MareFrame

Co-Creating Ecosystem-Based Fisheries Management Solutions

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

MareFrame Co-creating Ecosystem based Fisheries Management Solutions
Funded under the EU FP7 Programme
A consortium of 28 partners from 14 countries
Duration of four years: January 2014 – December 2017
Work programme topic addressed: KBBE
2013.1.2-08: Innovative insights and tools to integrate the ecosystem-based approach into fisheries advice
Project coordinator Dr. Anna Kristín Daníelsdóttir

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MareFrame Portfolio

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MareFrame Second Annual Meeting in Constanta Romania 2015

MareFrame Final Meeting in Brussels Belgium 2017

MareFrame

Co-creating Ecosystem-based Fisheries Management Solutions

MareFrame is a EC-funded RTD project which encourages a more widespread use of the ecosystem-based approach to fisheries management. This entails development of new tools and technologies, development and extension of ecosystem models and assessment methods, and development of a decision support framework that can highlight alternatives and consequences. Most importantly, the more widespread use depends not only on collaboration with stakeholders in general, but on close integration and co-creation with stakeholders in all development phases, to ensure that ownership lies with them and to increase the chance of acceptance and uptake of the project outcomes.The vision of MareFrame is to significantly increase the use of ecosystem-based approach to fisheries management (EAFM) when providing advice relating to European fish stocks.

The overall objective of MareFrame is to encourage a more widespread use of EAFM through development of new tools and technologies, development and extension of ecosystem models and assessment methods, and development of a decision support framework that can highlight alternatives and consequences; all in close collaboration with the stakeholders in the co-creation processes.

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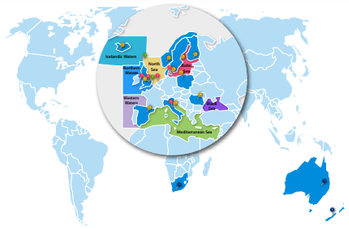


CO-CREATING ECOSYSTEM-BASED FISHERIES MANAGEMENT SOLUTIONS FOR THE MEDITERRANEAN

Who is involved?

MEDAC

Fishermen associations and producers organizations, environmental NGOs, fisheries scientist, other marine economic sectors.

What are the main challenges?

Overfishing, fleet economic performance, poor market conditions, environmental changes, changes in species composition.

Which objectives are being suggested?

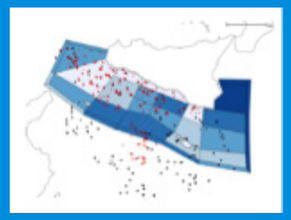
To improve the fishing patterns, to rebuild the main commercial stocks, to increase the economic performance of the trawlers, etc.

Have your say

- If you are a fishermen that knows the area, has knowledge about specific issues or wishes to share some comments.
- If you are a professional developing your activity in the area.
- If you are a scientist, interested in the Atlantis model or in the use of ecosystem models for fisheries management.
- If you have been involved in research projects relevant for the case study.
- If you are a policy-maker, willing to learn about the use of decision support tools and the ecosystem-approach to fisheries management.
- If you are a citizen aimed by curiosity or concern with the sustainable use of natural resources.

MEDITERRANEAN WATERS

Where: Strait of Sicily



What for: to explore in advance the implications of alternative management strategies.

Key features of the case study:

- Internationally shared fisheries (Italy-Malta-Tunisia).
- Multi-fleets-species fisheries: bottom trawl, artisanal vessels, purse seiners.
- High biodiversity and habitat heterogeneity
- Priority areas for conservation.

Doubts, comments, proposals?

Please contact the Case Study Leader, **Francesco Colloca**

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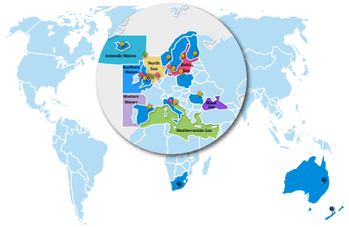

What has being going on?

- Launching of the case study, Mazara del Vallo (20/06/2014)
- Case study meeting, Mazara del Vallo (20/02/2015)
- Questionnaire distributed to select topics, priorities and possible actions. Would you like to have your say?
- Exploring the links with the General Fisheries Commission for the Mediterranean (GFCM) management plan.
- Working on the models: Atlantis (under calibration and data gathering for time series; re-construction of spatio-temporal distribution of the catch of the main fleet) and Gadget (for hake and its main commercial prey, horse mackerel and deep-water rose shrimp; data processing, model estimation and selection.

What is next for the Mediterranean Case Study?

- Case study meeting (June, 2015)
- Working with models: first version of the ecosystem models to be ready by December 2015 as the latest.
- Supporting the development of training tools and decision-making tools.

"Progress has little to do with speed, but much to do with direction! So honour every step….no matter how slow" Timber Hawkeye

Would you like to know more?

- **About the MareFrame project,** designed to remove the barriers that prevent a more widespread use of the Ecosystem Approach to Fisheries Management in the European Union. Watch our 3 minutes video with the key info and surface the Web for more!

MareFrame Video

www.mareframe-fp7.org

Contact us:

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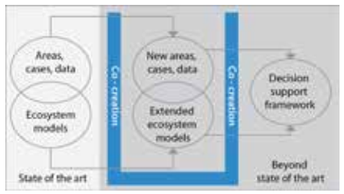
Scientific Manager: Dr. Gunnar Stefansson University of Iceland gunnar@hi.is

Networking with other projects

MareFrame liaises with other national and international research projects and is highly relevant to the future management of marine resources in Europe in a changing environment, taking a holistic view incorporating socio-economic and legislative issues.

Outcomes

- New tools and technologies
- Extended ecosystem models and assessment methods
- New Decision Support Framework (DSF) that can highlight alternative management actions and their consequences
- Development, acceptance and incorporation by stakeholders
- Support implementation of the new Common Fisheries Policy (CFP), the Marine strategy Framework Directive (MSFD) and the Habitats Directive (HD)



Project coordination

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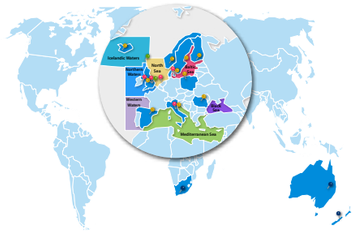
MareFrame

Co-creating Ecosystem based Fisheries Management Solutions



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rs: Jan. 2014 – Dec. 2017

topic addressed: KBBE
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European Union's Seventh
ological development and
613571

Aim

MareFrame seeks to remove barriers that currently prevent a more widespread use of an Ecosystem-based Approach to Fisheries Management (EAFM) by developing:

- Novel data based on new tools and technologies
- Ecosystem models and assessment methods based on indicators of Good Environmental Status (GES)
- A Decision Support Framework (DSF) adapted to the needs of decision makers, managers, operators, and other stakeholders that will support the implementation of the new Common Fisheries Policy (CFP), Marine Strategy Framework Directive (MSFD) and Habitats Directive (HD)

Beneficiaries

MareFrame contains tangible benefits for groups of stakeholders who have primary interest in clear policy objectives. The benefits include:

- Efficient and effective decision-making and implementation
- Sustainable industry performance in terms of ecological, social and economic aspects

The strategy

Nine Work Packages (WPs)

The MareFrame project will

- Enhance the capacity to provide holistic assessment on important issues
- Provide advice and decision support for an ecosystem based approach to fisheries management
- Look at feasibility for implementation

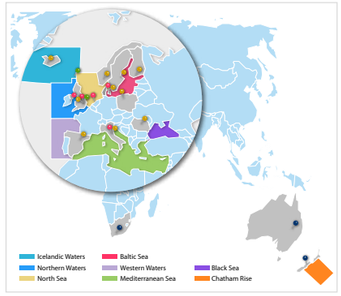
MareFrame will allow for

- Collaboration across multiple scientific fields
- Collaboration between different ecosystems involved in catching of fish
- Co-creation approach which merges analytical and participatory processes in collaborative research with stakeholders

A new approach

Broad spectrum of ecosystem based models will be developed. These models will then be tested and compared systematically to the same ecosystems, and evaluated using the same underlying datasets. This allows for a robust approach to test scenarios that are less dependent on model choice.

The new ecosystem approach will be based on responsiveness, flexibility, and stakeholders' involvement. It will be developed and demonstrated through training actions, role-play and workshops with stakeholders.



Eight case studies	Six ecosystem models
Baltic Sea	GADGET
North Sea	Ecopath with Ecosim (EWE)
Northern Waters – Iceland	FishSums
Northern Waters	Multi-species prod. models
Western Waters	Size spectra
Mediterranean Sea	Atlantis
Black Sea	
Chatham Rise – New Zealand	

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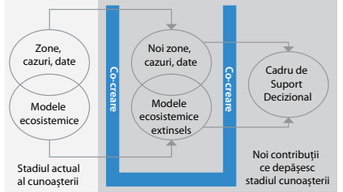
Sinergia cu alte proiecte

MareFrame este într-o strânsă legătură cu alte proiecte de cercetare naționale și internaționale și este extrem de relevant pentru managementul viitor al resurselor marine vii ale Europei, într-un mediu în continuă schimbare, având o abordare holistică ce ține cont și de aspectele socio-economice și legislative.

Rezultate

- Instrumente și tehnologii inovatoare
- Modele ecosistemice și metode de evaluare extinse
- Un nou Cadru de Suport Decizional (CSD) care poate evidenția acțiuni de management alternative și consecințele acestora
- Dezvoltare, acceptare și integrare de către factorii interesați
- Sprijin în implementarea noii Politici Pescărești Comune (PPC), Directivei-Cadru Strategia pentru Mediul Marin (DCSMM) și Directivei Habitate (DH)



Coordonator proiect

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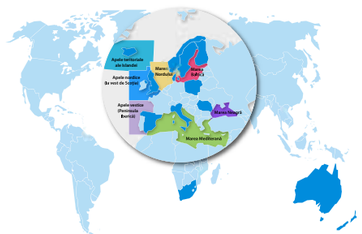
MareFrame

Co-crearea de soluții de management pescăresc bazat pe abordarea ecosistemică



Finanțat în cadrul Programului UE PC7
Un consorțiu ce cuprinde 28 parteneri din 14 state
Durată de implementare de 4 ani: Ian. 2014 - Dec. 2017

Problematică din programul de lucru abordată: KBBE (Bio-economie fundamentată științific)
2013.1.2-08: Perspective și instrumente inovatoare de integrare a abordării ecosistemice în consultanța din domeniul pescăresc

Scop

MareFrame își propune eliminarea barierelor ce împiedică utilizarea la o scară mai largă a abordării ecosistemice a managementului pescăresc (AEMP), prin crearea de:

- Date noi fundamentate de instrumente și tehnologii inovatoare
- Modele ecosistemice și metode de evaluare bazate pe indicatorii de Stare Bună a Mediului (SBM)
- Un Cadru de Suport Decizional (CSD) adaptat la necesitățile factorilor de decizie, managerilor, operatorilor din domeniul pescăresc și altor factori interesați în implementarea noii Politici Pescărești Comune (PPC), Directivei-Cadru Strategia pentru Mediul Marin (DCSMM) și Directiva Habitate (DH)

Beneficiari

Proiectul MareFrame generează beneficii palpabile pentru grupurile direct interesate în realizarea unor obiective de politici extrem de clare. Aceste beneficii includ:

- Un proces de luare și punere în practică a deciziilor eficient și eficace
- O dezvoltare durabilă a industriei pescărești din punct de vedere ecologic, social și economic

Strategia

Nouă pachete de lucru (PL)

Proiectul MareFrame își propune să

- Dezvolte capacitatea de a realiza o evaluare holistică a aspectelor semnificative
- Furnizeze consultanță și suport decizional pentru o abordare ecosistemică a managementului pescăresc
- Țină cont de fezabilitatea în implementare

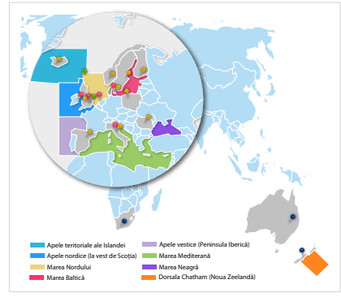
Proiectul MareFrame ia în considerare

- Colaborarea între multiple domenii științifice
- Colaborarea între diversele ecosisteme implicate în capturarea peștelui
- Abordarea de co-creare, ce contopește procesele analitice și participative într-o cercetare colaborativă, realizată împreună cu factorii interesați

O nouă abordare

În cadrul MareFrame se va crea un spectru larg de modele ecosistemice. Ulterior, aceste modele vor fi testate și comparate în mod sistematic cu ecosistemele care le-au generat și vor fi evaluate utilizând aceleași seturi de date ce le-au fundamentat. Aceasta este o abordare corectă de testare a scenariilor, care depind astfel într-o măsură mai mică de modelul ales.

Noua abordare ecosistemică se va baza pe capacitatea de reacție, flexibilitate și implicarea factorilor interesați. Aceasta va fi dezvoltată și pusă în aplicare prin intermediul acțiunilor de training, asumarea de roluri și ateliere de lucru cu factorii interesați.



Opt studii de caz	Șase modele ecosistemice
Marea Baltică	GADGET
Marea Nordului	Ecopath cu Ecosim (EWE)
Apele teritoriale ale Islandei	FishSums
Apele nordice (la vest de Scoția)	Modele de productivitate multi-specie
Apele vestice (Peninsula Iberică)	Spectre dimensiuni
Marea Mediterană	Atlantis
Marea Neagră	
Dorsala Chatham (Noua Zeelandă)	

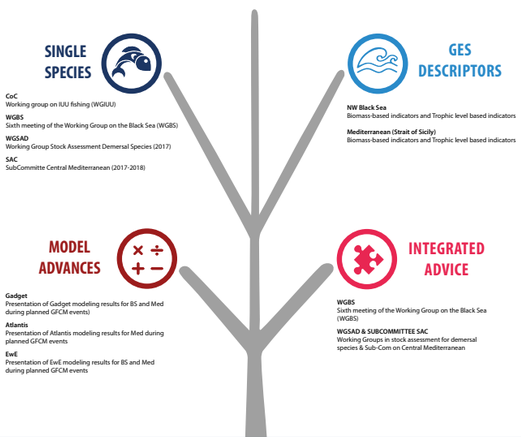
Meeting Plan for MareFrame - Dec 2014

MareFrame

Meeting Type	Frequency/Month/Date	Place	Participants	Meeting Description
Kick-off Meeting including PMG, SC & WP Meetings	Feb 2014 (M2) 11-13 Feb	Reykjavik Iceland	All (PMG, SC, WP & CS Leaders) & EAG	The kick-off meeting is scheduled at MATIS in Reykjavik, Iceland, in the first month of the project. EAG and SG members will be invited for advice and consultancy as well as for the remaining project meetings. Members of the EAG will be invited to attend each of the project meetings in accordance with the specific issues addressed.
Annual Meetings including PMG, SC & WP Meetings	Dec 2014 (M12) 9-11 Dec Dec 2015 (M24) 9-11 Dec Dec 2016 (M36) 13-15 Dec	Aberdeen UK Romania Palermo Sicily	All (PMG, SC, WP & CS Leaders) & EAG	The three Annual meetings will be used to monitor and discuss the progress and results in the project in context with the plan and will hence be used for quality control of the project.
PMG Meetings	Every month (conf. call) (Physical every 6 months) M3 M12 (with AM)		PMG	Project Management Group
Case Study Meetings including Launching and Fuzzy Cognitive Mapping Workshops	Two for each CS, total 14: Launching by May 2014 (M5) and Fuzzy Wshop by June 2015 (M18)		SG & CSL	Case study events: 2 events will be organised at each regional sea level (total of 14). a) Launching of the Case Study: interaction, EAF experiences and existing knowledge, particularly from fishermen; first input for the design of management plans b) Fuzzy Cognitive Mapping workshops, to build on models, decision support tools and iterative management plans.
Gadget workshop	Sept 2014 (M9) 20 Sept	A Corunha, Spain: to follow ICES 15-19 sept	CS leaders	
Workshop I: Pool of knowledge	March 2014 (M4) delay until Oct (M10) CANCELED	CETMAR	SG & EAG	Workshop with EAF FP6-FP7 as well as frontrunner countries projects to summarise findings and new research questions relevant for MareFrame
Workshop II: Meeting with RACs	June 2014 (M6)	Brussels	WP leaders & CS Leaders & CSL & SG & EAG	Meeting with the RACs to discuss how stakeholders can formally become part of the EAF advice process
Workshop III: Round table discussion	Jan 2015 (M13)	Brussels	WP leaders & SG & EAG	DG MARE, STECF, ICES, EFARO to identify shortcomings of the present approach and discuss ideas on how to set-up the EAF advice process in future
Workshop IV: EAF Fisheries Advice	Nov 2015 (M23)	Cobenhagen	WP leaders & SG & EAG	A joint technical meeting with the JRC, STEFC, ICES, RACs, DG-MARE and DG-ENVIROMENT. Analysis of the current fisheries advisory process, demands from the EAF, opportunities for improvement, etc.
WP7 workshops	June 2014 (M6) June 2015 (M18) to be decided	Faroes To be decided	Relevant participants	Training tool. In addition to these formal overall project meetings, visits between partners are encouraged to discuss the results and to receive training in techniques used in the project.
WP2 workshop	June 2015 (M18)	to be decided	CS and model experts	Workshop with experts on models (GADGET, Atlantis and EwE) after finish data analysis in WP2. The aim is to discuss how to implement the new data into models operationally. WP2
Decision Support Framework (DSF) working session for decision-makers	Prototype I: June 2015 (M18) Prototype II: June 2017 (M42)		WP leaders & SG & EAG	DSF working session for decision-makers: role play event. Test of the DSF prototype and use of it to adapt final management plans
Concluding Symposium with ICES & Final MareFrame Meeting including PMG, SC & WP Meetings	Dec 2017 (M48)	Vigo, Spain	ALL & SG & EAG	The Final meeting will be held in the end of the project, in conjugation with a Concluding Symposium, to review the overall results, prepare the data for the final report and report on the dissemination and exploitation plan of the results from the project.

