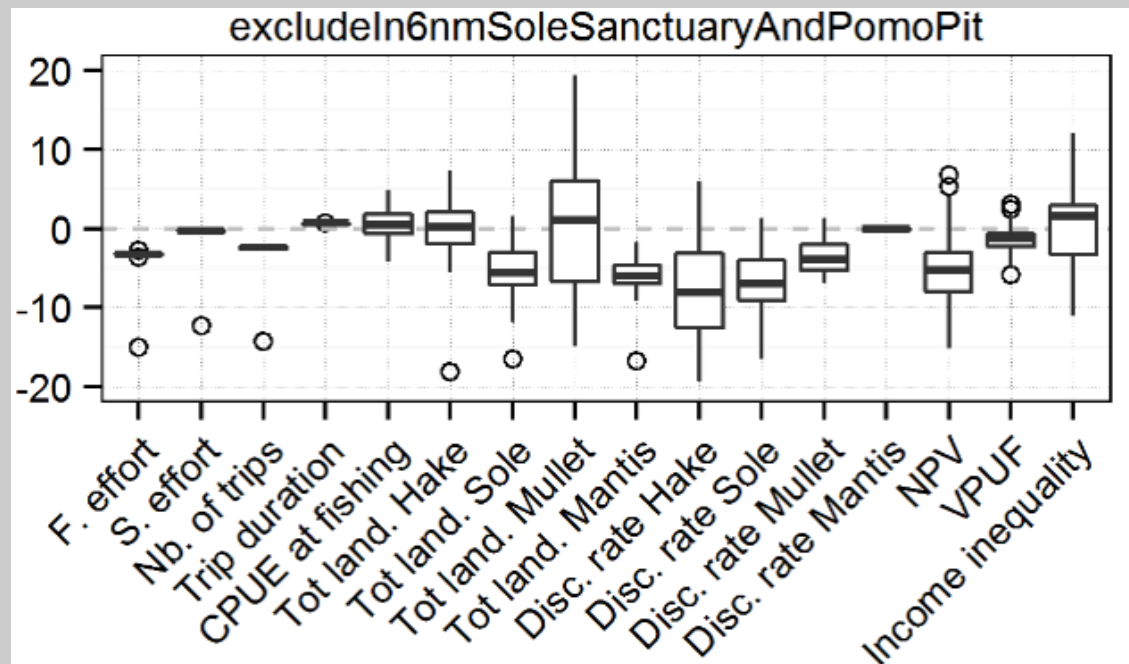


DISPLACE is a fisheries spatial ecosystem impact assessment tool that can be used to look at the consequences of fishing effort on the ecosystem and the economy.

