An example of a Decision Support Framework for ecosystem-based fisheries management (MareFrame project)

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PrimeFish Stakeholder Workshop

Vilanova i la Geltrú, Spain, April 6th 2017

About Nofima

Nofima is a private, non-profit research institute owned by the Norwegian government with head office in Tromsø and over 350 employees in six different locations around Norway.

Nofima was founded in 2008 when four former public food research institutes merged:
- Norconserv – canned and preserved foods, Stavanger
- Matforsk – food from agriculture, Ås
- Akvaforsk – aquaculture related research, Sunndalsøra
- Fiskeriforskning – seafood and processing, Tromsø

Main areas of work:
- Aquaculture and fisheries – raw materials
- Food from agriculture and aquaculture – processes and products
- Consumer and market research, which includes:
  - Consumer research, buying behaviour, food and context
  - Innovation and product development
  - Traceability, sustainability, environmental accounting

Turnover in 2013 was around 70 Million Euros

This presentation

1. Outline of the MareFrame project overall

2. Case studies and decision support tools in the MareFrame project

3. Overview of the MareFrame tools, and the development process

4. Brief introduction to what-if analysis / multi-criteria decision analysis

5. Demonstration of the MareFrame tools

6. Discussion on the applicability to PrimeFish

Key question in H2020 projects:

How do we go from "*knowledge generated*" to "*impact in the society in general, and in the industry in particular*"?

Our answer:

To improve decisions by using the knowledge generated; to develop "Decision Support Frameworks".

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FP7 MareFrame

- 48 month duration, 01/2014 – 12/2017
- 7.75 MEUR total, 6 MEUR EU contribution
- Matis leads, 28 participants from 16 countries

MareFrame objectives:

- Remove the barriers preventing more widespread use of the ecosystem-based approach to fisheries management

- Development of new tools and technologies, ecosystem models and assessment methods, and a support framework that can highlight alternatives and consequences

- Close integration and co-creation with stakeholders

Decision support in MareFrame

- Will develop a Decision Support Framework (DSF) for management of marine resources and thereby enhance the capacity to provide integrated assessment, advice and decision support for an Ecosystem Approach to Fisheries Management.

- Will enable comparisons between relevant "what-if" scenarios and their likely consequences.

- **Developers:** Tókni, Mapix.

- **Scientists:** UiT (Develop DSF), Syntesa (Synthesis & training), Matis, Nofima, …
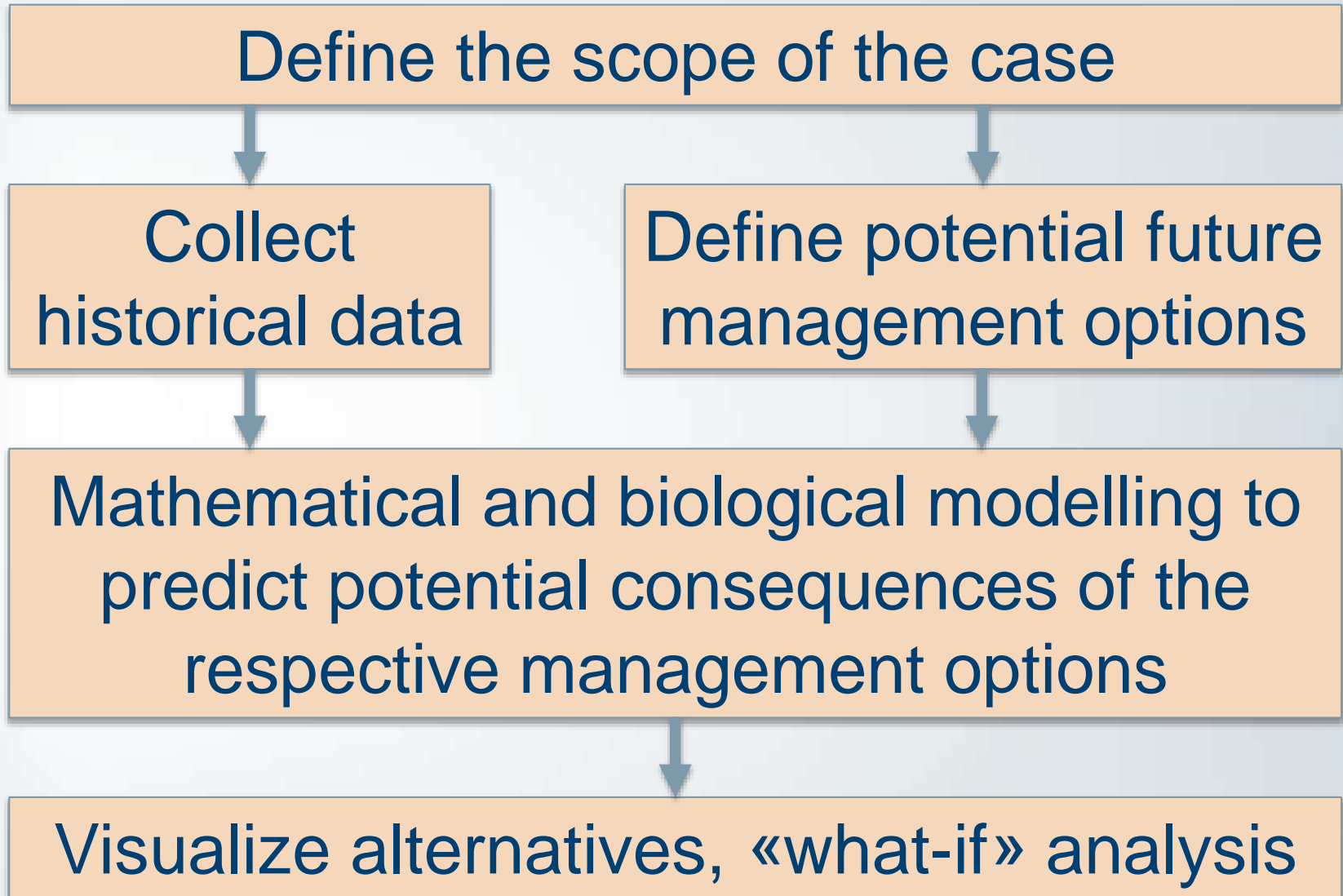
MareFrame tools