Project Management Group (PMG): participants with coordination, administrative and legal experience including the Coordinator (CO), Scientific Manager (SM) and Administrative Manager (AM). The operative and secretarial support of the project is given by the coordinating organisation.
Scientific Committee (SC): CO, SM, WP leaders and scientists with key expertise, led by the SM.
External Advisory Group (EAG): invited scientific experts, policy makers and stakeholders from Ministries of Fisheries, Fisheries Directives, Research Institutes, Fisheries Associations, Universities, Industries, independent research institutions, consultants, international fishery councils and agencies.
Stakeholders Group (SG): invited scientific experts, policy makers and stakeholders from Ministries of Fisheries, Fisheries Directives, Marine Research Institutes, Fisheries Associations, Universities, Industries, independent research institutions, consultants, international fishery councils and agencies (Table 2.3.2).
Case Studies Liaisons (CSL): "community leaders" or active stakeholders that follow-up closely the project. They are the people with which RTD normally interact when developing research in the area; they will be called directly on the phone and interact formally and informally during the case study implementation.

GFCM RoadMap



Options – Strategic Actions

AD HOC WORKSHOPS 2017

JOINT SESSIONS GFCM-STECF 2018

TWINNING WITH BLACK SEA4FISH PROJECT

Advice: Single Species

WG	Name	Species	Where & When	What
CoC	Working group on IUU fishing (WGIUU) Working group on VMS and related control systems / working group on integrated MCS measures for demersal fisheries in the Strait of Sicily		Greece 2–5 May 2017	Presentation of the MareFrame Decision Support Tool/Strait of Sicily Case Study Presentations of modeling results (Gadget/EwE/Atlantis)
WGBS	Sixth meeting of the Working Group on the Black Sea (WGBS), including workshop on impacts of management measures on selected fisheries	Turbot Piked dogfish Sprat Anchovy Whiting	Constanta, Romania 13–16 June 2017	Presentation of the MareFrame Decision Support Tool/BS Case Study Presentations of modeling results (Gadget/EwE)
WGSAD	Working Group Stock Assessment Demersal Species (2017)	Hake, Deep-Water rose shrimp	TBD	Presentation of single-species multi-species Gadget models. Hake and deep-water rose shrimp
SAC	SubCommitte Central Mediterranean (2017-2018)	Hake Deep-Water rose shrimp	TBD	Presentation of the MareFrame Decision Support Tool/Strait of Sicily Case Study Presentations of modeling results (Gadget/EwE/Atlantis)

CoC = Compliance Committee
WGBS = Working Group for the Black Sea
SAC = Scientific Advisory Committee on Fisheries
WGSAD = Working Group Stock Assessment Demersal Species

ADVICE: GES DESCRIPTORS

Sea basin/area	Descriptor/indicator	Descriptor
NW Black Sea	Biomass-based indicators and Trophic level based indicators	1,3,4
Mediterranean (Strait of Sicily)	Biomass-based indicators and Trophic level based indicators	1,3,4

Model Advances

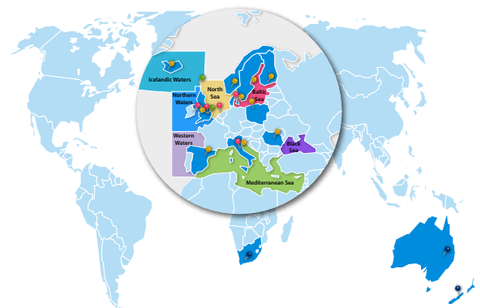
Model	Date	What
Gadget	2017	Presentation of Gadget modeling results for BS and Med during planned GFCM events
Atlantis	2017	Presentation of Atlantis modeling results for Med during planned GFCM events
EwE	2017	Presentation of EwE modeling results for BS and Med during planned GFCM events

SCIENCE: INTEGRATED ADVICE

WGBS	Sixth meeting of the Working Group on the Black Sea (WGBS), including workshop on impacts of management measures on selected fisheries	Presentation of the MareFrame Decision Support Tool/BS Case Study Constanta, Romania 13–16 June 2017
WGSAD& SUBCOMMITTEE SAC	Working Groups in stock assessment for demersal species and Sub-Com on Central Mediterranean	Presentation of the MareFrame Decision Support Tool/Strait of Sicily Case Study Presentations of modeling results (Gadget/EwE/Atlantis)

MareFrame

Roadmap for exploitation of MareFrame outputs within ICES



Co-creating Ecosystem based Fisheries Management Solutions

MareFrame on-going inputs for ICES

SINGLE SPECIES

- **WGBIE** Working Group on Bay of Biscay and Iberian Waters Ecoregion
- **WGDEEP** Working group on biology and assessment of deep-sea fisheries resources
- **WGHANSA** Working Group on Southern Horse Mackerel, Anchovy and Sardine
- **WGMIXFISH** Working Group on Mixed Fisheries Advice

GES DESCRIPTORS

- **West of Scotland** Biomass-based indicators and Trophic level based indicators
- **Baltic** Pressure descriptor
- **North Sea** Pressure descriptor
- **South Western Waters** Cetaceans in WGMME
- **South Western Waters** Pressure descriptor Anchovy

MODEL ADVANCES

- **Gadget** Working document: "A GADGET Multi-species models for cetacean and hake interactions in the Iberian Peninsula"
- **Atlantis, Ewe** Icelandic continental shelf-area Multi-species presentation
- **EwE** West of Scotland Multi-species key run
- **EwE** Baltic Sea Multi-species key run
- **ToR d** Investigate the performance of multi-model ensemble in comparison to single model approach for the Baltic Sea
- **Green Model** Presentation: "Green Model for the North Sea"

INTEGRATED ADVICE

- **WKDEICE** Working Group on DEveloping Integrated AdvICE for Baltic Sea ecosystem-based fisheries management
- **WGMME** Working Group on Marine Mammal Ecology

ADVICE — SCIENCE

MareFrame alternatives for ICES

TRAINING COURSES (e.g. Gadget)

AD HOC WORKSHOPS 2017 (e.g. from WGs findings)

JOINT SESSIONS ICES-STECF 2018 Decision Support Tools for the EAFM

ASC 2017 ICES ECOSYSTEM APPROACH Meeting Point

Advice: Single Species

WG	Name	Species	When	What
WGBIE	Working Group on Bay of Biscay and Iberi-an Waters Ecoregion	Hake	3-10 May 2017	Working document: "Hake natural mortality estimation from GADGET multispecies model"
WGDEEP	Working group on biology and assessment of deep-sea fisheries resources	Tusk & Ling	24 April-01 May 2017	Single Species Management Plans for Tusk and Ling in Icelandic Waters
WGHANSA	Working Group on Southern Horse Mackerel, Anchovy and Sardine	Anchovy	24-26 June 2017	Presentation: "Modelling anchovy dynamics in the Gulf of Cádiz: environmental forcing and economic projections
WGMIXFISH	Working Group on Mixed Fisheries Advice	Demersal & Pelagic	22-26 May 2017	Presentation: "Green model for the North Sea"

Advice: GES Descriptors

Sea basin/area	Descriptor/indicator	Descriptor
West of Scotland	Biomass-based indicators and Trophic level based indicators	1,3,4
Baltic	Pressure descriptor	3.1
North Sea	Pressure descriptor	3.1
South Western Waters	Cetaceans in WGMME	1,3,4
South Western Waters	Pressure descriptor Anchovy	3

Science: Model Advances WGSAM
Working Group on Multispecies Assessment Methods

Model	Date	What
Gadget	TBC 16-20 Oct 2017	Working document: "A GADGET multispecies models for cetacean and hake interactions in the Iberian Peninsula"
Atlantis, Ewe	TBC 16-20 Oct 2017	Icelandic continental shelf-area multi-species presentation
EwE	TBC 16-20 Oct 2017	West of Scotland Multi-species key run
EwE	TBC 16-20 Oct 2017	Baltic Sea Multi-species key run (update from the one submitted in 2016, available here*)
ToR d	TBC 16-20 Oct 2017	Investigate the performance of multi-model ensemble in comparison to single model approach for the Baltic Sea
Green Model	TBC 16-20 Oct 2017	Presentation: "Green Model for the North Sea"

*http://www.ices.dk/community/groups/Pages/WGSAM.aspx

Icelandic continental shelf-area multi-species key run presentation

á að vera

Icelandic continental shelf-area multi-species presentation

Science: Integrated Advice

WKDEICE	Working Group on DEveloping Integrated AdvICE for Baltic Sea ecosystem-based fisheries management	Presentation of the MareFrame Decision Support Tool
WGMME	Working Group on Marine Mammal Ecology	Co-chair (B. Santos). Progress in analysis of model inputs (natural mortality, survey time series, diet, etc), cetacean model development, identification of GES indicators, etc have been presented, mainly through contribution to Reports

MareFrame

Project coordination

Matis ohf. (Iceland)
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Tel: +354 422 5014 | Fax: +354 422 5001
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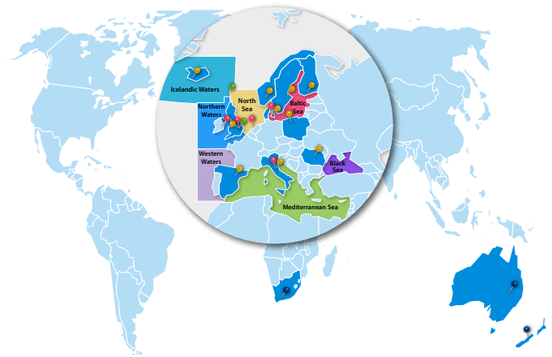
www.matis.is

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

MareFrame



MareFrame Kick-off Meeting

February 11th - 13th 2014

Location:

Matís, Vínlandsleið 12, Reykjavík, Iceland

MareFrame is a RTD project no. 613571 financed by the EC under the FP7-KBBE programme

Start Date: 2014-01-01

End Date: 2017-12-31

Co-creating Ecosystem-based Fisheries Management Solutions

Coordinator: Anna Kristín Daníelsdóttir, Matis

MareFrame Abstract

MareFrame seeks to remove barriers preventing a more widespread use of an Ecosystem-based Approach to Fisheries Management (EAFM). It will develop assessment methods and 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 EAFM.

Enabling comparisons between relevant "what-if" scenarios and their likely consequences, DSF will support the implementation of the new Common Fisheries Policy (CFP) and the Marine Strategy Framework Directive (MSFD).

The project SMEs, together with RTD institutions and stakeholders, will develop and demonstrate the use of innovative decision support tools through training actions, role-play and workshops. Indicators of Good Environmental Status (GES) will be developed along with models for ecosystem-based management.

The models will take multi-species approaches into account and be developed and compared through seven datasets of six European regional seas. The models will draw on historical data sets and data from new analytical methods. Model performance will be compared and evaluated using a simulated ecosystem as an operating model. Learning from the experience of previous and on-going research, MareFrame integrates stakeholders at its core using a co-creation approach that combines analytical and participatory processes to provide knowledge that can be applied to policy-making, improving management plans and implementation of EAFM. The project dissemination will use innovative ways to ensure effective usage of project outcomes. The work packages and the allocation of roles have been designed to ensure effective collaboration through the project's lifetime.

MareFrame liaises with other national and international research projects and is of high relevance to the future management of living marine resources in Europe in a changing environment, taking a holistic view incorporating socio-economic and legislative issues.

MareFrame

Thursday

08:30

09:00 - 17:30

13 February

Bus leaving hotels to Matis

Matís – WP workshops

Time	Item		
09:00 - 09:30	Discussion about objectives for the day		
09:30 - 10:30	Parallel session I	Parallel session II	Parallel session III
10:30 - 11:00	**Coffee break**		
11:00 - 13:00	Parallel session I	Parallel session II	Parallel session III
13:00 - 14:00	**Lunch at Matís**		
14:00 - 15:00	Parallel session reports		
15:00 - 15:30	Q & A consolidation		
15:30 - 16:00	**Coffee break**		
16:00 - 17:30	Q & A consolidation		

Parallel session I:
WP 1: Co-creation & pathways for implementation
WP 7: Synthesis & training development
WP 8: Dissemination & training actions

Parallel session II:
WP 2: Select & apply analytical methods
WP 3: Data management
WP 4: Ecosystem models & assessment models
WP 6: Develop a decision support framework

Parallel session III:
WP 5: Apply new methods in case studies

17:30 Bus leaving Matis to hotels

19:30 Get-together for dinner at Slippbarinn (at own cost)

Organisation contact information

– 28 participating organisations from 14 countries –

Participant organisation name and type	Short name	Telephone	E-mail
Matis ohf. - RTD and Coordinator *Anna Kristín Daníelsdóttir*	MATIS	+354422 5014	annak@matis.is
University of Iceland *Gunnar Stefánsson*	UI	+354 525 5915	gunnar@raunvis.hi.is
National Fisheries Research Institute *Jan Horbowy*	NMFRI	+48 58 735 6267	horbowy@mir.gdynia.pl
Fisheries and Environmental Management Group (FEM), Department of Environmental Sciences, University of Helsinki *Sakari Kuikka*	UH	+358 50 330 9233	sakari.kuikka@helsinki.fi
Marine Research Institute *Guðmundur Þórðarsson*	MRI	+354 575 2031	gudthor@hafro.is
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Department of Coastal Ecology and Management, Instituto de Ciencias Marinas de Andalucia *Javier Ruiz*	CSIC	+34 95 683 2612	javier.ruiz@icman.csic.es
Spanish Institute of Oceanography *Santiago Cervino*	IEO	+34 986 492 111	santiago.cervino@vi.ieo.es
Consiglio Nazionale delle Ricerche *Francesco Colloca*	CNR	+39 0923 948 966	francesco.colloca@iamc.cnr.it
National Institute for Marine Research and Development "Grigore Antipa" *Tania Zaharia*	INCDM	+40 24 154 0870	tzaharia@alpha.rmri.ro
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CETMAR *Rosa Chapela Pérez*	CETMAR	+34 986 247 047	rchapela@cetmar.org
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Nofima *Petter Olsen*	NOFIMA	+47776 29231	petter.olsen@nofima.no
Innovative Fisheries Management, Aalborg University Centre *Jesper Raakjær*	IFM-AAU	+45 9940 3673	jr@ifm.aau.dk