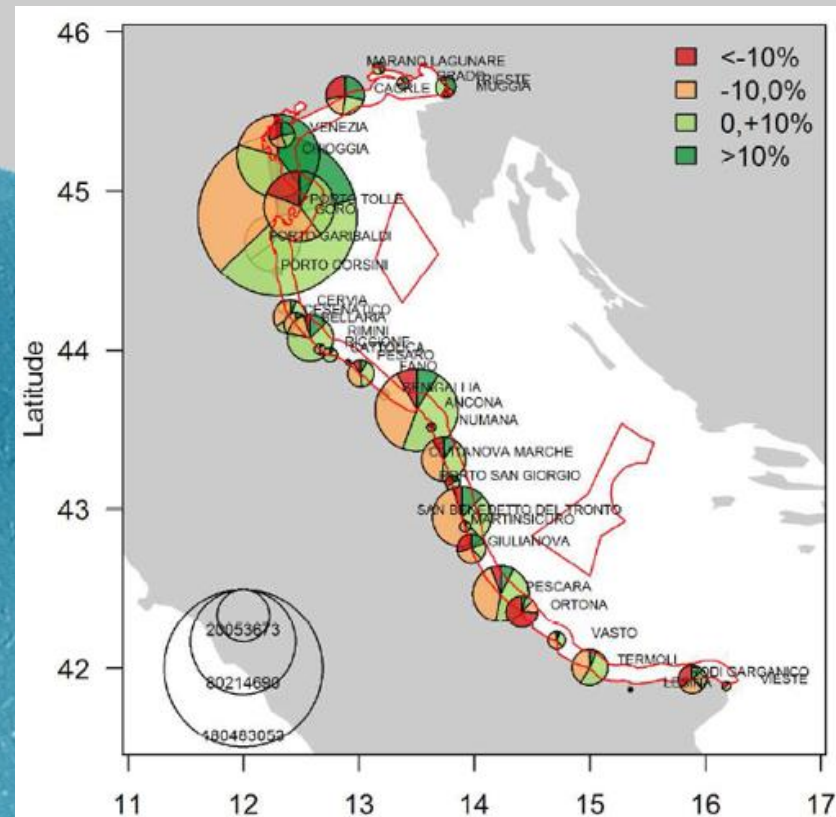
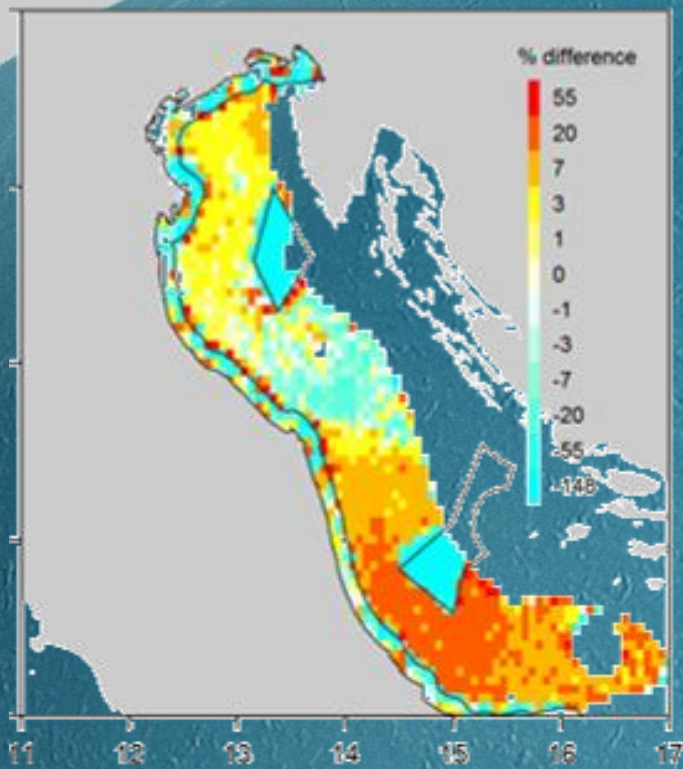
The Helicopter View on Five European Case Studies



