TRADITIONAL EUROPEAN FISHING TECNIQUES FACE DIFFERENT CLIMATE RISK LEVELS: THE GALICIAN CASE

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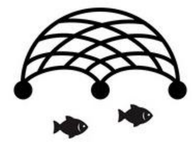


INTRODUCTION

- In Galicia (NW Spain), Small-Scale Fisheries (SSF) are particularly significant, contributing substantially to the local economy and employment.
- Climate change poses a significant threat to Galicia's SSF. This could profoundly impact the well-being of fishing communities and the broader Galician economy.
- Given the critical importance of SSF to Galicia, there is an urgent need to understand and quantify the climate risks faced by these fisheries.

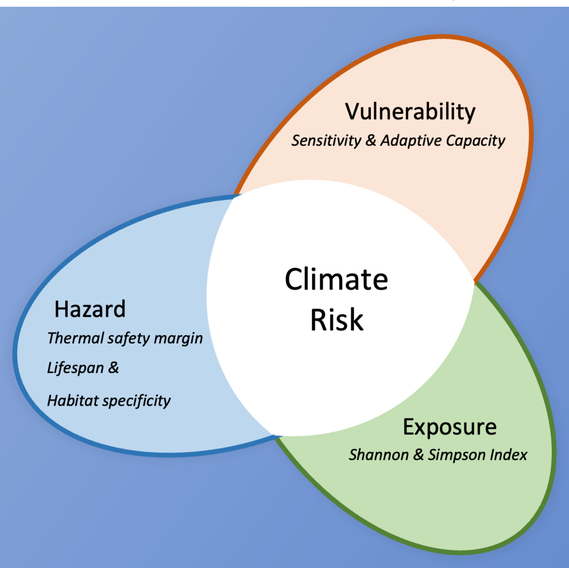


Figure 1. Framework of climate risk assessments used, adapted from IPCC (2014), including the dimensions and indicators used.

This study applies the IPCC (AR5) climate risk assessment framework to Galician SSF, evaluating vulnerability, exposure, and hazard. The main objective is to assess climate risk for traditional fishing techniques in Galicia, aiming to enhance understanding of how local fishing communities can adapt to climate change effects.

METHODS

We grouped 61 traditional fishing modalities into 10 fishing techniques (Fig.3). Our approach combines SSF community surveys, biological databases, and sea temperature projections (1999-2050, RCP 2.6 and 8.5).

For this study, a total of 404 surveys were conducted in 9 fishing guilds distributed along the Galician coast (Salgueiro-Otero et al., 2022) (Fig.2) .

We evaluate the three key dimensions of climate risk:

- Hazard: is assessed through species-specific and population-specific processes, including biological traits and thermal safety margins (literature and projections)
- Exposure: is measured with catch diversity and species dominance in each fishing technique (survey data)
- Vulnerability: is evaluated through sensitivity and adaptive capacity indicators, considering social, economic, and cultural factors for fishers in each fishing *technique* (survey data)

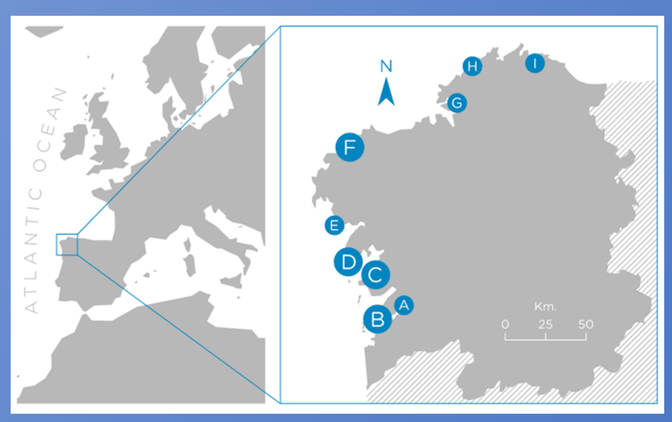
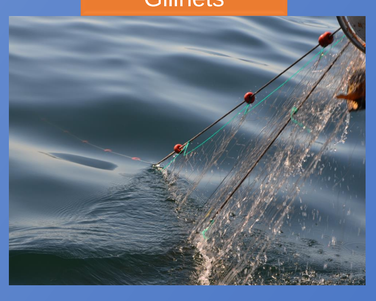
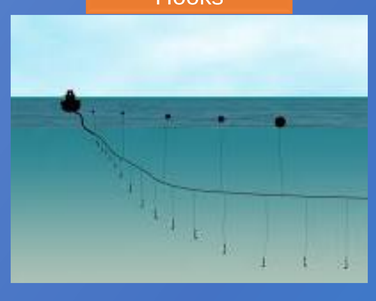
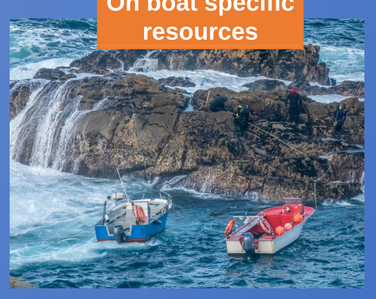
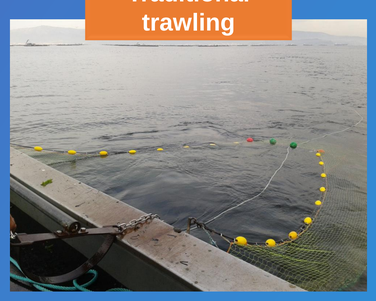