Tuesday

08:30

09:00 - 09:10

09:10 - 09:20
09:20 - 09:30
09:30 - 10:00

10:00 - 10:30
10:30 - 11:00
11:00 - 11:30
11:30 - 13:00

13:00 - 14:00

14:00 - 14:45
14:45 - 15:30

15:30 - 16:00

16:00 - 16:45

17:30

19:00

MareFrame

MareFrame Kick-off Meeting

Agenda

February 11th - 13th 2014

11 February

Bus leaving hotels to Matis, Vínlandsleið 12, Reykjavík

Opening speech: the Icelandic Minister of Fisheries and Agriculture, Mr. Sigurður Ingi Jóhannsson
Commission (DG RTD) – Jacques Fuchs, EU project officer
Welcome – Sveinn Margeirsson, CEO of Matís
Project introduction by Coordinator – Anna Kristín Daníelsdóttir (Matís)

Coffee break

WP 9: Project Management – Oddur Már Gunnarsson (Matís)
Overall workplan and interactions among WPs – Gunnar Stefánsson (UI)
Partner introductions by each Partner Manager

Lunch at Matís

Work Package Leaders introduction and discussions
WP 1: Co-creation & pathways for implementation – Rosa Chapela (CETMAR)
WP 2: Select & apply analytical methods – Santiago Cervino (IEO)

Coffee break

Continuation of WP Leader's introduction
WP 3: Data management – Jamie Lentin (STL)

Bus leaving Matis to hotels

Bus leaving hotels to Restaurant Kolabrautin at Harpa

Wednesday

08:30

09:00 - 09:45
09:45 - 10:30

10:30 - 11:00

11:00 - 11:45
11:45 - 12:30

12:30 - 13:30

13:30 - 14:15

14:15 - 15:30

15:30 - 16:00

16:00
21:00

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12 February

Bus leaving hotels to Matis

Continuation of WP Leaders introduction
WP 4: Ecosystem models & assessment models – Paul G. Fernandes (UNIABDN)
WP 5: Apply new methods in case studies – Francesco Colloca (CNR)

Coffee break

Continuation of WP Leaders introduction
WP 6: Develop a decision support framework – Michaela Aschan (UiT)
WP 7: Synthesis & training actions – Ólavur Gregersen (SYN)

Lunch at Matís

Continuation of WP Leaders introduction
WP 8: Dissemination & training actions – Mariana Golumbeanu (INCDM)
Launching of the MareFrame homepage
Discussions
Representatives from the External Advisory Group
- Evaluation and critical questions
WRAP-UP Overview by the Scientific Coordinator Gunnar Stefánsson (UI)

Coffee break

Bus leaving Matis for the Blue Lagoon (including dinner)
Bus leaving the Blue Lagoon to hotels

Organisation contact information

– 28 participating organisations from 14 countries –

Participant organisation name and type	Short name	Telephone	E-mail
University of Cape Town *Doug Butterworth*	UCT	+27 216 502 343	doug.butterworth@uct.ac.za
Marine & Atmospheric Research *Elizabeth Fulton*	CSIRO	+612 627 66480	Beth.Fulton@csiro.au
NIWA *Rosemary Hurst*	NIWA	+64 4 386 0867	r.hurst@niwa.co.nz
NRC (Europe) Ltd *John Pope*	NRC	+44 150 267 7377	PopeJG@aol.com
Syntesa sp/f *Olavur Gregersen*	SYN	+298 443978	og@syntesa.fo
Simprentis *Julius Biskopsto*	SIM	+298 356 600	jb@simprentis.com
MAPIX technologies Ltd. *Gert Riemersma*	MAPIX	+44 131 555 7588	gjr@mapix.com
Shuttle Thread Limited *Jamie Lentin*	STL	+44 161 883 0283	lentinj@shuttlethread.com
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North Western Waters RAC *Conor Nolan*	NWW RAC	+353 1 2144 146	nolan@bim.ie
Pelagic Stocks RAC *Verena Ohms*	PELAGIC RAC	+31 703369 624	v.ohms@pelagic-rac.org
International Council for the Exploration of the Sea *Poul Degnbol*	ICES INTERNATIONAL	+45 333 86757	Wojciech@ices.dk
Mediterranean Sea RAC through CETMAR *Rosa Caggiano*	MED RAC	+39 06 489 13624	r.caggiano@racmed.eu
The Black Sea Regional Activity Centre for Environmental Aspects of Fisheries and other Marine Living Resources Management through INCDM *Simion Nicolaev*	FOMLRM	+40 241543288	snicolaev@alpha.rmri.ro

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From the MareFrame Kick-off Meeting in Reykjavík Iceland 2014

From the MareFrame Kick-off Meeting in Reykjavík Iceland 2014

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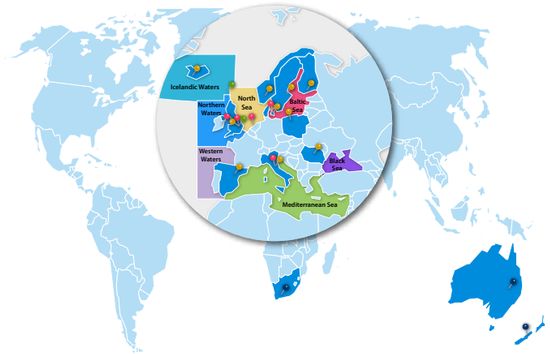

Launching of the Icelandic case study

June 10th 2014 at 12:00-16:00

Location:

Matís, Vínlandsleið 12, Reykjavík, Iceland

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Launching of the Icelandic case study

Agenda

The meeting will start with a complementary lunch at 12:00.
The official agenda starts at 12:30

Tuesday

10 June

12:00 - 12:30 **Lunch**

12:30 - 12:45 **Welcome and Goals for the meeting** Gunnar Stefánsson, HI

12:45 - 13:00 **Overview of the MareFrame project** Anna Kristín Daníelsdóttir, Matis
Objectives, methodology, expected outputs, website etc.

13:00 - 13:15 **Main steps in the case study** Guðmundur Þórðarson, Hafró
Research, deliverables, milestones and estimated calendar/time frame

13:15 - 13:30 **Co-creation** Sveinn Agnarsson, HI

- What is co-creation, why and of what? Differences with traditional participatory approach, how and when (approx.)
- CSs leaders are going to engage with participants, formal and informal communication channels, flow of information, etc.

13:30 - 14:00 **Coffee break**

14:00 - 14:15 **Intro** Jónas R. Viðarsson, Matís

14:15 - 15:00 **Group work**

- **Ecosystem Approach to Fisheries Management:** The application EAF for their day to day work, projects implemented in the region and research priorities in a policy and social perspective.
- **Management priorities:** Priorities identified in the DoW and debate. Are there additional priorities or different ranking needed to be considered for the Icelandic case study, and should they be included in the case study? For the priorities agreed as relevant for the case study, identification of the decision capacity (who will be the actors involved, at which level, etc.).

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Agenda

- **Identification of management issues requiring decision support:** (relates to ecological, socioeconomic and governance aspects).
  - conflicting interests among stakeholders implying multi-criteria decision making problem.
  - multi-annual management plans
  - lack of clear management objectives, recovery plan etc.
  - uncertainty and lack of (scientific) knowledge
  - threatened or vulnerable species impacted by the fisheries.
  - policy, science and stakeholders interactions.
- **Policies and objectives in place** (as relevant for the addressed issue):
  - CFP relevant for issue? MSY and Bpa Blim, Flim, Fpa defined for relevant species?
  - MSFD relevant for issue? How to transform the high level descriptors 1, 3, 4 and 6 into indicators and reference levels?
  - Ecological, environmental social, economic policies relevant for issue addressed (nationally, regionally, and locally?)
- **Management regulations and measures in place** (as relevant for the addressed issue): Management rules enforced (HCR, TACs, effort limits, closed areas/seasons (MPAs), technical regulations, landing obligations; other regulations which can affect fisheries and ecosystem). Marine Strategy Framework Directive, particular descriptors 1, 3, 4 and 6. Assessment: methods, institutions; key assessment uncertainties, key uncertainties impacting yield prognosis.
- **Decision environment:** Identification of the governance setting (as relevant for the management priorities): Covered CFP? MSFD? Decision-making by Council/Parliament or other European institutions; nations involved, regional bodies for cooperation on resource manage ment or environmental issues, relevant international conventions in place, division of responsibility and decision-making process regarding fisheries management and environmental issues.

15:00 - 15:45 **Presentations of group work & discussions**, Group leaders

15:45 - 16:00 **Summary and AOB**

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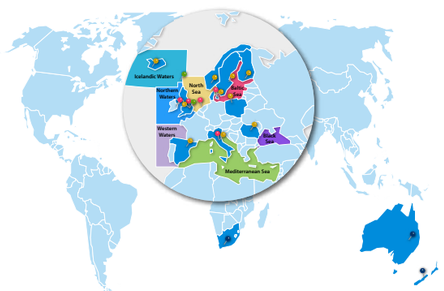

MareFrame Annual Meeting

December 8th – 12th 2014

Location:
The Sir Duncan Rice Library
University of Aberdeen,
Bedford Road, Aberdeen AB24 3AA, Scotland

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

MareFrame WP Meetings

Tuesday — 9 December

08:30	Bus leaving Hilton Garden Inn
09:00 - 10:00	PMG meeting (Project Management Group members)
10:00 - 10:30	**Coffee break**
(a) 10:30 - 11:30	*Meeting Room 1* WP1, 6, 7, 8 (socioeconomics group + dissemination – to discuss papers et al)
(b) 10:30 - 11:30	*Meeting Room 2* Breakout room: WP2, 3, 4, 5 (science group + case studies)
(a) 11:30 - 12:30	*Meeting Room 1* WP1, 5, 6, 7 (socioeconomics + case studies)
(b) 11:30 - 12:30	*Meeting Room 2* Breakout room: WP2, 3, 4, 8 (science group + dissemination – to discuss papers et al)
12:30 - 13:30	**Lunch at meeting place**
(a) 13:30 - 14:30	*Meeting Room 1* WP1, 4, 5, 6 (socioeconomics + modelling)
(b) 13:30 - 14:30	*Meeting Room 2* Breakout room: WP2, 3, 7, 8 (miscellaneous + dissemination – to discuss papers et al)
(a) 14:30 - 15:30	*Meeting Room 1* Breakout room: WP1, 4, 5, 6 (socioeconomics + modelling continued) + any other WP
(b) 14:30 - 15:30	*Meeting Room 2* Available for any other WP
15:30 - 16:00	**Coffee break**
16:00 - 17:30	Parallel session summary and reflection from the SC meeting – Gunnar Stefánsson, Scientific manager (UI)
19:30 - 22:30	**Dinner (own cost) at Stage Door** www.stagedooraberdeen.com

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Other MareFrame workshops and meetings

Data workshop and Scientific Committee Meeting

Monday — 8 December

09:00 - 16:00	Data Workshop (invitations only) – Jamie Lentin (WP3) Chairing the meeting
16:30 - 18:30	Scientific Committee (SC) – scientific quality of work, funding possibilities, publications, students exchange and participation etc.
19:30 - 22:30	**Dinner (own cost) at Howies restaurant**

Bayesian Belief Nets Workshop

12 December

Bayesian Belief Nets Workshop (invitations only) - Kåre Nolde Nielsen (UiT) and Mika Rahikainen (UH) co-chairing the meeting

MareFrame

Organisation contact information

– 28 participating organisations from 14 countries –

Participant organisation name and type	Short name	Telephone	E-mail
University of Cape Town *Doug Butterworth*	UCT	+27 216 502 343	doug.butterworth@uct.ac.za
Marine & Atmospheric Research *Elizabeth Fulton*	CSIRO	+612 627 66480	Beth.Fulton@csiro.au
NIWA *Rosemary Hurst*	NIWA	+64 4 386 0867	r.hurst@niwa.co.nz
NRC (Europe) Ltd *John Pope*	NRC	+44 150 267 7377	PopeJG@aol.com
Syntesa sp/f *Olavur Gregersen*	SYN	+298 443978	og@syntesa.fo
Tókni *Olavur Ellefsen*	TOK	+298 556 600	oe@tokni.com
MAPIX technologies Ltd. *Gert Riemersma*	MAPIX	+44 131 555 7588	gjr@mapix.com
Shuttle Thread Limited *Jamie Lentin*	STL	+44 161 883 0283	lentinj@shuttlethread.com
North Sea RAC *Lorna Duguid*	NS RAC	+44 (0)7841 117625	lornad@nsrac.org
North Western Waters RAC *Conor Nolan*	NWW RAC	+353 1 2144 146	nolan@bim.ie
Pelagic Stocks RAC *Verena Ohms*	PELAGIC RAC	+31 703369 624	v.ohms@pelagic-rac.org
International Council for the Exploration of the Sea *Poul Degnbol*	ICES	+45 333 86757	poul.degnbol@ices.dk
Mediterranean Sea RAC through CETMAR *Rosa Caggiano*	MED RAC	+39 06 489 13624	r.caggiano@racmed.eu
The Black Sea Regional Activity Centre for Environmental Aspects of Fisheries and other Marine Living Resources Management through INCDM *Simion Nicolaev*	FOMLRM	+40 241543288	snicolaev@alpha.rmri.ro

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MareFrame First Annual Meeting

Wednesday — 10 December

08:30	Bus leaving Hilton Garden Inn
09:00 - 09:15	Welcome and housekeeping – Paul G. Fernandes (UNIABDN)
09:15 - 09:30	Project introduction by coordinator – Anna K. Daníelsdóttir (MATIS)
09:30 - 10:00	Project Management (deliverables, milestones, budget) Oddur M. Gunnarsson, Administrative manager (MATIS)
10:00 - 10:30	Overall work plan and WPs interactions Gunnar Stefánsson, Scientific manager (UI)
10:30 - 11:00	**Coffee break** Introduction from each WP leader (progress, next steps and interaction between WP´s)
11:00 - 11:20	WP 9: Project Management – Oddur M. Gunnarsson (MATIS)
11:20 - 11:50	WP 8: Dissemination & training actions – Mariana Golumbeanu (INCDM)
11:50 - 12:30	WP 1: Co-creation & pathways for implementation – Rosa Chapela (CETMAR)
12:30 - 13:30	**Lunch at meeting place**
13:30 - 14:10	WP 2: Select & apply analytical methods – Santiago Cervinio (IEO)
14:10 - 14:50	WP 3: Data management – Jamie Lentin (STL)
14:50 - 15:50	WP 4: Ecosystem models & assessment models – Paul G. Fernandes (UNIABN)
16:20 - 19:00	**Social adventure**
20:00 - 22:30	**Dinner at Shri Bheemas** www.shribheemas.co.uk

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MareFrame First Annual Meeting

Thursday — 11 December

Introduction from each WP leader (progress, next steps and interaction between WP´s), cont.