Demersal fisheries in the Adriatic Sea

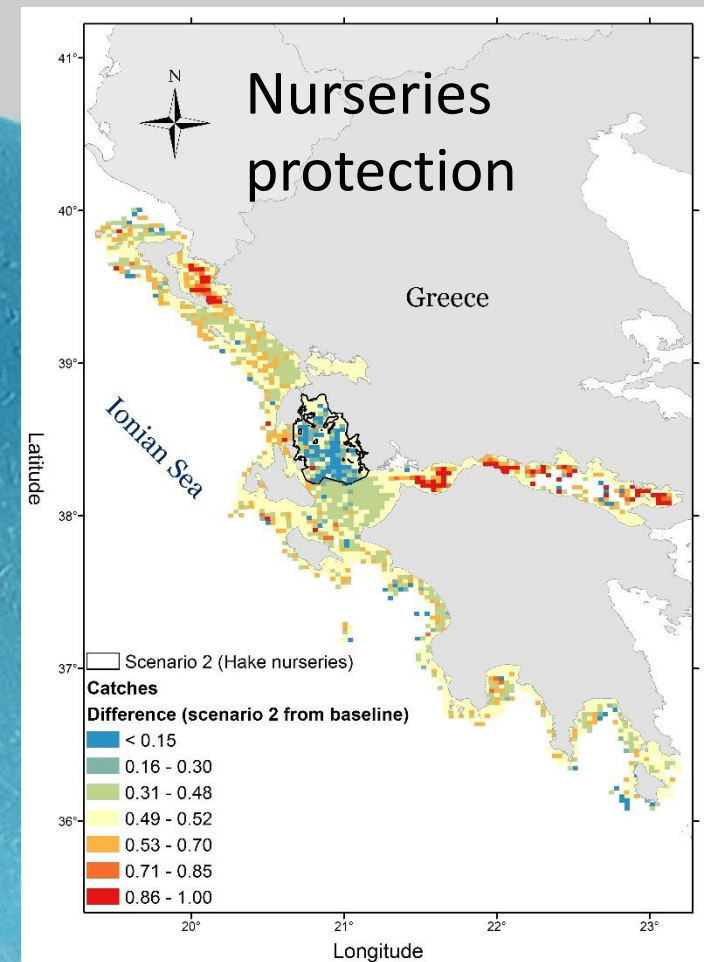
