MareFrame

WP5: Apply new methods in case studies

Final meeting, December 12, 2017 Brussels

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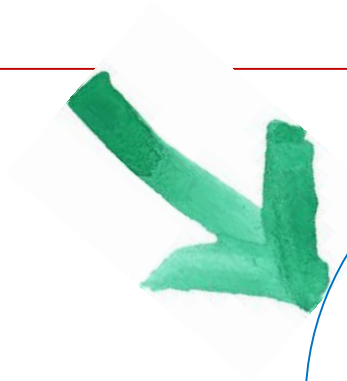
This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 613571

Objectives of WPx

MareFrame

What were the objectives and how have they been met?

1) by using ecosystem models in different areas to explore the direct and ecosystem-mediated implications of alternative management strategies,
2) by coupling the implementation of an Integrated Ecosystem Assessment to ad-hoc Decision Support Tools in connection with WP6.



- Alternative management scenarios explored in all case studies

- On line DSTs ready to be used in CS areas

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Baltic Sea case study

What were the objectives?
The stakeholders group was interested in a framework able to support the management of the Central Baltic fisheries of cod, herring and sprat considering trophic interactions, environmental influence, social and economic benefits

…and how have they been met*?*
1) Multliple complementary Ecosystem models used to forecast alternative fishery mngm scenarios under environmental uncertainty; 2) Decision Support Tool (BBN+MCA); 3) Co-creation

Main challenge
1) The Baltic is a data-rich system with few species, but still reconstructing the interacting dynamics of cod, herring and sprat is a challenge; 2) Integration of output from multiple ecosystem models; 3) Find a representative stable group of stakeholders attached to the case study; 4) lack of socio-economist in the group

Legacy – What now? What are the most significant results of the project and how to make sure they will be exploited after the project end
The Baltic DSF is at an inphant stage but is sufficiently general to host new models and further developments. Constructive experience for both stakeholders and scientists to grow into EBFM. Promote and offer the DSF for testing and exploration of alternative fishing strategies

Expected publications
- Bauer et al. Effect of the underwater habitat quality on the top predator Baltic cod and its food web interactions
- Kulatska et al. Ontogenetic and temporal variability of Eastern Baltic cod diet
- Bartolino et al. Impact of spatial heterogeneity of survey data on the assessment of Baltic Sea sprat
- Bauer et al. Sources of structural uncertainty and its impacts on simulated fisheries management strategies in the Baltic Sea
- Rahikainen et al. A decision support tool for ecosystem approach of the Baltic fisheries

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North Sea Case Study

- Objectives Describe MSY in a Multispecies-Multifleet context if possible consider Compliance in context of LO.
- Main Challenges: the North Sea has many species (12 plus) and many different fishing gear* country interactions with different mixes of species and different economics and social aims.
- Legacy. T-ONS model to be curated and made easy for ICES to adopt.

DSF approaches clarified and partially sold to stakeholders.

- Publications 5 papers proposed for special edition. Probably 2 follow on papers through SAF21 and WGSAM.

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North western waters case study (Iceland)

Objectives

Build three substantially different ecosystem models for Icelandic waters

- All three models are up and running, but development will continue well into the future

Investigate the performance Gadget and EwE based on simulated data from Atlantis

- Simulated data from Atlantis is now fed into MFDB and used as the basis for comparison
- Results from these comparison are presented at this symposium

Investigate variations in the current management scheme for cod and related species

- Five scenarios developed using a Gadget model, two have been presented to the stakeholders

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North western waters case study (Iceland)

Legacy

Knowledge transfer:

- Gadget workshop in La Coruna
- Extended stays at the MFRI, Reykjavík

Software development:

- **Rgadget**: toolbox for model building and compilation of results: http://www.github.com/hafro/rgadget
- **GadgetLite:** A playground for further Gadget development http://www.github.com/bthe/gadgetLite
- **Gadget-models:** Gadget models built in this case study http://www.github.com/bthe/gadget-models
- **VAT**: Visualising Atlantis Toolbox http://www.github.com/mareframe/vat