08:30	Bus leaving Hilton Garden Inn
09:00 - 10:30	WP 5: Apply new methods in case studies – Francesco Colloca (CNR)
10:30 - 11:00	**Coffee break**
11:00 - 12:00	WP 6: Develop a decision support framework – Michaela Aschan (UiT)
12:00 - 13:00	WP 7: Synthesis & Training actions – Olavur Gregersen (SYN)
13:00 - 14:00	**Lunch at meeting place**
14:00 - 14:30	Challenges and solutions when implementing genetic data into models – Doug Butterworth (UCT)
14:30 - 15:00	Canadian experience in Fisheries Management, with Ecopath – Lyne Morissette (M Canada)
15:00 - 15:30	**Coffee break**
15:30 - 16:30	Evaluation and critical questions - Representative from the External Advisory
16:30 - 17:30	General discussion and conclusion (Gunnar Stefánsson, Scientific coordinator)
19:00 - 22:00	**Annual Meeting Dinner at The Silver Darling restaurant** www.thesilverdarling.co.uk

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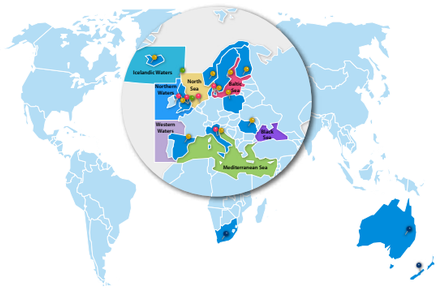

MareFrame Second Annual Meeting

November 17th – 20th 2015

Venue:
National Institute for Marine Research and Development "Grigore Antipa"

Address:
300 Mamaia Blvd., Constanta 900581, Romania

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

MareFrame Second Annual Meeting

Tuesday

17 November – MareFrame WP Meetings

09:00 - 10:00	PMG meeting (Project Management Group members)
10:00 - 10:30	**Coffee break – Poster session**
10:30 - 11:30	Seperate meetings of WP1, WP6 and the MFDB group
11:30 - 12:30	WP6+WP1+CS leaders joint meeting
12:30 - 13:30	**Lunch**
13:30 - 15:00	WP4, WP5 and WP6 joint meeting
15:00 - 15:30	Joint meeting of WP2+CS leaders
15:30 - 16:00	**Coffee break – Poster session**
16:00 - 16:30	Synchronization of case studies with WP7 and WP8
16:30 - 17:00	Parallel session summary – Gunnar Stefánsson, Scientific Manager (UI)
17:00 - 18:30	Scientific committee meeting
19:30 - 22:30	**Dinner – Own cost**

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MareFrame Second Annual Meeting

Wednesday

18 November

09:00 - 09:15	Welcome and housekeeping – Dr. Eng. Simion Nicolaev (INCDM)
09:15 - 09:30	Presentation by coordinator – Anna K. Daníelsdóttir (MATIS)
09:30 - 10:00	Project Management (deliverables, milestones, periodic report) – Oddur M. Gunnarsson, Administrative Manager and WP9 Leader (MATIS)
10:00 - 10:30	Overall work plan and status of work – Gunnar Stefánsson, Scientific Manager (UI)
10:30 - 11:00	**Coffee break – Poster session**
	Introduction from WP leaders (progress, next steps and interaction between WP´s)
11:00 - 11:20	WP 4: Ecosystem models & assessment models – Paul G. Fernandes (UNIABN)
11:20 - 11:40	WP 5: Apply new methods in case studies – Francesco Colloca (CNR)
11:40 - 12:00	WP 6: Develop a decision support framework – Michaela Aschan (UiT) Introduction from Case Study Leaders (progress, main challenges, DSF, cooperation, next steps)
12:00 - 12:20	Baltic Sea – Valerio Bartolino (SLU)
12:20 - 12:40	North Sea – John Pope (NRC)
12:40 - 13:00	Northern & Western Waters, Iceland – Bjarki Elvarsson (MRI)
13:00 - 14:00	**Lunch**
14:00 - 14:20	Northern Waters, West of Scotland – Paul G. Fernandes (UNIABDN)
14:20 - 14:40	South Western Waters, Iberian Peninsula – Javier Ruiz (CSIC)
14:40 - 15:00	Mediterranean – Francesco Colloca (CNR)
15:00 - 15:20	Black Sea – Gheorghe Radu (INCDM)
15:20 - 15:40	New Zealand, Chatham Rise – Ian Tuck (NIWA)
15:40 - 16:00	General discussion
17:00 - 19:00	**Social adventure**
19:30 - 22:30	**Dinner at Le Premier Restaurant**

MareFrame

MareFrame Second Annual Meeting

Thursday

19 November

Introduction from each WP leader (progress, next steps and interaction between WP´s), cont.

09:00 - 09:40	WP 2: Select & apply analytical methods – Santiago Cervinio (IEO)
09:40 - 10:20	WP 3: Data management – Jamie Lentin (STL)
10:20 - 11:00	WP 8: Dissemination & training actions – Mariana Golumbeanu (INCDM)
11:00 - 11:30	**Coffee break – Poster session**
11:30 - 12:30	WP 7: Synthesis & training actions – Olavur Gregersen (SYN)
12:30 - 13:30	**Lunch**
13:30 - 14:20	WP 1: Co-creation & pathways for implementation – Marta Ballesteros (CETMAR)
14:20 - 15:00	Evaluation and critical questions – Representative from the External Advisory
15:00 - 15:30	**Coffee break – Poster session**
15:30 - 16:00	Modelling Social Science Aspects in Fisheries – Charlotte T. Weber (UiT)
16:00 - 16:30	General discussion and conclusion – Gunnar Stefánsson, Scientific Manager (UI)
19:00 - 22:00	**Annual Meeting Dinner at Akolade by Vega**

Friday

20 November – Stakeholder Meeting

09:00 - 17:30	Common Stakeholders Meeting of PERSEUS & MAREFRAME Projects

PERSEUS

MareFrame

Common Stakeholders Meeting of PERSEUS & MAREFRAME Projects

Constanta, Romania, November 20th 2015

VENUE:
National Institute for Marine Research and Development "Grigore Antipa"
Constanta 900581, 300 Mamaia Blvd., Romania

Agenda

09:00 - 09:20	PERSEUS Project – *Vangelis Papathanassiou*
09:20 - 09:40	Tool for the identification and assessment of Environmental Aspects *in Ports (TEAP) – Marti Puig*
09:40 - 10:00	Concept of the Research Vessel – *Costantino Cosmidis*
10:00 - 10:20	Early Warning Management Tool for Oil Spills – *Constantinos Kalkavouras*
10:20 - 10:40	Marine Litter – *Christos Ioakeimidis*
10:40 - 11:00	Vessel Monitoring System in the Med (VMS) – *Iris Maina*
11:00 - 11:30	**Coffee Break**
11:30 - 11:50	MAREFRAME Project – *Anna Kristín Daníelsdóttir*
11:50 - 12:10	MareFrame – Application of ecosystem models in fisheries management – *Gunnar Stefánsson*
12:10 - 12:30	MareFrame – Mapping and weighing stakeholders inputs in case studies – *Mika Rahikainen*
12:30 - 13:00	General Discussion
13:00 - 14:30	**Lunch**
14:30 - 15:30	The PERSEUS Adaptive Marine Policy (AMP) Toolbox – *Aleksandar Shivar*
15:30 - 15:50	Decision Support Framework and Bacean Believe Network – *Melania Borit and Charlie Weber*
15:50 - 16:10	Training and educational tools- Interactive simulation training tool and tutor web – *Bo Lærke and Gunnar Stefánsson*
16:10 - 17:30	Brokerage Session Stakeholders can visit the experts from the two projects to discuss in detail the use of the tools presented and acquire practical hands-on experience
17:30	End of the meeting

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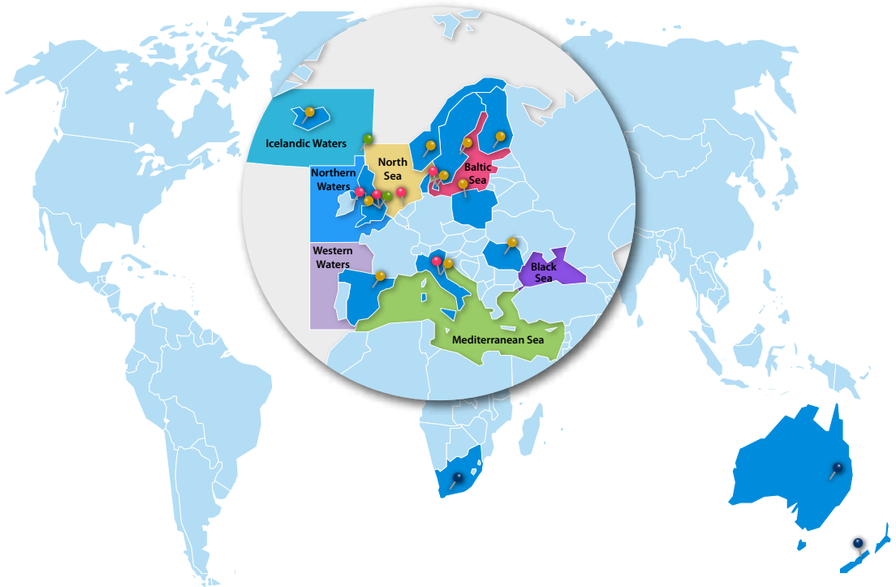
Co-creating Ecosystem based Fisheries Management Solutions



MareFrame

MareFrame Final Meeting

General assembly & preparation for the Policy Day

12 December 2017

Venue:
Comics Art Museum - Brussels, Rue des Sables 20, 1000 Brussels

Agenda

09:00 - 09:15	Welcome – *Anna Kristín Daníelsdóttir, MATIS*
09:15 - 09:30	MareFrame Impact – *Gunnar Stefánsson, UI*
09:30 - 10:00	Project Management – *Oddur Már Gunnarsson, MATIS*
10:00 - 10:30	**Coffee Break**
10:30 - 12:00	WP Final results achieved, their potential use and impact: WP 1: Co-creation & pathways for implementation - Marta A. Ballesteros, CETMAR WP 2: Select & apply analytical methods – Santiago Cervino, IEO WP 3: Data management – Jamie Lentin, STL WP 4: Ecosystem models & assessment models – Paul G. Fernandes, UNIABDN WP 5: Apply new methods in case studies – Francesco Colloca, CNR WP 6: Develop a decision support framework – Michaela Aschan, UiT WP 7: Synthesis & training development – Olavur Gregersen, SYN WP 8: Dissemination & training actions – Mariana Golumbeanu, INCDM
12:00 - 12:30	Publications – *Gunnar Stefánsson, UI*
12:30 - 13:00	General Assembly – *Oddur Már Gunnarsson, MATIS*
13:00 - 14:00	**Lunch**
14:00 – 18:00	Preparation for Policy Day (dry-run of presentations), CETMAR
19:00 –	Dinner at Restaurant Chez Léon, Rue des Bouchers 18, B-1000 Bruxelles

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

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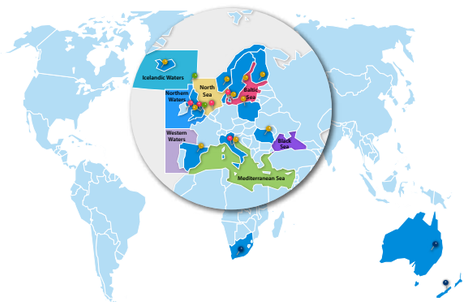

MareFrame Final Meeting

13-14 December 2017

***Venue*:**

Comics Art Museum - Brussels, Rue des Sables 20, 1000 Brussels

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

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Coffee

12:20 **What is in an ecosystem approach for the industry?**
Martin Pastoors, Chief science officer at the Pelagic Freezer-trawler Association (PFA)

13:00 **Inside-out: lessons learnt from being a stakeholder and project partner.**
Verena Ohms, Executive secretary of the Pelagic Advisory Council (Pelagic AC)

13:05 **Lunch**

14:15 Panel Sessions

Chair: *Gunnar Stefánsson*, University of Iceland

Parallel Session	Chair	Participants
I. How the advisory System copes with EAFM	Mark Dickey-Collas, Ecosystem approach coordinator, ICES	Robin Cook, University of Strathclyde Maciej Tomczak, Stockholm University
II. The policy system facing EAFM	Jesper Raakjær, IFM-AAU	Luc Van Hoof, IMARES Poul Degnbol, IFM
III. What answers are available? International panel	Ian Tuck, NIWA	Andre Punt, University of Washington Beth Fulton, CSIRO

15.20 Briefing from the parallel sessions

Mark Dickey-Collas, Jesper Raakjær and *Ian Tuck*

PART II

Chair: *Gunnar Stefánsson*, MareFrame Scientific Manager, University of Iceland

15:35 Delivering: the MareFrame Roadmap for the Implementation of EBFM in the European Union

Paulina Ramirez-Monsalve, IFM-AAU

15:40 Round Table Discussion

Chair: *Andrew I. L. Payne*, A&B Word Ltd.

16:10 The MareFrame Legacy

Anna Kristín Daníelsdóttir, MareFrame Coordinator, MATIS

16:20 Ambassador Mrs Bergdís Ellertsdóttir, Icelandic Embassy, Brussels

16:30 Reception by the Embassy of Iceland in Brussels

MareFrame

MareFrame Policy Day

Increased use of an Ecosystem-based Fisheries Management Solutions

13 December 2017

09:00 Registration

09:30 Welcome Speech

Chair: *Anna Kristín Daníelsdóttir*, MareFrame Coordinator, MATIS

- *Sigi Gruber*, Head of the Marine Resources Unit, Directorate General for Research and Innovation, European Commission.
- *Ernesto Penas Lado*, Principal Advisor, Common Fisheries Policy Development, Directorate General for Maritime Affairs and Fisheries, European Commission.
- *Michel Sponar*, Deputy HoU Marine Environment & Water Industry, Directorate General for Environment, European Commission.

10:15 On the implementation of Ecosystem-based Fisheries Management (EBFM)

Gunnar Stefánsson, MareFrame Scientific Coordinator, University of Iceland

PART I

10:30 A walk through the MareFrame Roadmap for the Implementation of EBFM in the European Union

Chair: *Gunnar Stefánsson*, MareFrame Scientific Manager, University of Iceland

10:35 **Policy relevance and social robustness (II): the co-creation approach.**
Marta Ballesteros, CETMAR

10:40 **What are the advisory system needs for an effective implementation of an EBFM?**
Clara Ulrich, Chair of the European Commission Scientific, Technical and Economic Committee for Fisheries (STECF). DTU-AQUA, Section for Ecosystem-based Management.