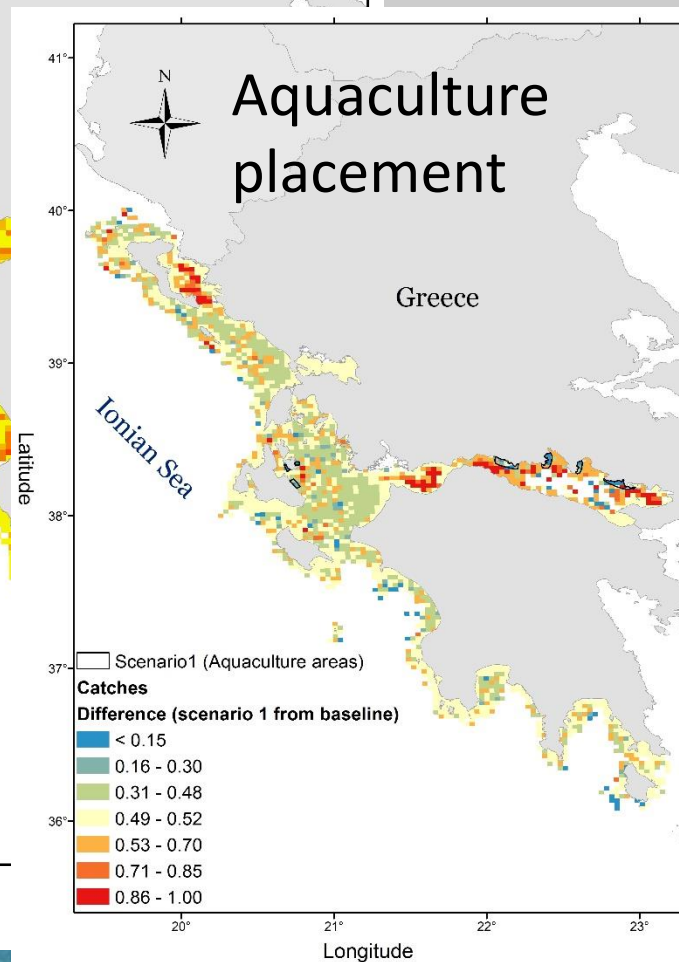
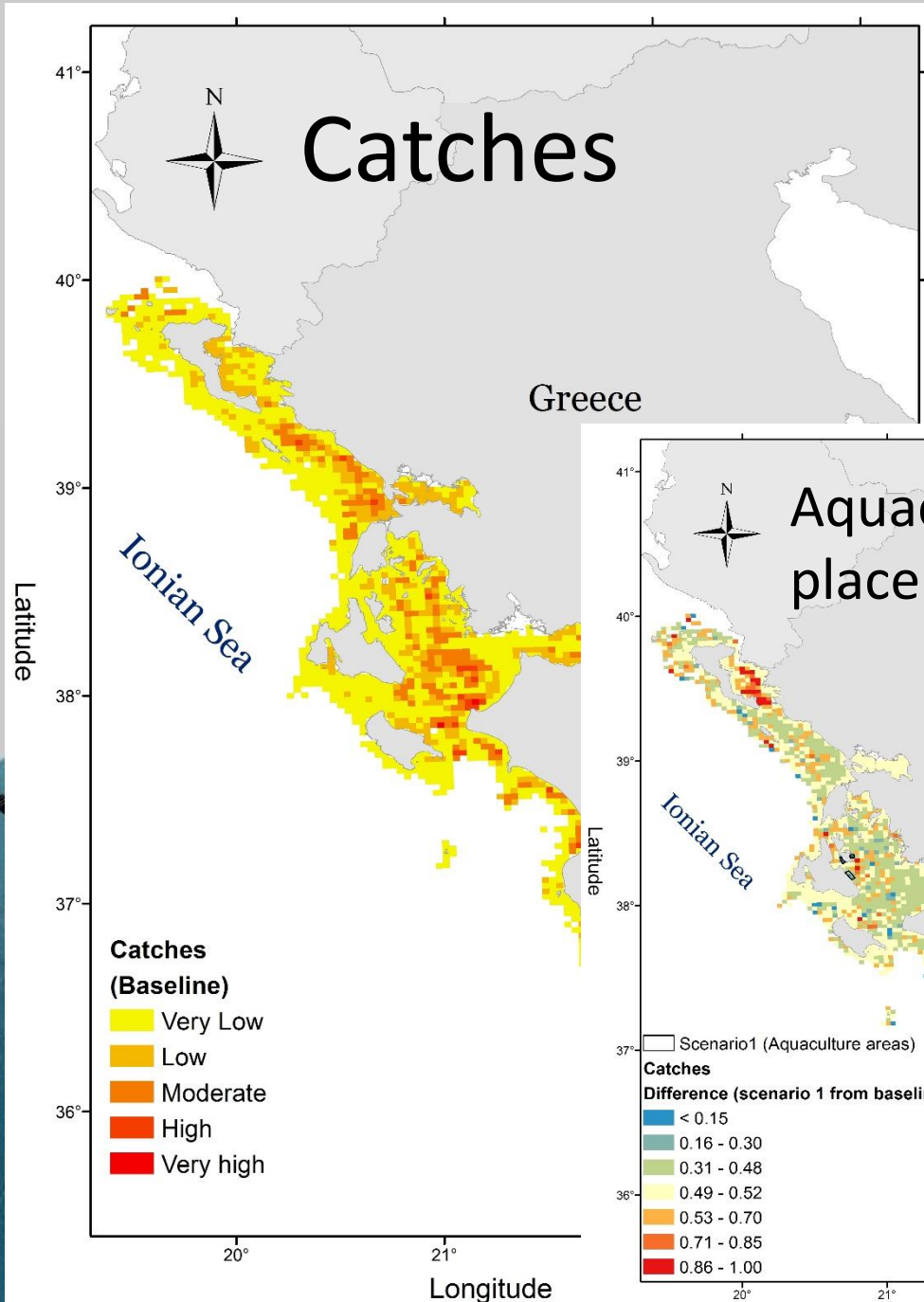


