Changing uses and values of marine ecosystem services in Arctic Norway – MarES
Comparative Studies of the Utilization of Marine Ecosystem Services: Portugal and Norway

Maria A. Cunha-e-Sá and Rui Mota
Nova Center for Environmental Economics
Nova School of Business and Economics, UNL
Tromsø, Norway
December 6, 2017
Our contribution to the project

WP 3: Region-specific valuation of ecosystem services and industrial activities

Activity 3.2: Case 2 - Marine fishing tourism

Activity 3.4: Sea transport and oil spill risks

WP 4: Integrating ES values into CBA and bio-economic models to inform policy-making

Activity 4.4: Lessons for policy making
Our Contribution: Identifying potential case studies to compare with Norwegian case studies

Activity 3.2: Case 2 - Marine fishing tourism:

- Recreational fishing competes with commercial fishing: seabass, white sea bream, and golden bream;

- Real magnitude is largely unknown: the perceived impact on the sustainability of those species suggests that the amounts harvested should be taken into account for sustainable management;
Our Contribution: Identifying case studies to compare with Norwegian case studies

Activity 3.2: Case 2 - Marine fishing tourism:

- Conflicts with other recreational uses that share the same areas occur frequently in the high season (coast of Algarve): bans on recreational fishing on those areas have been proposed;

- The increase in the demand for marine wildlife tourism, such as diving, and cetaceans watching can be seriously affected due to increased fishing activity in the first case and the potential biological impacts of congestion in the second, putting at risk the sustainability of some of the species involved (Azores, Algarve)
Our Contribution: Identifying potential case studies to compare with Norwegian case studies

Activity 3.2: Case 2 - Marine fishing tourism:
We propose:

(i) to identify the current and potential pressures/threats associated to the different activities that may be involved,

(ii) to conduct a stated preference survey to elicit information on how the distinct attributes are valued by different users in order to assess alternative management policies (scenarios) to inform policy design (WP4, Activity 4.3 of the Proposal);
Our Contribution: Identifying potential case studies to compare with Norwegian case studies

Activity 3.4: Sea transport and oil spill risks:

- The southwestern coast of Portugal, Costa Vicentina, hosts one of the largest oil refineries in Europe located at the (city of) Sines;

- The Sines harbor is the most important in the iberian-atlantic coast and it is expected to become even more so in the future;

- The Portuguese Government has granted a deep-offshore drilling concession to explore oil and natural gas about 80 kms (50 ms) off the coast of Sines and 46 km (29 ms) off the coast of Aljezur to begin April 2018;
Protected Areas

**Natural Parks:**
12: Sudoeste e Costa Vicentina

**Natural Reserves:**
22: Sto André and Sancha Lagoons

Source: Instituto Conservação Natureza e Florestas (ICNF)
Our Contribution: Identifying potential case studies to compare with Norwegian case studies

Activity 3.4: Sea transport and oil spill risks:

- South of Sines to the coast of Algarve stretches the Natural Park of the Southeast Alentejo and Vicentina Coast (Parque Natural do Sudoeste Alentejano e da Costa Vicentina, http://www.icnf.pt/portal/ap/p-nat/pnsacv):
  - pristine natural environments, including beaches, and the uniqueness of some of its habitats
    - Rare fishing eagles;
    - White storks (only place in the world where they build their nests in seashore rocks);
    - One of the fewer places in Europe where we can find otters in marine habitats;
    - Unique plant species;
    - Unique fish species;
Map of Licenses/Concessions

Source: Entidade Nacional para o Mercado de Combustíveis Source (ENMC)
Our Contribution: Identifying potential case studies to compare with Norwegian case studies

Activity 3.4: Sea transport and oil spill risks:

Therefore, the goal is to conduct a stated preference survey to elicit preferences for risk-reducing efforts in the region, in line with the Lofoten Islands case study, that can inform policy makers, contributing to WP 4, Activity 4.4;

“Eliciting local inhabitants preference for risk-reducing efforts in this high-pressure area, and comparing them with preferences for risk reducing efforts in low-pressure areas as Lofoten areas will be useful in environmental BT exercises in the Norwegian as well as in the European marine transport policy making.”
Our Contribution: Identifying potential case studies to compare with Norwegian case studies

Activity 3.4: Sea transport and oil spill risks:

- Detailed assessment of the services provided by the marine and coastal ecosystems in the region is required:
  - Mapping ES and links to supported human activities:
    - spatial distribution of services, synergies and trade-offs;
    - how they are provided (private/public);

- Goal: To estimate the welfare impact on populations of different ecosystem services losses scenarios due to potential oil spill accidents in the western coast of Portugal and compare with Lofoten Island’s potential oil spill results:
  - Elicit respondents’ WTP to avoid those losses for different scenarios (could be based on the case of Prestige in Galicia): it depends on how individuals relate to natural resources: Total Economic Value (use and nonuse value)
Incorporating economics into harvest control rules for fisheries’ management

Rui Mota
December, 2017
Tromso
Motivation

[juri choices]
Gisela João, Rita Blanco, Nuno Marki, Rui Unas and Vhils

[Images: Festival Lisboa '16, fish art, people cooking, grilled sardines in bread]

[Logo: NOVA School of Business & Economics]
Motivation

- Ibero-Atlantic sardine stock is jointly managed by Portugal and Spain.
- Historically low stock levels. Multiannual management plan needed.
Most stocks are managed only with population models.

Bioeconomic modeling has, typically, not been used to obtain harvest control rule (HCR) endogenously.

IPMA has a population model to manage the stocks.

We contributed by including economic aspects into the HCR.

- How can obtain a HCR in a bioeconomic context?
Motivation

- IPMA’s HCR

Figure: HCR used to manage the Ibero-Atlantic sardine stock since 2012.
Bioeconomic model

- Optimal paths from a bioeconomic model:
- Maximize yield:
Optimal paths from a bioeconomic model:

Maximize yield + smoothening of catches over time:
Bioeconomic model

- Optimal paths from a bioeconomic model:
- Maximize yield + smoothening of catches over time + risk of collapse

![Graph showing bioeconomic model results](image_url)
Harvest Control Rule

- How to obtain a HCR from optimizing a bioeconomic model?
Harvest Control Rule

- How to obtain a HCR from optimizing a bioeconomic model?

175 random initial populations

![Graph showing harvest and biomass relationship](image-url)
How to construct a HCR from optimal bioeconomic model?

175 random initial populations
Harvest Control Rule

- How to construct a HCR from optimal bioeconomic model?
- Example: With critical depensation (in recruitment).
Applications:

- Sardines, with the Portuguese fisheries management agency (IPMA).

- Western Baltic Cod, part of the ICES’s Workshop on Developing Integrated Advice for Baltic Sea ecosystem-based fisheries management.
Nova Center for Environmental Economics