Figure 2. Galician small-scale fishing communities along the coastline. The blue dots on the map represent the social sampling locations for the fishers' database (Salgueiro-Otero et al., 2022).









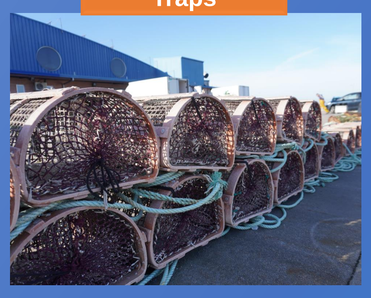


Figure 3. Fishing techniques of the study.

Video: Adaptation of artisanal fisheries to climate change in Galicia

RESULTS

Ecological Hazard of target species

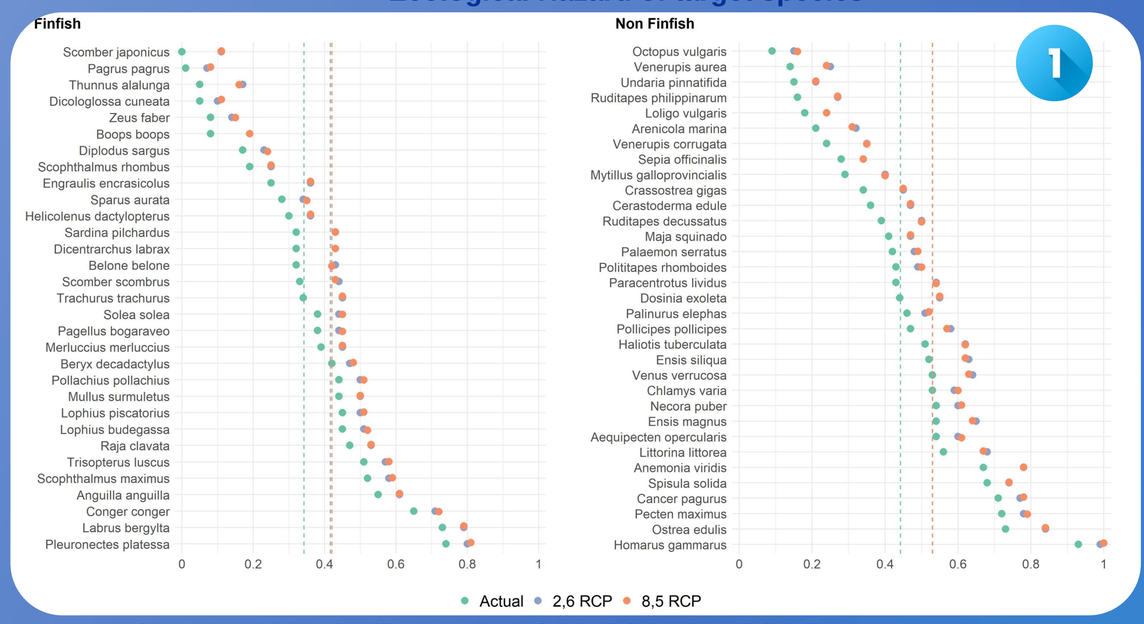


Figure 4. Climate hazard scores for different species in Galicia, finfish and non-finfish. The current hazard is shown, as well as projected future hazards under RCP 2.6 and 8.5 scenarios. Dashed lines indicate the average value for each scenario.