Spatial conflicts between mutually exclusive gears and conservation areas, and trade-off analysis



Demersal Greek fisheries in Ionian Sea

Spatial conflicts between mutually exclusive use and trade-off analysis / define priority sites also ensuring the sustainable use of the seas

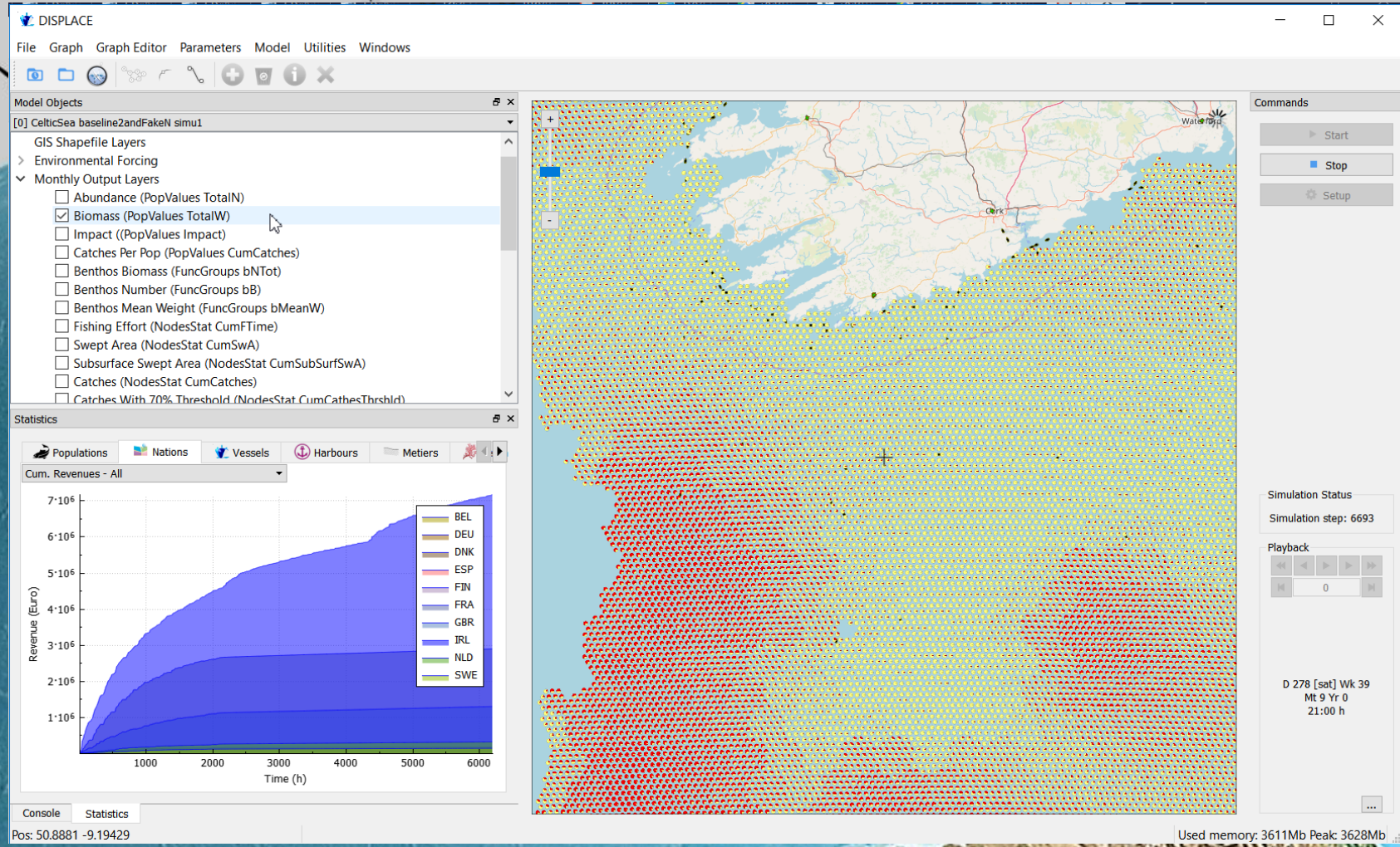


Demersal Irish Fisheries in the Celtic Sea

Annual decisions on TACs and problems of quota underutilization from choked species.