Scenario model output

- **Timeline**, predicted development for multiple stocks for a given management scenario
- **Scenario comparison**, predicted development for a single stock comparing management scenarios
- **Traffic light**, multiple stocks, multiple scenarios, comparison with biological reference values
- **Scatterplot**, biomass versus landings

What-if analysis, multi-criteria decision analysis (MCDA) where the user can weight what is most important

What-if analysis, Bayesian Belief Nets (BBNs) where the stakeholder can weight what is deemed most likely

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Where does the data come from?

Define the scope of the case

Collect historical data

Define potential future management options

Mathematical and biological modelling to predict potential consequences of the respective management options

Visualize alternatives, «what-if» analysis

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The MareFrame DSF and DSTs

MareFrame Decision Support Framework

The MareFrame Decision Support Framework is a pragmatic planning process for moving towards an Ecosystem Approach to Fisheries Management. Please select from the case studies below to review the available information and decision support tools.

1. Iceland

2. West Coast of Scotland

3. North Sea

4. Baltic Sea

5. Gulf of Cádiz

6. Strait of Sicily

7. Black Sea

http://mareframe.mapix.com/

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Case: West of Scotland fisheries

<u>Main problem:</u> Spawning stock biomass for cod and whiting are at the lowest levels ever seen

<u>Proposed management scenarios:</u>

CurPath	Current path
MixMEY	Mixed MEY
GadRec	Gadoid Recovery
SQ	Status Quo
Seal_R	Seal Reduction
GRecSC	Gadiod recovery with real reduction
Spatial	Spatial F approach

Multiple-Criteria Decision Analysis

- MCDA evaluates multiple conflicting criteria in decision making.

- Conflicting criteria are typical in evaluating options: cost or price is usually one of the main criteria, and some measure of quality is typically another criterion, easily in conflict with the cost.

- The difficulty of the problem originates from the presence of more than one criterion. The concept of an optimal solution is often replaced by the set of nondominated solutions. A nondominated solution has the property that it is not possible to move away from it to any other solution without sacrificing in at least one criterion.

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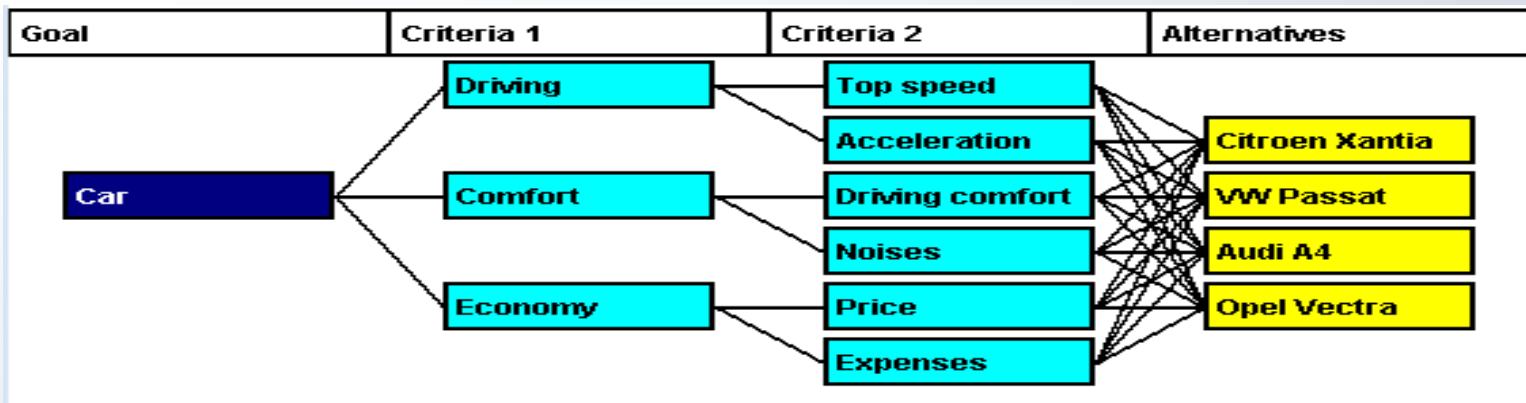
In conclusion

MareFrame is a different type of project; it is fisheries only, it focuses on resource management, and the primary users are those who manage stocks

However…

There are some commonalities with PrimeFish; both projects are in the seafood sector, they both involve formulating strategies for the future and forecasting what the effects might be, and in both projects we aim to develop tools that will support better decisions

The question is, can any of the MareFrame tools serve as input to the PrimeFish tool development process?

Thank you for your attention

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