11:05 **Using, comparing and choosing: Ecosystem Models for European fisheries.**
Paul G. Fernandes, University of Aberdeen

11:10 **A Decision Support Framework for the real policy context.**
Kåre N. Nielsen, University of Tromsø

11:20 **Let's make it work: Case study Showhows: ecosystem models and decision support tools in practice.**
Chair: *Francesco Colloca*, CNR

Case Study	Case Study Leader	What
North Sea	John Pope, NCR (Europe) Ltd.	9 fishing nations, 12 species, 7 management scenarios
Mediterranean Sea	Francesco Colloca, CNR	Internationally shared fisheries, 3 species, 7 management scenarios
Baltic Sea	Valerio Bartolino, SLU	9 fishing nations, 3 species, 6 management scenarios
Black Sea	Magda Nenciu, INCDM	3 fishing nations, 1 species, 3 management scenarios
South Western Waters	Javier Ruiz, CSIC	1 fishing nation, 2 species, 4 management scenarios
West of Scotland	Alan R. Baudron, UNIABDN	5 fishing nations, 3 species, 7 management scenarios
Icelandic Waters	Bjarki Elvarsson, MFRI	1 fishing nation, 3 species, 5 management scenarios
Chatham Rise, New Zealand	Ian Tuck, NIWA	1 fishing nation, multispecies

Participants:

Agnese Accapezzato	Estonia
Alan Baudron	Scotland
Alexandre Rodriguez Rodriguez	Spain
Ana Rita Garcia-Ferreira	N/A
Andre Punt	USA
Andre Tapadinhas	United Kingdom
Andrew I L. Payne	United Kingdom
Anna Kristin Danielsdóttir	Iceland
Anna Pála Sverrisdóttir	Iceland
Aoudj Cherif	Algeria
Barbara Bauer	Sweden
Beth Fulton	Australia
Bjarki Þór Elvarsson	Iceland
Bulto	Belgium
César Baron	Belgium
Clara Ulrich	European Union
Covadonga Rayon	Spain
Daniel Voces de Onaindi	Belgium
Debbi Pedreschi	Ireland
Despina Symons	Belgium
Dorota Szalaj	Portugal
Doug Butterworth	South Africa
Lebeau PEMHA THINA	France
Md. Sainar Alam	Bangladesh
Eider	Spa
Els Torreele	Belgium
Enda Conneely	Ireland
Erin Priddle	United Kingdom
Erla Sturludóttir	Iceland
Eyþór Björnsson	Iceland
Fabio Boscaleri	Italy
Fombo Franklin Fon	Cameroon
Francesco Colloca	
Francesco Di Lodovico	Italy
Gert Riemersma	United Kingdom
Grímur Valdimarsson	Iceland
Gunnar Stefánsson	Iceland
Hanne Risan Johnsen	Norway
Hans Nieuwenhuis	Netherlands
Hans Polet	Belgium
Ian Tuck	
Ibrahim, Oladayo Ramon	Nigeria
Ibukun Jacob Adewumi	Italy
Ingrid Kvalvik	Norway
Izaskun Preciado	Spain
Jamie Lentin	United Kingdom
Javier Ruiz	
Jesper Raakjaer	
Jessica Demblon	
Joana Ribeiro	Iceland
John Pope	United Kingdom
Jónas Viðarsson	Iceland
José Carlos Macias	Spain
Jose Francisco Perez	
Juliana Arias-Hansen	Faroe Islands
Kåre Nielsen	Norway
Karel Vanhulle	Belgium
Kate Sanderson	Faroe Islands
Kim Rægaard	Denmark
Kristen Ounanian	Denmark
Kristján Freyr Helgason	Iceland
Lindsay Keenan	Sweden
Lotte Worsøe Clausen	Denmark
Luc Rosiers	Belgium
Luc Van Hoof	Netherlands
Lucia Fanning	Canada
Lyne Morissette	Norway
Maartje Oostdijk	Iceland
Maciej T. Tomczak	Sweden
Magda Ioana Nenciu	Romania
Manaila Marian Sorinel	Romania
Margarita María Rincón Hidalgo	Spain
Marian Paiu	Romania
Marianne Svorken	Norway
Mark Dickey-Collas	Denmark
Marta Ballesteros	Spain
Mårten Åström	Sweden
Martin Pastoors	The Netherlands
Matteo Sinerchia	Italy
Md. Monowar Parvez	Bangladesh
Michaela Aschan	Norway
Michael Andersen	Denmark
Mika Rahikainen	Finland
Montse Perez	Spain
Mr Priit Ojamaa	Belgium
Mrs. Teta S. Ballah	Liberia
Mwanja Waiswa Wilson	Uganda
Mykola Bohoslavets	Ukraine
Niall Fallon	Scotland
Nicholas M.Ntheketha	Kenya
Oddur Már Gunnarsson	Iceland
Olavur Ellefsen	Faroe Islands
Olavur Gregersen	Faroe Islands
Orestis Karghotis	Cyprus
Oscar Sagué	EU
Patrick Murphy	Ireland
Paul Fernandes	United Kingdom
Paulina Ramírez-Monsalve	Denmark
Perrine Geraudie	Norway
Philippe Moguedet	France
Piotr Margonski	Poland
Poul Degnbol	Denmark
Razvan Mateescu	Romania
Robin Cook	United Kingdom
Romain López	France
Rosa Caggiano	Italy
Rosa Chapela Pérez	Spain
Rune Larsen	Norway
Sakari Kuikka	Finland
Sally Clink	Denmark
Santiago Cerviño	Spain
Sarah Kraak	Germany
Serge Garcia	France
Sigi Gruber	Belgium
Steinar B. Aðalbjörnsson	Iceland
Sveinn Agnarsson	Iceland
Tania Zaharia	Romania
Thierry Vancrombrugge	belgium
Tobias Belschner	Germany
Troels J. Hegland	Denmark
Ulrika Gunnartz	Sweden
Ulrika Gunnartz	Sweden
Unn Laksá	Faroe Islands
Valerio Bartolino	Sweden
Valodia Maximov	Romania
Vasile Patrascu	Romania
Verena Ohms	Netherlands
Vidette McGregor	New Zealand
Villy Christensen	Canada
Violeta Popova	Bulgaria
Wouter van Broekhoven	Netherlands

MareFrame

MareFrame Scientific Conference

Advances in Ecosystem-based Fisheries Management

14 December 2017

08:30-09:00 Registration

09:00-10:30 Plenary Session

Chairs: *Anna Kristín Daníelsdóttir, Gunnar Stefánsson, Oddur M. Gunnarsson*

INVITED LECTURES:

09:00-09:30 **Ecosystem Based Management - What is it and how do we deliver it?** *Beth Fulton*

09:30-09:45 **Are ecosystem models used for management and policy?** *Villy Christensen*

09:45-10:00 **Value-added science: Increasing the role of science in environmental management.** *Lucia Fanning*

10:00-10:15 **Modelling frameworks for the NE Pacific and how we integrate stakeholders into our decision making framework, including MSEs.** *Andre Punt*

10:15-10:30 **Fisheries certifications and how Mareframe initiatives inter-relate.** *Andrew Payne*

10:30-11:00 Coffee Break

11:00-12:24 ORAL PRESENTATIONS (paper, Q&A included)
Topic 1. Participatory approaches to include stakeholders in Ecosystem-based Fisheries Management (EBFM).
Chair: *Lucia Fanning*

11:00-11:12 **Who joins the table? A critical overview of the co-creation approach for the implementation of an Ecosystem Approach to Fisheries Management.** *M. Ballesteros, R. Chapela, J. Raakjaer, P. Ramirez-Monsalve, T.J. Hegland, P. Degnbol, K. N. Nielsen, M. Rahikainen, A. Baudron, V. Bartolino, F. Colloca, J. Ruiz, M. Rincón, J. Pope, S. Agnarsson, B. Elvarson, M. Dickey-Collas, G. Stefánsson*

11:12-11:24 **Real-Time Incentives (RTI), Ecosystem-Based Fisheries Management using 21st century technology.** *S.B.M. Kraak, D. Pedreschi, H. Höffle, K. Farnsworth, A. Barkai, D. Reid*

11:24-11:36 **Co-design, testing and stakeholder buy-in of real-time incentive fisheries management: The Celtic Sea case study.**
D. Pedreschi, H. Höffle, S. Kraak, A. Barkai, K. Farnsworth, D. Reid

11:36-11:48 **A swift transportable and User Friendly Multispecies Model of the North Sea that describes the main tradeoffs involved in an Ecosystem Approach to Fisheries Management (EAFM).** *J. Pope*

11:48-12:00 **Steps to unlocking an Ecosystem Approach to Fisheries Management: Towards displaying the N Dimensional Potato.** *J. Pope, T.J. Hegland, M. Ballesteros, K.N. Nielsen*

12:00-12:12 **Carrots or sticks? How to institutionalise EAFM advice within the CFP.**
P. Ramirez-Monsalve, K.N. Nielsen, M. Ballesteros, T.S. Kirkfeldt, M. Dickey-Collas, A. Delaney, T.J. Hegland, J. Raakjær, P. Degnbol

12:12-12:24 **Human dimensions in ecosystem-based fisheries management: On integrating social objectives in Sweden.** *P. Ramirez-Monsalve, M. Arias Schreiber, S. Linke*

12:24-13:30 Lunch Break

13:30-14:54 ORAL PRESENTATIONS (paper, Q&A included)
Topic 2. Decision Support Frameworks in Ecosystem-based Fisheries Management (EBFM). Chair: *Andre Punt*

13:30-13:42 **Tools and processes to support scenario based planning in Ecosystem Based Fisheries Management: lessons from seven European case studies.**
K.N. Nielsen, M. Aschan, S. Agnarsson, M. Ballesteros, V. Bartolino, A. Baudron, B. Bauer, F. Colloca, A.K. Danielsdóttir, B. Elvarsson, P.G. Fernandes, T.J. Hegland, M. Nenciu, M. Rahikainen, P. Ramirez-Monsalve, M. Rincón, J. Ruiz, G. Sirbu, M. Sinerchia, J. Raakjær, G. Stefánsson, J.R. Viðarsson

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13:42-13:54 **A Gadget multispecies model to explore the fisheries management implications of prey-predator interactions in the Strait of Sicily trawl fishery.**
F. Colloca, M. Enea, V. Gancitano, F. Fiorentino

13:54-14:06 **Evaluating MareFrame decision support tools in their ability to support implementation of the EAFM in the EU.**
U. Laksá, P. Ramirez-Monsalve, K.N. Nielsen, P. Sørdahl, J. Arias, M. Ballesteros, O. Gregersen

14:06-14:18 **Using Gadget in a multi-criteria analysis of the Icelandic cod fishery.**
B. Elvarsson, S. Agnarsson, S. Guðmundsdóttir, J. Viðarsson

14:18-14:30 **Spawning stock recruitment when natural mortality is dynamic: a proposed solution for ecosystem models.** *V. McGregor, B. Fulton, M. Dunn*

14:30-14:42 **Cetacean fishery interactions: A multi-species model for ecosystem management in Atlantic waters of the Iberian Peninsula.**
C. Saavedra, S. Cerviño, B. Elvarsson, D. Howell, G. Pierce, B. Santos

14:42-15:00 Coffee Break

15:00-16:48 ORAL PRESENTATIONS (paper, Q&A included)
Topic 3. Bridging the gap between fisheries research, policy and societal needs: case studies and lessons learned. Chair: *Robin Cook*

15:00-15:12 **The future of European Fisheries under sustainable management.**
P.G. Fernandes, N.G. Fallon, V. Bartolino, B. Elvarsson, E. Sturludottir, B. Bauer, M. Sinerchia, S. Cerviño, C. Saavedra, J. Pope. A. Baudron, M.M. Rincon-Hidalgo

15:12-15:24 **Ecosystem resilience: Managing our fisheries for a sustainable future.**
L. Morissette, M. Aschan

15:24-15:36 **Can the Common Fisheries Policy achieve Good Environmental Status in exploited ecosystems: the example of West Scotland fisheries?** *A. Baudron, N. Serpetti, N. Fallon, S. Heymans, P.G. Fernandes*

15:36-15:48 **Towards ecosystem-based fisheries management: Modelling multispecies interactions between grey seals and demersal fish species in the West of Scotland.**
N.G. Fallon, V. Bartolino, A. Baudron, P.G. Fernandes

15:48-16:00 **Decision support disentagles the multiple EAFM goals of the mixed shrimp and hake fishery in the Strait of Sicily.**
M. Rahikainen, M. Sinerchia, M. Enea, F. Fiorentino, M. Ballesteros, F. Colloca

16:00-16:12 **Granger-causality analysis of integrated-model outputs, a tool to assess external drivers in fishery.** *M. Rincón, B. Elvarsson, F. Ramos, J. Ruiz*

16:12-16:24 **Ecosystem model of Icelandic waters using the Atlantis modelling framework.**
E. Sturludottir, C. Desjardins, B. Elvarsson, B. Fulton, K. Logeman, G. Marteinsdottir, G. Stefnsson

16:24-16:36 **Socio-economic impact assessment of management alternatives in the context of EAFM.**
M. Laksdfoss, J. Arias-Hansen, U. Laksá, P. Ramirez-Monsalve, A. Delaney, M. Ballesteros, Ó. Gregersen

16:36-16:48 **Simulating the effect of alternative management solutions in the mixed fisheries of the Strait of Sicily using the Atlantis end-to-end ecosystem model.**
M. Sinerchia, A. Cucco, G. Garofalo, M. Gristina, F. Badalamenti, F. Fiorentino F., F. Colloca

16:48-17:05 Coffee Break

17:05-17:20 **Report of the MareFrame External Advisory Group: Overall evaluation and lessons-learned.**

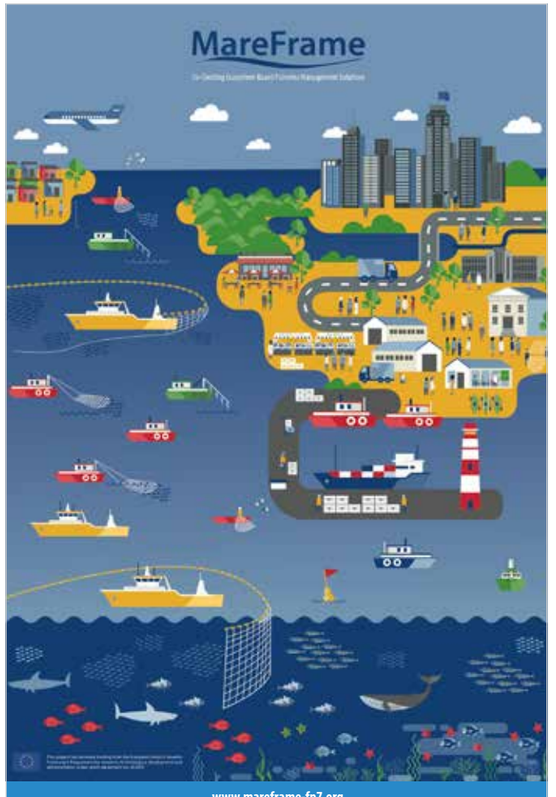
17:20-17:35 **Scientific Conference Wrap-Up & Conclusions.**

MareFrame

Poster Session

In parallel with oral presentations (during coffee/lunch breaks)

1. **Is the ecosystem based fisheries management a reality in the Bay of Biscay? Analyzing the effects of the implementation of the landing obligation at an ecosystem level.**
Andonegi et al.
2. **Benchmarking the ability of different stock-assessment models to capture the highly-fluctuating dynamics of small pelagics.**
Carti et al.
3. **Taking a data challenged stock further: a case-study on Icelandic ling.**
Elvarsson et. al.
4. **Testing the performance of a spatial resampling bootstrap method using a simulated ecosystem.**
Frater et al.
5. **Ecological trends in the Cantabria Sea ecosystem: A modeling approach including trophic controls.**
López-López et al.
6. **Activities of the COSMOMAR Competence Center for Earth Observation Data used for decision support aiming at sustainable fisheries in the Romanian coastal area.**
Mateescu et al.
7. **Participatory planning and decision support for the West coast of Scotland mixed fisheries.**
Nielsen et al.
8. **Ecosystem approach to long-term environmental assessment.**
Patrascu et al.
9. **ODEMM in the Celtic Seas: A qualitative IEA with decision support tools.**
Pedreschi et al.
10. **Questions and answers about the use of genetics for stock assessment and management. European hake as an example.**
Perez et al.
11. **Comparing the Steady State Results of a range of Multispecies Models between and across the geographical areas considered by the MareFrame Project using a Jacobian matrix approach.**
Pope et al.
12. **A time varying extension to the Charmingly Simple Model of the North Sea that can fit tropic level data.**
Pope et al.
13. **How Do We Start to Understand the Cost of Compliance and its Long Term Consequences to EBFM?**
Pope et al.
14. **MareFrame toolbox supporting informed fisheries management decisions.**
Rahikainen et al.
15. **EwE model for Icelandic waters.**
Ribero et al.
16. **GIS as a Tool for an Ecosystem Approach to Fisheries Management - The Case Study of Sardine Fishery in Portugal.** *Szalaj et al.*
17. **Can Ecopath with Ecosim mimic the Atlantis ecosystem?**
Sturludóttir et al.
18. **Sensitivity study of the Icelandic Atlantis model.**
Sturludóttir et al.