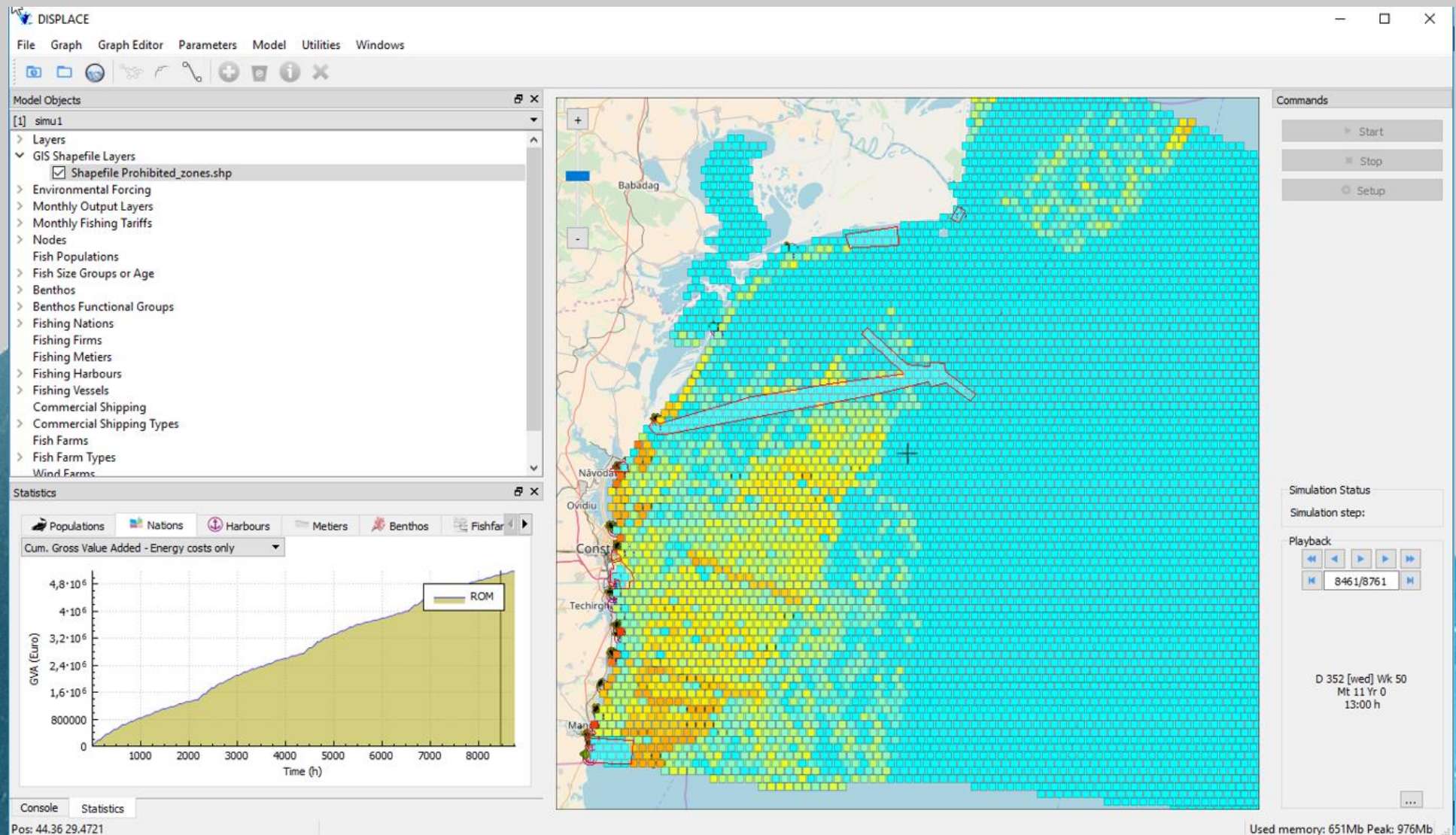
Benefits for fishing from displacement effects and associated ecosystem and fisheries impacts (habitat credit system)