Management plans:

- Stock assessment and harvest control rules for tusk and ling developed using MareFrame tools and accepted by ICES

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North western waters case study (Iceland)

Publications (expected)

Elvarsson, Bjarki Þór. "Evaluating stock structure hypotheses using genetically determined close relatives: a simulation study on North Atlantic fin whales." ***ICES Journal of Marine Science: Journal du Conseil*** **(2014): fsu140.**

Sturludottir et al. Ecosystem model of Icelandic waters using the Atlantis modelling framework

Sturludottir et al. "Can Ecopath with Ecosim mimic the Atlantis ecosystem?**"**

Frater et al. "Evaluating Gadget using an OM" (working title)

Ribeiro et al. "Ecopath model for Icelandic waters" (working title)

Elvarsson et al. Using Gadget in a multi-criteria analysis of the Icelandic cod fishery Gadget

Elvarsson et. al: Taking a data challenged stock further: a case-study on Icelandic ling

Elvarsson et. al: Gadget

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Northern waters case study: west of Scotland

Objectives

- Develop EBFM framework ✓
- 2 ecosystem models ✓
- Co-creation: identify issues ✓
- Co-creation: identify best scenario ✓
- Implement DSTs, use DSF ✓
- Draft management plan proposal ~

WEST OF SCOTLAND FISH PRODUCERS ORGANISATION LIMITED

SWFPA The Scottish White Fish Producers Association Ltd

Conseil Consultatif pour les Eaux Occidentales Septentrionales · North Western Waters Advisory Council · Consejo Consultivo para las Aguas Noroccidentales

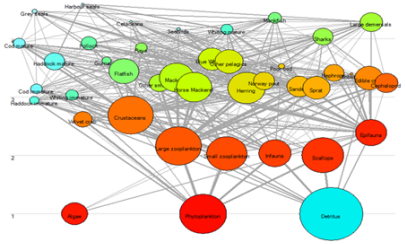
Challenges

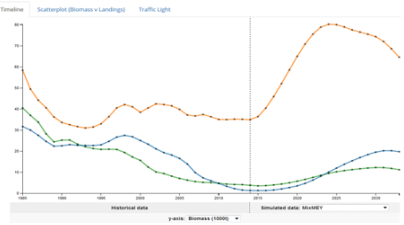
- Stakeholders interest = short-term (e.g. discard ban)
- EBFM framework = long-term issues (e.g. GES)
- No discards in models used
- Sometimes difficult to engage stakeholders
- Stakeholder fatigue

Legacy

2 up-to-date ecosystem models available

Lessons learned





Visualisation tool

Decision Support Framework

DSF: method and tools applicable beyond MareFrame project

Publications

N. Serpetti, A. R. Baudron, M. T. Burrows, B. L. Payne, P. Helaouët, P. G. Fernandes & J. J. Heymans. **2017**. Impact of ocean warming on sustainable fisheries management informs the Ecosystem Approach to Fisheries. Scientific Reports DOI:10.1038/s41598-017-13220-7

Alan Baudron, Natalia Serpetti, Niall Fallon, Sheila Heymans, Paul Fernandes. **In Prep**. Can the Common Fisheries Policy achieve Good Environmental Status in exploited ecosystems: the west of Scotland fisheries example. Fisheries Research (MareFrame special issue)

Alan Baudron, Natalia Serpetti, Niall Fallon, Sheila Heymans, Paul Fernandes. **In Prep**. Multispecies Maximum Sustainable Yield in the west of Scotland fisheries

Niall Fallon, Alan Baudron, Paul Fernandes. **In Prep**. A length- and age-based multispecies model for the west of Scotland fisheries

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SWW Case Study

Main Objective

To explore management options leading to greater sustainability in the biological and economic realms for a fishery of societal importance but highly fluctuating under environmentally-driven and nonhuman controlled drivers.