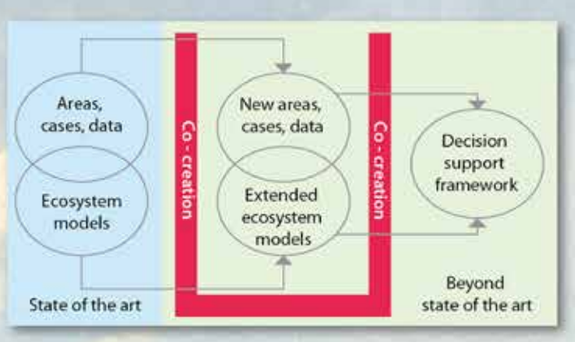
www.mareframe-fp7.org

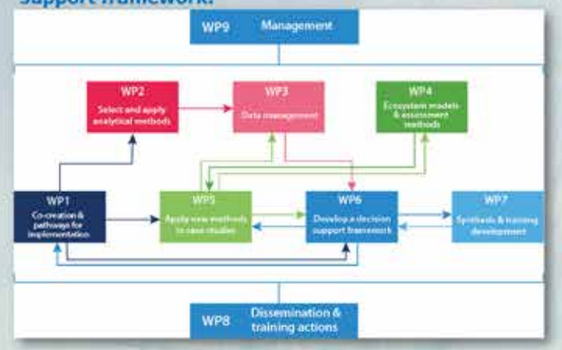
MareFrame

Co-creating Ecosystem-based Fisheries Management Solutions

CONCEPT:

MareFrame is a EC-funded RTD project which seeks to remove the barriers preventing more widespread use of the ecosystem-based approach to fisheries management. The vision of MareFrame is to significantly increase the use of ecosystem-based approach to fisheries management (EAFM) when providing advice relating to European fish stocks.
The overall objective of MareFrame is to remove the barriers preventing more widespread use of EAFM through development of new tools and technologies, development and extension of ecosystem models and assessment methods, and development of a decision support framework.





STRATEGY:

The collective intelligence of the MareFrame project is integrated by 30 partners and focused on enhancing the capacity to provide integrated assessment, advice and decision support for an ecosystem based approach to fisheries (EAF), leading to a stage feasible for implementation. This will be done combining three approaches: collaboration across scientific fields; collaboration on fisheries in different ecosystems; and the co-creation approach which merge analytical and participatory processes in collaborative research with stakeholders.

OBJECTIVES:

The overall objective of MareFrame is to remove the barriers preventing more widespread use of EAFM through development of new tools and technologies, development and extension of ecosystem models and assessment methods, and development of a decision support framework that can highlight alternatives and consequences; all in close collaboration with the stakeholders in the co-creation processes. The project will address important issues within the Common Fisheries Policy (CFP), the Marine Strategy Framework Directive (MSFD) and the Habitat Directive (HD).

PARTNERS:

More details: www.mareframe-fp7.org

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MareFrame

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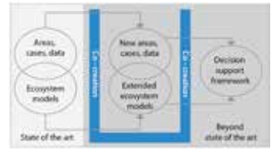
Co-creating Ecosystem-based Fisheries Management Solutions

Concept

MareFrame is a EC-funded RTD project which seeks to remove the barriers preventing more widespread use of the ecosystem-based approach to fisheries management.

The vision of MareFrame is to significantly increase the use of Ecosystem-based Approach to Fisheries Management (EAFM) when providing advice relating to European fish stocks.

The overall objective of MareFrame is to remove the barriers preventing more widespread use of EAFM through development of new tools and technologies, development and extension of ecosystem models and assessment methods, and development of a decision support framework.



Objective

MareFrame seeks to remove barriers that currently prevent a more widespread use of an EAFM by developing:

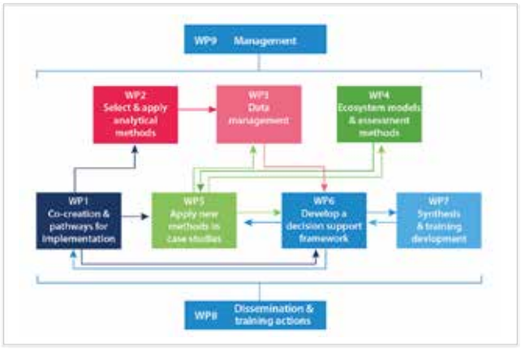
- Novel data based on new tools and technologies
- Ecosystem models and assessment methods based on indicators of Good Environmental Status (GES)
- A Decision Support Framework (DSF) adapted to the needs of decision makers, managers, operators, and other stakeholders that will support the implementation of the new Common Fisheries Policy (CFP), Marine Strategy Framework Directive (MSFD) and Habitats Directive (HD)

More details: *www.mareframe-fp7.org*

Strategy

Broad spectrum of ecosystem based models will be developed. These models will then be tested and compared systematically to the same ecosystems, and evaluated using the same underlying datasets. This allows for a robust approach to test scenarios that are less dependent on model choice.

The new ecosystem approach will be based on responsiveness, flexibility, and stakeholders' involvement. It will be developed and demonstrated through training actions, role-play and workshops with stakeholders to enhance implementation.



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Co-Creating Ecosystem-Based Fisheries Management Solutions

Why?

MareFrame is a European research project which will increase the use of an Ecosystem-based Approach to Fisheries Management (EAFM) for better governance in European fisheries.

How?

Our main strategies are:

1) **Improving the science supporting EAFM**
   A total of six ecosystem-based models will be advanced and extended in eight ecosystems. These models are tested, compared and evaluated systematically, allowing for a robust approach to assess scenarios that are less dependent on model choice.
2) **Decision Support Framework**
   The broad spectrum of models applied to the chosen ecosystems will provide knowledge that can be used for policy making by improving management plans and implementing EAFM. A Decision Support Framework will be developed to enable decision makers to compare relevant potential scenarios and their likely consequences.
3) **Co-creation**
   MareFrame is developed in co-creation with stakeholders, demonstrated through training actions, role-play and workshops for successful implementation. It includes socio-economic and legislative issues and is based on responsiveness and flexibility.

Who?

MareFrame is an international consortium of 28 partners from 14 countries and 3 continents, including a dynamic team of leading researchers from natural and social sciences, as well as the Advisory Councils and the multi-stakeholders platform within the Common Fisheries Policy.

Would you like to know more?

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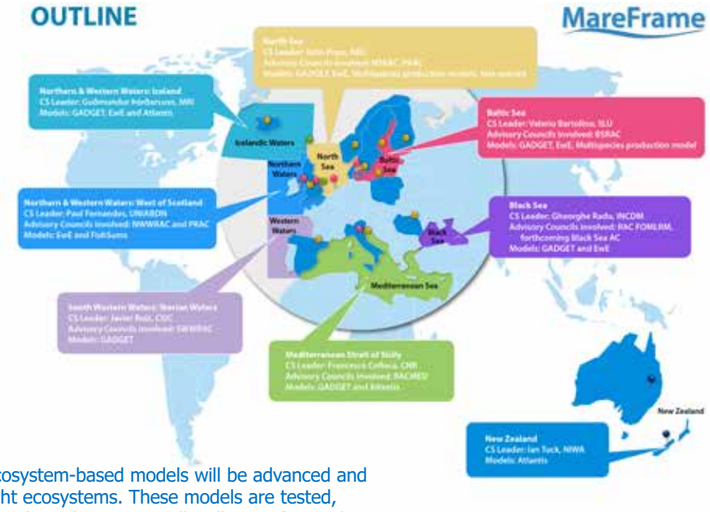
Contact us:
Coordinator: Dr. Anna Kristín Daníelsdóttir, Matís, Iceland annak@matis.is
Scientific Manager: Prof. Gunnar Stefánsson, University of Iceland gunnar@hi.is
Presenting at WSC: Jónas Viðarsson, Matís, Iceland jonas@matis.is

MareFrame

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

Co-creating Ecosystem-based Fisheries Management Solutions

MareFrame is a European research project which seeks to remove the barriers preventing more widespread use of the Ecosystem-based Approach to Fisheries Management (EAFM) when providing advice relating to European fish stocks.



Strategy

A total of six ecosystem-based models will be advanced and extended in eight ecosystems. These models are tested, compared and evaluated systematically, allowing for a robust approach to test scenarios that are less dependent on model choice.

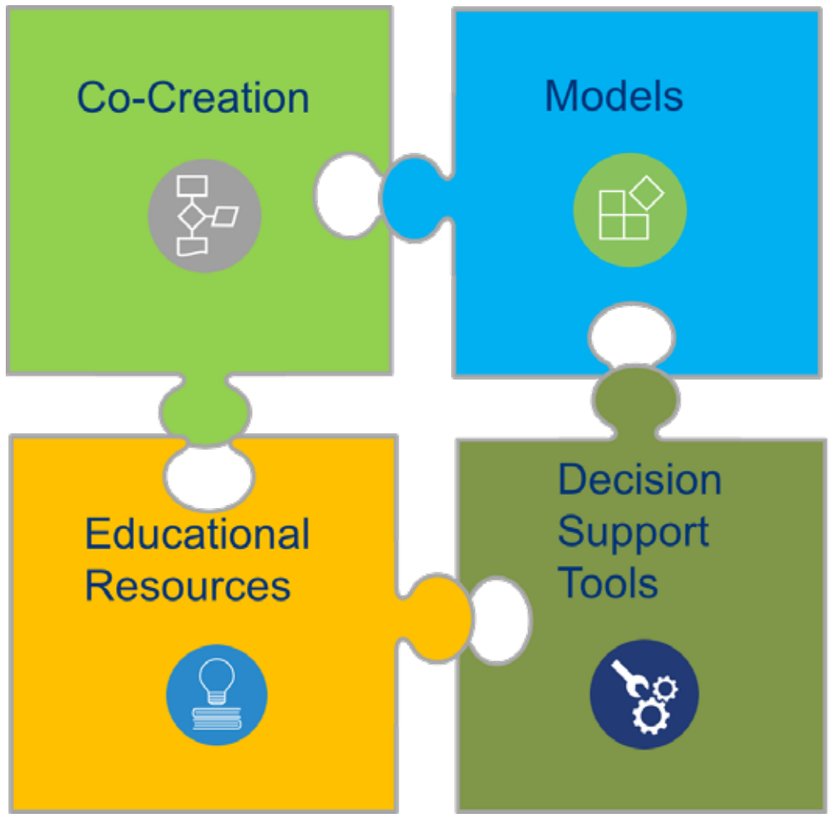
The broad spectrum of models applied to the chosen ecosystems will provide knowledge that can be used for policy making, improving management plans and implementing EAFM. A Decision Support Framework will be developed to enable decision makers to compare relevant "what-if" scenarios and their likely consequences.

MareFrame contributes to EAFM. Including socio-economic and legislative issues. Based on responsiveness and flexibility. Developed in co-creation with stakeholders. Demonstrated through training actions, role-play and workshops to enhance implementation.

Outcomes

- Advanced ecosystem models and assessment methods based on indicators of Good Environmental Status (GES)
- Application of novel data into fisheries management decisions based on new tools and technologies
- A Decision Support Framework adapted to the needs of decision makers, managers, operators and other stakeholders that will support the implementation of the new Common Fisheries Policy (CFP), Marine Strategy Framework Directive (MSFD) and Habitats Directive (HD)

Further information: www.mareframe-fp7.org



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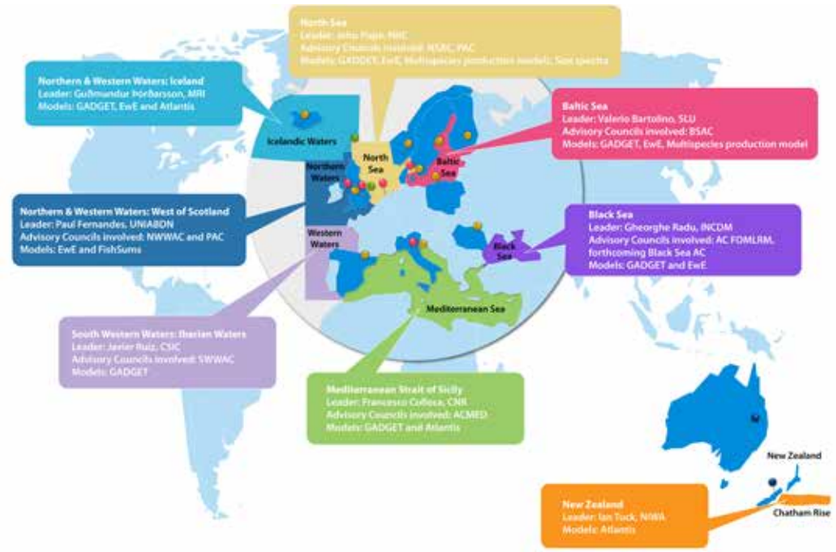

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MAREFRAME POLICY DAY & CONFERENCE

DECEMBER 13TH & 14TH, 2017

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

POLICY DAY, DECEMBER 13TH

Opening by Sieglinde Gruber,
DG-Research & Innovation, European Commission

SPEAKERS AND PARTICIPANTS:

Ernesto Penas Lado, CFP Policy Development, DG-MARE, European Commission
Mark Dicky-Collas, Ecosystem Approach Coordinator, ICES
Paul Degbol, Aalborg University, Denmark
Ian Tuck, NIWA, New Zealand
Jesper Raakjær, IFM, Denmark
Maciej Tomczak, Stockholm University, Sweden
Andre Punt, University of Washington, USA
Andrew Payne, A&B Word Ltd, UK
Clara Ulrich, DTU Aqua, Denmark
Martin Pastoor, Pelagic Fisheries Association
Robin Cook, University of Strathclyde, UK
Luc van Hoof, IMARES, Wageningen, The Netherlands

CONFERENCE DAY, DECEMBER 14TH

INVITED SPEAKERS INCLUDE:

Beth Fulton, CSIRO, Australia
Andre Punt, University of Washington, USA
Andrew I.L. Payne, A&B Word Ltd, UK
Robin Cook, University of Strathclyde, UK
Lucia Fanning, Dalhousie University, Canada

CONFERENCE PARTICIPANTS ARE INVITED TO SUBMIT MANUSCRIPTS FOR POSSIBLE PUBLICATION IN A SPECIAL ISSUE OF FISHERIES RESEARCH: "ADVANCING ECOSYSTEM BASED FISHERIES MANAGEMENT"

Deadline for submitting abstracts for the conference is October 15, 2017

LOCATION:

Comics Art Museum - Brussels
Rue des Sables 20
1000 Brussels

CONTACT:

Email: annak@matis.is
Twitter: @MareFrame
www.mareframe-fp7.org

Co-creating Ecosystem based Fisheries Management Solutions

Project duration:
Jan 2014 – Dec 2017

Total budget:
€ 7.7 million

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MareFrame

MareFrame

The vision of MareFrame is to significantly increase the use of an ecosystem-based approach to fisheries management (EAFM) when providing advice relating to European fish stocks.

Participants:
28 partners
14 countries
3 continents

Project coordinator details:
Dr. Anna Kristín Daníelsdóttir
Tel: +354 422 5014
@DanielsdottirK
anna.k.danielsdottir@matis.is

9 Work Packages (WPs)

WP1 Co-creation & pathways for implementation
WP2 Select and apply analytical methods
WP3 Data management
WP4 Ecosystem models & assessment methods
WP5 Apply new methods in case studies
WP6 Develop a decision support framework
WP7 Synthesis & training development
WP8 Dissemination & training actions
WP9 Management

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@gstefans
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Fisheries Management Solutions

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How to advance towards an Ecosystem-based approach to fisheries Management (EBFM) in the European Union

The widespread implementation of an EBFM is a central goal for the EU. Although there have been significant advances, is wider implementation still faces structural and institutional challenges. MareFrame has identified four central challenges: policy harmonization of the CFP and MSFD; inadequate platforms for meaningful participation; insufficient frameworks for balancing objectives; and the need of capacity building for advice and uptake.

MareFrame has designed a ***Decision Support Framework*** (DSF) to address these challenges in cooperation with stakeholders. The DSF includes:

(1) a co-creation process, involving cooperation with stakeholders to identify, analyse, and explore how to address the problem;
(2) ecosystem models, to understand the likely consequences of management options
(3) a set of computerized Decision Support Tools that aid complex planning and decision-making
(4) educational resources to facilitate the use of the DSF

	Component of the MareFrame DSF addressing specific challenge			
Challange	**Co-creation**	**Ecosystem Model**	**Decision Support Tools**	**Education materials**
Policy harmonization of the CFP and MSFD	✓	✓		
Inadequate platforms for meaningful participation	✓		✓	
Insufficient frameworks for balancing objectives		✓	✓	✓
Capacity building needed for advice and uptake	✓	✓		✓

The findings of MareFrame advocate that managers adopt all four components of the DSF together for best practice, but the components can be implemented piece by piece in the case of scarce resources or context-dependent circumstances.