=> Sizespectra modelling & trophic cascading

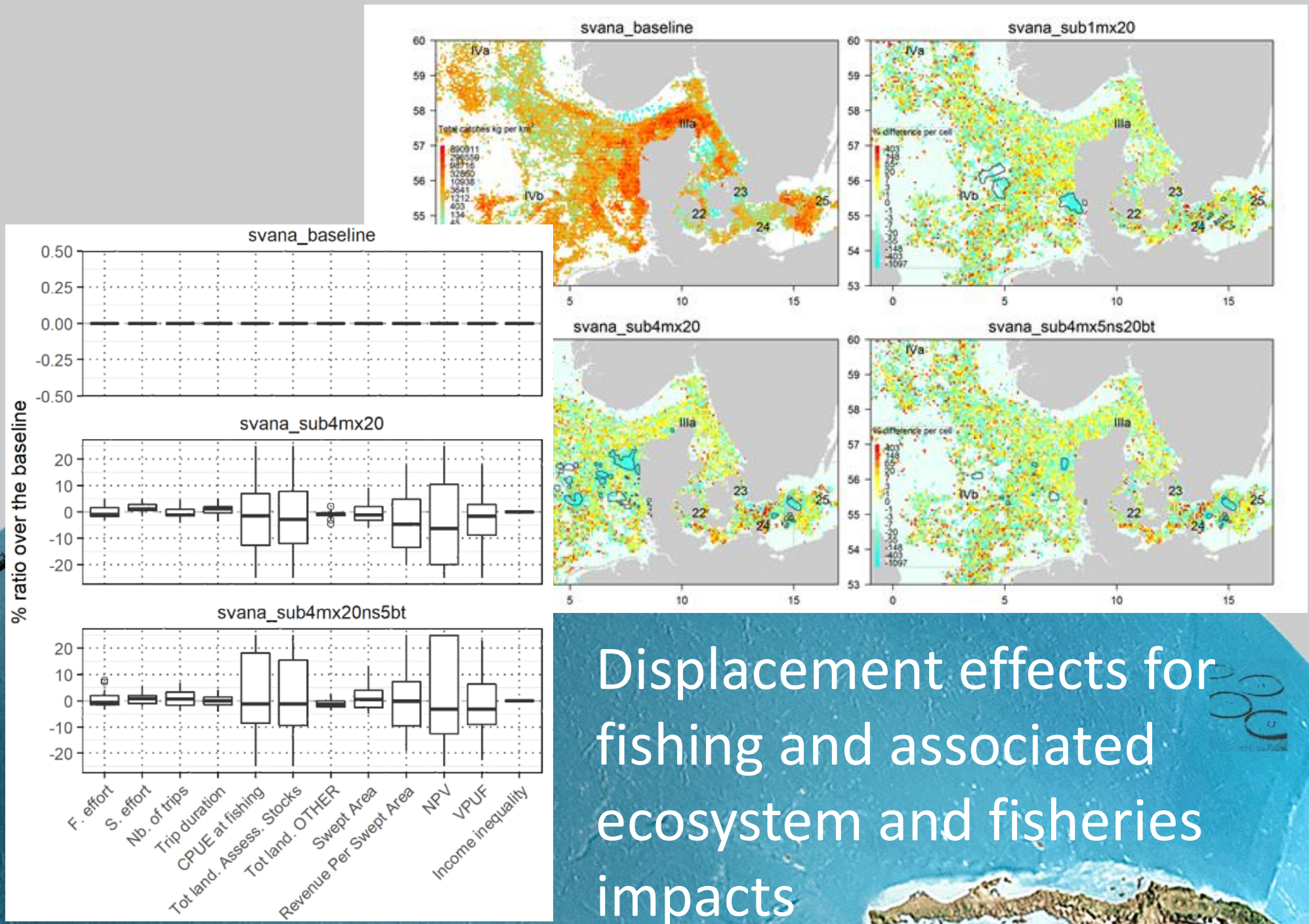


Romanian fisheries in the EEZ

Ensure viable fishing within ongoing Marine Spatial Planning / impact assessement of top down decisions for spatial reservation