Social-ecological risk of fishing techniques

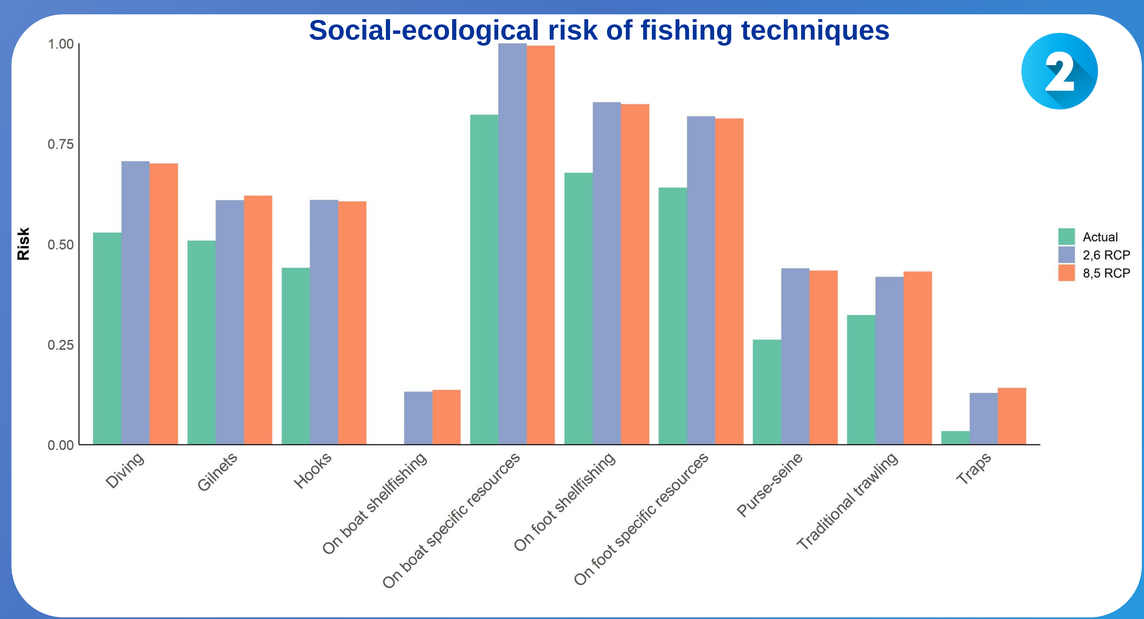


Figure 5. Climate risk of fishing techniques for the current projection and future scenarios RCP 2.6 and 8.5.

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- Hazard scores are consistently higher in future scenarios (RCP 2.6 and RCP 8.5) than in the present, with statistically significant differences (p-value < 0.001).
- Non finfish show significantly higher hazard scores than finfish across all scenarios (p-value < 0.05 for each scenario).
- Hazard scores range from low values for species like *Scomber japonicus* (0.27) and *Octopus vulgaris* (0.30) to high values for *Ostrea edulis* (0.8) and *Homarus gammarus* (0.92).

2

- Significant differences in risk levels are observed between different fishing techniques (p-value < 0.001).
- Risk levels are higher in future scenarios (RCP 2.6 and RCP 8.5) compared to the current scenario.
- Fishing techniques targeting non-finish resources have the highest risks levels, driven by the species ecological hazard.

CONCLUSIONS

- ✓ Most targeted species showed high to moderate hazard values, primarily due to their thermal safety margin, habitat requirements, and lifespan.
- ✓ Non-finfish species consistently exhibit significantly higher hazard scores.
- ✓ Fishing techniques face different climate risk levels, needing tailored adaptation.
- ✓ Fishing techniques targeting high-hazard species (e.g., on boat specific resources) face higher climate risk levels.
- ✓ This risk assessment enables targeted climate adaptation strategies for SSF by identifying specific groups with different risk levels, rather than applying a one-size-fits-all approach.
- ✓ Future climate risk strategies can now be more targeted and effective, building on these results that identify specific adaptation needs for different SSF groups.

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