1. Policy harmonization of the CFP and MSFD

There is room for improving the CFP and the MSFD coherence associated to the interplay of the multilevel governance (Member States and EU level), facilitating how decision makers, science advisors, and stakeholders should analyse trade-offs.

What MareFrame has done	Barrier Remaining	Recommended Action
Identified institutional and legal barriers and challenges	Sector/area based policies may slow down advances towards EBFM (fisheries, environmental)	Enhance regional policy structures and strengthen links with Regional Sea Conventions
Analysed the advisory system for an EBFM	Lack of resources/ resource optimization; fragmentation of the knowledge pool, piecemeal advice	Allocate resources strategically to broaden the scope of science processes
Used scoping exercises to address cross policy issues (e.g. joint consideration of GES Descriptors 3, 4 and 6)	Different users request different advice	Enhance capacity of the advisory system to support cross-policy cooperation (involving ICES, GFCM, STECF, JRC)

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2. Inadequate platforms for meaningful participation

There are many stakeholder forums in the EU, but their activities are in many cases weakly connected to decision-making. Meaningful participation with regard to EBFM requires platforms that foster iterative scoping of problems for adaptive planning and management.

What MareFrame has done	Barrier Remaining	Recommended Action
Enhanced participatory processes with facilitators and scientific support	Lack of funding and awareness (resources and commitment)	Integrate structured dialogue in existing work programs
Analysed the relationship between Advisory Councils and Member States Regional Groups	Underdeveloped links between (some of) the ACs and the MSRGs	Provide guidance on best practice for cooperation
Analysed the science-policy-society gaps and the need for multiple sources of knowledge connected to relevant policy fora	Stakeholder fatigue and "misuse" of consultative processes detached from decision-making; overlapping work and underestimation of requirements and workloads; legitimacy of constituencies; differences in capacity to influence the dialogue	Use the regionalization process to support scoping exercises. Regionalization should include management at regional, sub-regional and supra-regional levels

3. Insufficient frameworks for balancing objectives

EBFM requires the capacity to address and balance a number of conflicting ecological, economic, and social objectives in a fair, transparent, and legitimate manner where costs and benefits of specific options on the various dimensions of sustainability are described systematically.

What MareFrame has done	Barrier Remaining	Recommended Action
Developed methodology supporting joint consideration and evaluation of ecological, economic, and social objectives/ trade-offs	Lack of social and economic indicators and defined thresholds; limitations with regards to incorporate such indicators in ecosystem model frameworks; difficulties of reconciling multiple objectives with multiple decision makers at multiple levels	Support the collection of relevant data. Interdisciplinary collaboration to model full ecosystem by considering social, economic and environmental aspect. Define reference levels for ecosystem indicators; establish scoping processes involving all authority levels
Developed DSTs for informed decision-making	DSTs have not been tested in real planning decision-making	Facilitate the actual use of DSTs at local level to test suitability and usefulness

4. Capacity building needed for advice generation and uptake

There is a need to strengthen the supply of EA advice from scientists and stakeholders. In addition, capacity building is necessary for decision makers to better know how to handle EA advice.

What MareFrame has done	Barrier Remaining	Recommended Action
Cooperation between natural social sciences, transdisciplinary research to address uncertainty and complexity of social-ecological systems	Lack of skills for enhancing multi-disciplinary research approaches	Promote "a sustainability sciences approach," providing adequate resources and platforms for transdisciplinary cooperation in research
Assessed the role of the ACs in the EBFM and relevant fora for the exploration of trade-offs	Lack of availability of stakeholders to provide knowledge into a compatible and connected format within an EBFM	Conduct practical experimentation connected to ongoing activities with ICES and STECF to identify the benefits of an EBFM for the ACs

The MareFrame project contributed to a wider implementation of EBFM by developing processes, models, and tools to support scenario-based planning in iterative cooperation with stakeholders. The findings are ofrelevance for the future management of the marine living resources and for the supporting the implementation of the CFP, the MSFD, the Habitat Directive the Birds Directive, the Marine Spatial Planning Directive and the overall Blue Growth Strategy.

All the information and public deliverables are available at *www.mareframe-fp7.org*

Contact the MareFrame team: Anna Kristín Daníelsdóttir, project coordinator (*annak@matis.is)*

Photos from the Final Meeting in Brussels Belgium 2017

MareFrame

WORKSHOP ON DECISION-SUPPORT TOOLS FOR THE ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT

20th June 2017, DG-RESESEARCH HQ, Brussels

www.mareframe-fp7.org

MareFrame develops a pragmatic planning process in support of an Ecosystem Approach to Fisheries Management (EAFM). For this purpose, a total of **37** meetings have been held in **7** case studies. Participants from the fisheries industry, environmental NGOs, policy makers, scientists and the Advisory Councils have jointly tested and re-designed the tools for their specific contexts.

The MareFrame case studies

In preparation for the Workshop, please consider the following:

- What tools could help you in supporting the decision-making process?
- How do you deal with trade-offs in decision-making?
- What challenges do you foresee regarding the process of implementing the EAFM, nationally and in the EU?

The MareFrame decision-support toolbox allows users to explore, assess and evaluate **alternative management scenarios**. The tools are essentially generic but have been adapted specifically to each of the MareFrame case studies in cooperation with stakeholders.

This Workshop will focus on two specific tools to illustrate the potential for **evaluation and comparison** of alternative management approaches. Presentations and **group work** will be used to test the tools, discuss the potentials and the drawbacks - and to identify improvement ideas to enhance their relevance in the actual policy context.

The Workshop is part of the inclusive co-creation approach pursued throughout MareFrame, and aims at producing knowledge that is both scientifically valid and policy relevant, hence contributing in a useful way to a socially robust and acceptable basis for policy and management actions.

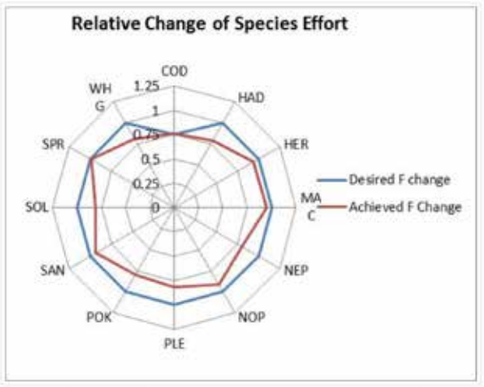

Illustration from a MareFrame decision support tool to define and compare scenarios

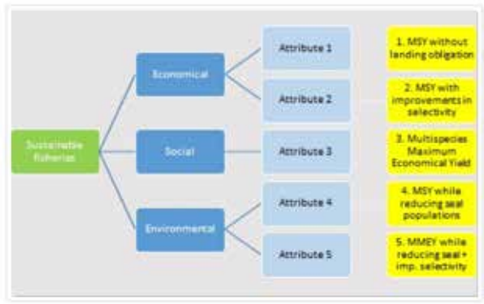

Illustration from a MareFrame decision support tool to evaluate scenarios

Experience with decision support tools shows that "one size does not fit all". The MareFrame team looks forward to walk you through the main findings of the case studies and the versatility of the tools to be applied at local, regional and national level.

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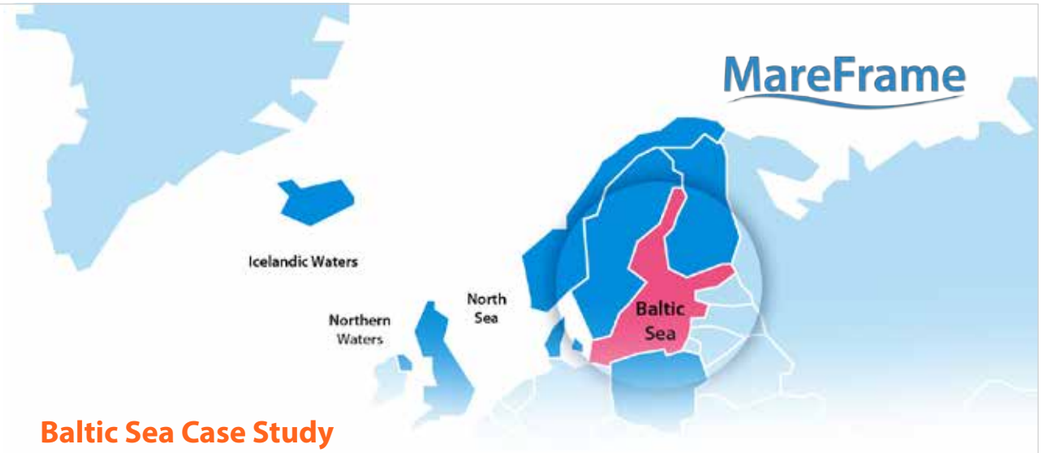

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Baltic Sea Case Study

The three most commercially important stocks in the offshore Baltic Sea, cod, herring and sprat, are managed by means of TAC's[1]. The European Union is now aiming to manage these stocks following an Ecosystem Approach (EA), which will require long-term planning rather than on a yearly basis, and having a better understanding of the implications of the fishery on the ecosystem and on socio-economic aspects in the fisheries communities.

Key features

- The nations involved in the Baltic Sea fisheries include Sweden, Denmark, Poland, Germany, Finland, Russia, Estonia, Latvia, and Lithuania.
- Five fish species are commercially exploited at the highest scale in the Baltic: cod, herring, sprat, flounder, and salmon. Cod, herring and sprat comprise the majority of the fish community in biomass.
- Cod is the main predator on herring and sprat which are also important part of diet of salmon and seals. Herring and sprat in particular prey on cod eggs. Herring spawns in coastal areas on gravel or aquatic vegetation while sprat spawns in the pelagic area. The cod spawning habitat is limited by environmental conditions, specifically the oxygen concentration and salinity in the pelagic area of the southern Baltic Sea.
- Climate driven changes in the salinity, sea water temperature and oxygen concentration affect the recruitment and growth of fishes. Also eutrophication plays an important role in the low oxygen concentration in the Baltic.
- The main EU fishing nations for cod are Denmark, Poland, and Sweden. Main fishing nations for herring are Sweden and Poland. Main fishing nations for sprat are Poland, Sweden and Denmark.
- As the first of its kind, a multi-annual multi-species plan for the stocks of cod, herring and sprat in the Baltic Sea, building on the principles of the 2013 Common Fisheries Policy, entered into force in July 2016 (Regulation (EU) 2016/1139).

The MareFrame Road

5 face to face meetings: Launch of Case Study (Gothenburg, May 2014); workshops on Decision Support Tool (DST) design (December 2015, January 2016); Test of DST Prototype I (October 2016); Test of DST prototype II (August 2017)

3 remote meetings: Follow up (November 2014, April 2015, May 2016)

8-10 participants: typical number of participants, including MareFrame team

http://bit.ly/CaseStudyBalticSea

Participants profile

Baltic Sea Advisory Council (chair, executive secretary, members); Fishing Industry (Danish Fishermen Association); Managers (Swedish Agency for Marine and Water Management); Academia (Gothenburg University); E-NGO (Fisheries Secretariat, WWF); MareFrame scientists.

What

The Baltic Case Study aims to explore mid- and long-term consequences of different management alternatives leading towards an EA. It uses ecosystem models to characterize the biological interactions among fish species (cod, herring, sprat), and it has implemented a Decisions Support Framework to explore the trade-offs among the fishing fleets that operate in the Baltic. It also acknowledges the environmental drivers (climate change, eutrophication, seal abundance) influencing the harvest of these species as well as the social and economic benefits derived from this exploitation.

[1] Total Allowable Catches (TAC) are catch limits, expressed in tonnes or numbers, that express how much of each commercial fish stock might be harvested within a year. TACs are prepared based on scientific advice, and are shared with EU and non-EU countries following a specific negotiating process.

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Management Objectives

- To rebuild the eastern Baltic cod stock.
- To maintain herring and sprat biomass at levels that will provide the maximum long-term average catch of the stocks (BMSY).
- To ensure economically viable fleets.
- To maintain foodweb integrity.

Criteria selected with stakeholders

- For eastern Baltic cod stock: Fishing mortality at levels that allow the maximum sustainable yield [F at about FMSY] at medium and long term. Spawning stock biomass at levels that will maintain a viable population of the stock in the medium and long term [SSB at biomass reference point (Bpa)]
- For herring and sprat: Spawning stock biomass at levels that will maintain a viable population of the stock in the medium and long term [SSB at biomass reference point (Bpa)]
- Trends in landings: is economic sustainability of the fisheries achieved?
- Foodweb integrity: demersal: pelagic ratio; fishing impact, proportion of mature cod, the 95th percentile of the estimated length distribution of the cod stock.

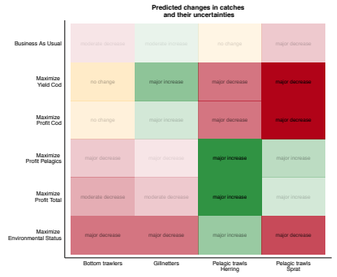
Tools

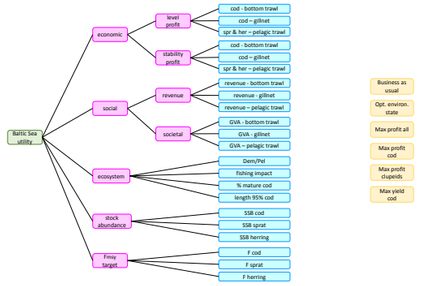
Ecosystem Models Ecopath with Ecosim (EWE), GADGET and Multispecies Stock-Production Model (MSPM).

Decision Support Tools Two methods for decision analysis are used in the Baltic case: Multi-Criteria Analysis (values from the ecosystem models are directly applied in the evaluation process) and Bayesian Influence Diagrams (probabilities are developed for the variable of interest in each scenario).

Results

- Business-as-usual (TACs based on current single species assessment for cod, sprat, herring)
- Maximize yield on cod (harvest rules on clupeids are conditioned to the reach the target on cod first)
- Maximize profit on cod
- Maximize profit on pelagics
- Maximize profit total
- Maximize Environmental State (maximize the demeral: pelagic ratio conditioned to keep herring and sprat at viable levels).





Resources

- **General** *http://mareframe.mapix.com/baltic-sea.html*
- **Briefing**, Multiannual plan for Baltic fisheries, Oct 2016. *http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/589823/EPRS_BRI(2016)589823_EN.pdf*
- **Research publications:**
  Rahikainen et al. (forthcoming) Decision analysis as a lifeline in ecosystem-approach to fisheries management.
  Bauer et al. (forthcoming). Ensemble modelling of fisheries management strategies in a changing environment.

Key Takeaways

- Ecosystem models are tools which can inform about ecosystem consequences of alternative management strategies.
- Decision support tools are useful interfaces interfaces to make use of those complex models output and deal with trade-offs.
- There is a much higher level of uncertainty about the consequences of alternative management strategies when we move from the single-species to the EBFM context in the Baltic. To take decisions which are robust to such uncertainty multiple ecosystem models have to be used.
- EBFM in the Baltic Sea requires high inter-disciplinarity and unprecedented level of interaction with stakeholders. The approach to decision making may require quite some change if EBFM has to be implemented in the Baltic. The main reasons are that trade-offs exist and with EBFM we aim to address them explicitly and in a transparent way.

http://bit.ly/CaseStudyBalticSea

Black Sea Case Study

The Black Sea ecosystem is seriously affected by dynamic changes directly related to fishing, climate change and pollution. Fishery is the sector most affected by these changes. At the same time, fishing activities contribute themselves to the worsening of the ecological situation and for the depletion of the fish stocks. The Black Sea turbot (Psetta maxima maeotica) is a highly valuable commercial species, which has been subjected to severe decline in recent decades. The main reasons for the decline appears to be overfishing, in particular due to Illegal, Unreported, and Unregulated (IUU) fishing, but the stock development has also been adversely affected by environmental change (including eutrophication and invasive species).