Main challengues

Implement the socioeconomic components demanded by the SH in a model that includes not only the biology but also the environmental forcing on the biology. To do so in a frame scientifically rigorous but also transparent beyond the scientific realm, so that real impact is feasible.

Implementation

1) A bioeconomic model based on real data of the stock and the fleet. 2) Implemented in a probabilistic frame able to account for uncertainty. 3) Implemented in a DST available on internet and that can be used by any stake holder in a fully transparent manner.

Legacy

The main stake holders are now fully aware, accept and look for better management strategies than the present fixed TAC. They are requesting further work and actions along this line.

Papers

ICES journal of Marien Science on what are the advantadges of an insurance to the stock

Marine Policy on the different management strategies

Fisheries Oceanography (still in review) on the consequences of climate change under different management strategies

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Mediterranean Case Study

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Objectives: Develop a tool for the application of EAFM in the Strait of Sicily

Results: two new models Gadget and Atlantis.

Two DST ready to be used for tactical short-term advice(Gadget based) and medium term strategic advice (Atlantis based) advice: the first structured tool for the implementation of EAFM in the Mediterranean.

Support to the GFCM management plan. Single species Gadget already adopted as alternative assessment models to VPA/XSA by GFCM.

Main Challenges: ecosystem models from scratch, stakeholder engagement.

Legacy - What now?

Roadmap to deliver CS outputs to GFCM. A cooperation with FAO, Italian DG Pesca, Medac and GFCM established. Models development will continue in the future

Publications:

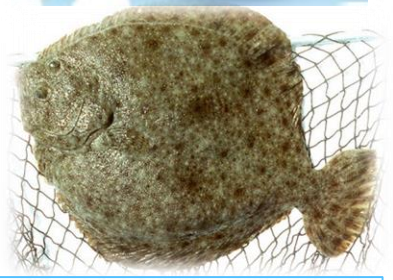
- Di Lorenzo, M., Sinerchia, M., & Colloca, F. 2017. The North sector of the Strait of Sicily: a priority area for conservation in the Mediterranean Sea. Hydrobiologia,
- Colloca, F., Scarcella, G., & Libralato, S., 2017. Recent trends and impacts of fisheries exploitation on Mediterranean stocks and ecosystems. Frontiers in Marine Science, 4, 244
- MareFrame Fisheries Research Special issue: three manuscripts in preparation

Black Sea Case Study

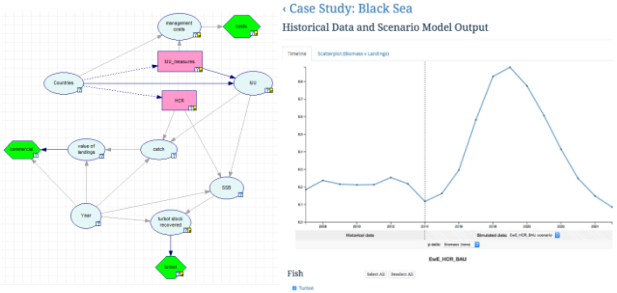
MareFrame

The focus: Black Sea turbot (*Psetta maxima maeotica*)

Challenges: Data poor case study: the main gaps in the fishery dependent data sets are related to the quality of the official landings and effort data, the unknown rates of discards and IUU catch.



Tools: Two ecosystem models: **GADGET** & **EwE**
User-friendly visualization tool and Bayesian belief networks as decision support tool.



Scenarios:
HCR &
IUU measures

Legacy - What now?
Adapt measures to the regional situation.
Common Roadmap with GFCM.
Capacity building & training in ecosystem modeling = expertise

Stakeholders: fishermen and fishing organizations from Romania and from all six countries bordering the Black Sea;
National Agencies for Fisheries and Aquaculture;
Regional Commissions and Working groups.
4 face to face meetings

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Main challenges

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Legacy – What now?

What are the most significant results of the project and how to make sure they will be exploited after the project end

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Publications

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