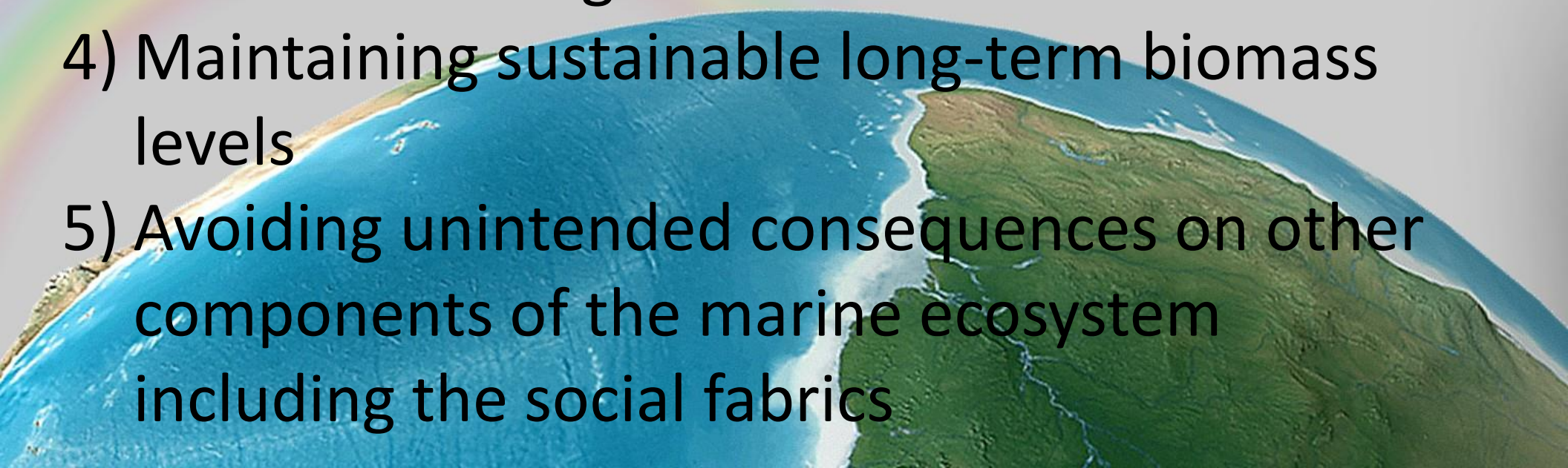


Danish Mixed Fisheries in the North Sea & Baltic Sea



Overarching goals: Consider the exploitation of marine fishery resources with regards to all maritime activities

- 1) Maintaining the accessibility of fishing grounds still reachable at the reasonable cost
- 2) Ensuring stable yields
- 3) Ensuring a high quality of food production from the landing of the more valuable fish
- 4) Maintaining sustainable long-term biomass levels
- 5) Avoiding unintended consequences on other components of the marine ecosystem including the social fabrics



Stakeholders' views (some of)

- “Shared stocks” issue: Most of the catches of the Romanian targeted stocks are done outside the EEZ. Effort of mitigation done within the EEZ will have small impact only. Need for cross border concertation!!!
- Help for fixing possible lack of coordination in implementation of policy, e.g. in designating areas to protect might lead to inconsistent network of areas when several EEZs that biology connect
- Doubts on the robustness of some of the input data used. However the platform is precisely useful here for getting uncertainties around estimates!
- A useful platform to integrate and discuss several data layers from different participating countries, for co-creation & social acceptance



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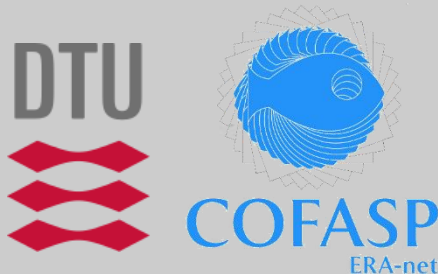


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Find out more on www.displace-project.org or @navigate4sea 