Key features

- Turbot: several local populations mixing in the adjacent zones, shared stocks between riparian countries.
- No established agreement on the management of fisheries in the entire Black Sea. Romania and Bulgaria as Member States of the European Union comply with EC regulations.
- Romania and Bulgaria are members of the General Fisheries Commission for the Mediterranean (GFCM), which has authority to adopt binding measures for its members. Ukraine is a cooperating non-contracting party. Bulgaria, Romania and Ukraine participate in an ongoing GFCM initiative to develop a common management plan for Black Sea turbot. MareFrame supports this initiative.

The MareFrame Road

4 face to face meetings: 20 November 2015, 24 March 2016, 24-25 October 2016, 7 September 2017.

http://bit.ly/CaseStudyBlackSea

50 participants attended the meetings: 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.

What

The case study aims to restore the Western stock of Black Sea turbot to productive levels through an Ecosystem Approach to Fisheries Management.

Management objectives:

- To counteract direct and indirect overfishing in order to ensure the sustainable economic viability of fisheries.
- To restore, to the extent possible, the size of Black Sea turbot stocks at least Maximum Sustainable Yield levels.
- To guarantee a low risk for stocks of the associated species to fall outside safe biological limits.
- To reduce the extent of IUU fishing on turbot.
- To ensure the protection of biodiversity in order to avoid undermining ecosystems structure and functioning.

The main challenges include a high fishing mortality estimated for Turbot and the high levels of Illegal, Unreported & Unregulated catch (IUU). In addition, the stock structure is not fully resolved.

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Tools

Two ecosystem models, a user-friendly visualization tool and Bayesian belief networks a decision support tool.

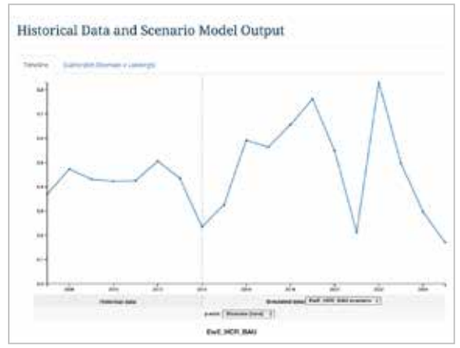
The ecosystem models were used to evaluate policy proposals and include up to ten groups of species. The details about the models (Ecopath with Ecosym-EwE- and Global applicable Area Disaggregated General Ecosystem Toolbox-GADGET) can be easily found in the resources section below. Although the models do not include economic outputs, the catches can be easily converted to revenue.

The visualization tool allow users to explore the details of scenarios: how much catches of turbot would we have under a given management system? Are we reaching a set threshold for a given variable? The tool "digest" the information from the model and presents it in an interactive way. The user selects the information that would like to see, for instance, the total value of the catches, and she/he is able to compare how it performs under different management scenarios.

The Bayesian Beliefs Networks (BBN) link the management objectives with the ecosystem models. The stakeholders define the "things that matter" in a particular setting, how they are related to each other and how much they matter. This approach enables using several types of data simultaneously: data sets, expert knowledge, parameter estimates in literature and modeling outputs. Using BNN, it is possible to analyze the information on the likely outcomes of the different scenarios and therefore the consequences of a given choice.

Results

In order to develop the scenarios, three sets of rules for management action have been explored (Harvest Control Rules): business as usual, fishing mortality for turbot remains at current levels; setting a total allowable catch fixed at 2015 level; setting specific limits for the weight of individuals in a fish stock that are capable of reproducing (the so-called spawning stock biomass - SBB). For those scenarios, changes in the level of IUU are included.



Resources

- **General:** *http://mareframe.mapix.com/black-sea.html*
- **Research publications:** Shlyakhov, V., 2014 - Fisheries and biological information and the stock assessment of turbot Psetta maxima maeotica (Pallas) in Ukrainian waters of the Black Sea, Труды ЮгНИРО, Т. 52, 2014 ISSN 1026-5643. Труды ЮгНИРО, Т. 52: 24-43
  Duzgunes, E., and Erdogan, N. 2008. Fisheries Management in the Black Sea Countries. Turkish Journal of Fisheries and Aquatic Sciences, 8: 181-192.
- **Others:**
  GFCM Working Group on the Black Sea (WGBS) - Report of the Workshop to test the feasibility of implementing multiannual management plans in the Black Sea http://www.fao.org/3/a-ax827e.pdf
  Background Technical Document in Support of the Management Plan for turbot fisheries in the Black Sea (GSA 29). GCFM background report.

Key Takeaways

- 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.
- Stock identification and stock boundaries are still not well defined and for the time being the turbot population in the Black Sea is assessed as a single stock. Genetic and tagging studies are essential for the definition of the population structure of turbot in the Black Sea.
- Stakeholder involvement and feedback are essential!

http://bit.ly/CaseStudyBlackSea

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Chatham Rise Case Study

The Chatham Rise is a broad ridge lying to the east of central New Zealand and extending for c. 1400 km. Warm subtropical and cold sub-Antarctic waters meet at the western end of the Chatham Rise and then run eastwards forming the sub-tropical front, creating ideal conditions for primary productivity. The subtropical convergence gives the region high biodiversity, and makes it the most productive in New Zealand waters. The ecosystem supports substantial commercial fisheries production, and also a high diversity of seabird, cetacean, and large pelagic fish species, many of which are protected under New Zealand law but threatened by human activities. The region also includes a number of seamounts, hills and knolls, which are also often sites of high productivity and the focus of some important fisheries, but often support extensive coral growths, which are very sensitive to physical impact by fishing or other disturbance.

MareFrame contributes to incorporating Ecosystem Approach to Fisheries Management (EAFM) in this highly complicated and multi-stakeholder case study, by exploring the implications of alternative management strategies, to inform the decision making process.

Key features

- Area of high primary productivity, supporting high levels of biodiversity.
- 60% of New Zealand's commercial fisheries.
- Protected corals and seabirds.
- Fishing industry initiated Benthic Protection Areas, excluding demersal fishing from 8 % of the area shallower than 1000 m.
- Phosphorite nodule deposits, with a proposed mining operation generating an estimated value of $280M per year.

http://bit.ly/CaseStudyChathamRise

The MareFrame Road

- Engagement activities with stakeholders, identifying objectives and priorities.
- Contributions to evidence and reports provided to the Environmental Protection Agency Decision-making Committee, for consideration of the application to mine phosphate nodules on the Chatham Rise.
- Development of an Atlantis ecosystem model, to examine the implications of different management approaches and environmental scenarios on various ecosystem components.
- Detailed analysis of food web structure and the role of mesopelagic species.

Participant profile: Commercial fisheries interests; Seabed mining interests; Chatham Islands residents; Maori; Ministry for Primary Industries; Ministry for the Environment; Department of Conservation; Environmental NGOs.

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What

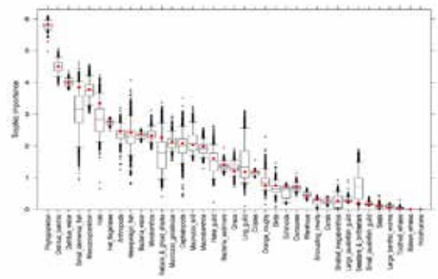
What criteria have been selected by the stakeholders
Balancing the protection of seabed habitats and protected species with the maintenance of important commercial fisheries, and the development of a seabed mining industry. Scenarios examining seabed mining and fishing scenarios.

Tools

A balanced food-web model and Atlantis ecosystem model have been used to explore trophic importance and estimate and predict impact of various management decisions.

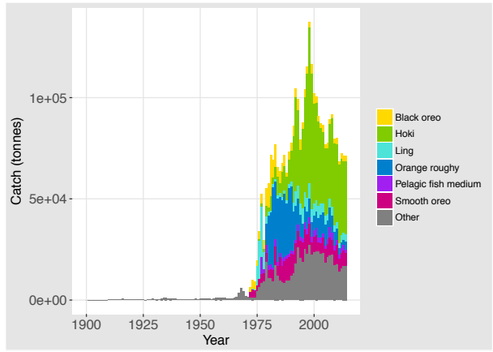
Results

Having identified key species in the food-web (trophic importance), expert knowledge used to estimate potential risk of seabed mining to ecosystem function.

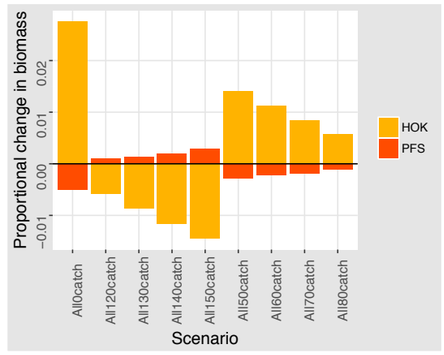


Trophic importance of Chatham Rise food-web groups

A range of increased and decreased fishing pressure scenarios have been examined with Atlantis



Historical catch levels



Relative changes after 10 years in hoki (HOK) and small pelagic fish (PFS) biomass for different future fishing scenarios

Key Takeaways

- Effects of seabed mining uncertain, but potential localised risk to small demersal fish, microzooplankton & krill, cephalopods and rattails & ghost sharks identified
- Implications of changing fishing patterns are being explored. Further investigations underway
- Further development of ecosystem based management solutions through the Sustainable Seas National Science Challenge project. *http://sustainableseaschallenge.co.nz/*

http://bit.ly/CaseStudyChathamRise

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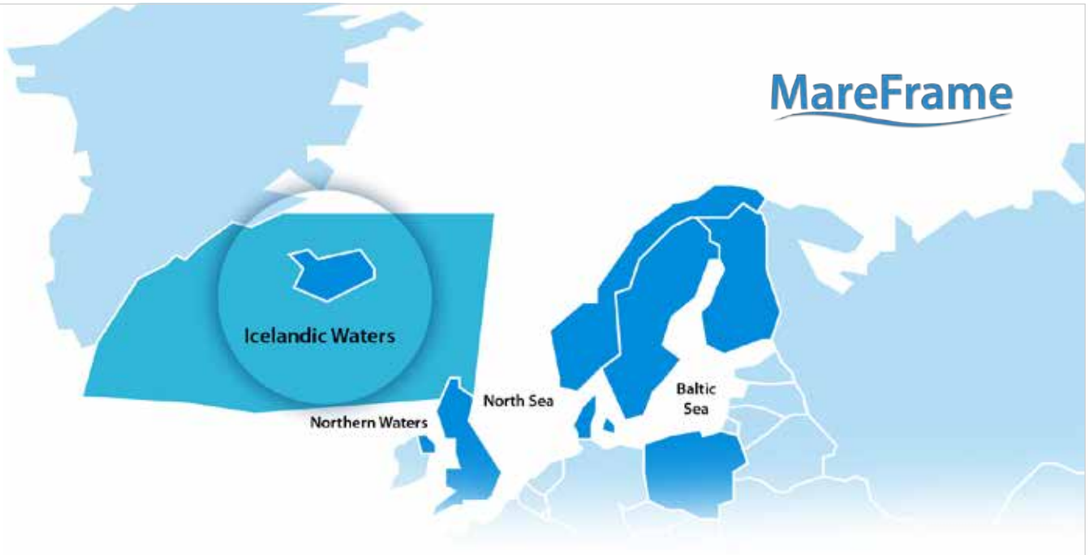

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Icelandic Waters Case Study

Icelandic waters are rich of biological resources, comprising mainly localised demersal and pelagic stocks such as cod, haddock, saithe, redfish and herring; and migratory pelagic stocks such as mackerel, herring, blue whiting and capelin. For the localised stocks, Iceland is in the quite unique situation to solely utilise and manage their stocks, since they are not shared with any other nation. For the migratory pelagic stocks, Iceland shares utilisation and management with other coastal states around the North-Atlantic. Fisheries are immensely important for the Icelandic economy and regional development, accounting for almost 1/4th of the nation's export values and providing jobs in areas with limited employment opportunities.

Icelandic fisheries are managed by Individual Transferable Quota (ITQ) system, where the Ministry of fisheries sets Total Allowable Catches (TAC) for each species, which are then allocated in proportion to each quota holder's share. Quotas can be sold and leased, similarly to most commodities, meaning that the resources have to a point been privatised. The ITQs however only permit to utilise common resources. In return the fishing companies are required to pay resource rent to the government and are further subjected to enhanced environmental and social responsibility.

In general, there is a good consensus amongst most stakeholder groups with both the objectives and the implementation of the Icelandic Fisheries management system. The main concerns are on how to distribute quotas and profits from the industry.

Key features

- Localised demersal stocks that are solely managed and utilised nationally.
- Shared utilisation and management of migratory pelagic stocks with other coastal states around the North-Atlantic.
- Highly profitable industry that plays an important role for the country's economy and employment.
- Cod is the most important species, accounting for 43% of seafood export values in 2016.

The MareFrame Road

2 face to face meetings: 10 June 2014 and 30 October 2015

30 participants in total

http://bit.ly/CaseStudyIcelandicWaters

Participants profile:
Fishing industry, ministry of fisheries, Directorate of fisheries, fisheries Iceland, National association of small boat owners, Association of fish processors and exporters, Icelandic Nature conservation association, Consumer's association, labor unions, fishermen's associations.

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What

Five alternative scenarios where examined and two presented to stakeholders.

Business as usual: This scenario serves as baseline to other potential management scenarios. In the scenario the current status of management is maintained and the effects on the status of the ecosystem explored going forward. In terms of control variables this entails that the current fleet composition and harvest rate maintained.

Cod to Fmsy (Fishing mortality at Maximum sustainable Yield): [1] This scenario offers a slight modification of scenario 1 as here the harvest rate is adjusted in such a way that the yield of the cod fishery reaches its maximum while fleet composition remains fixed.

Changes in fleet composition: The effects of specific changes in fleet composition in terms of management restrictions are explored. Currently the small scale fishery is allotted a proportion of the quota that cannot be transferred to larger fishing vessels. This scenario analyses the effects of removing this restriction on quota transfer from the small scale fishery.

Multi-species maximum sustainable/economic yield: The fishing rate and fleet composition is altered such that either of the following yield levels is attained: a. Maximum sustainable yield from the resource b. Maximum economic yield.

Environmental concerns: This scenario investigates the effects of adjusting the harvest rate and fleet composition such a way that overfishing and over depletion is prevented and the effects on the environment such as CO2 emissions and damage to the sea floor is reduced.

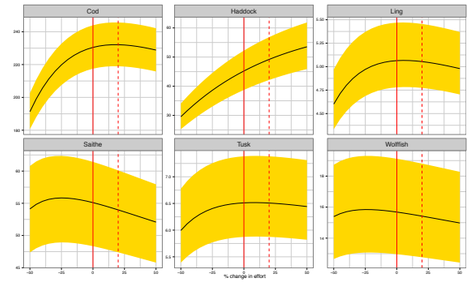
Tools

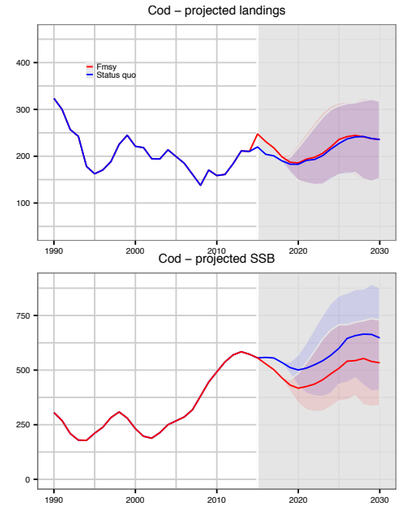
Three different ecosystem models have been applied to estimate and predict impact of various management decisions i.e. with stakeholder objectives in mind. These ecosystem models are Gadget, EwE and Atlantis.

Decision Support Tools Multi-Criteria analysis has also been applied in order for stakeholders to further set objectives and understand complexities and trade-offs related to their decisions.

Results

http://mareframe.mapix.com/WCOS-scatterplot/scatter-beta-confidence.html





Resources

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http://bit.ly/CaseStudyIcelandicWaters

[1] The maximum sustainable yield is the largest catch than can be taken from a fish stock over an indefinite period without harming it (European Commission).

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Mediterranean – Strait of Sicily Case Study

The Mediterranean Sea is the largest semi-enclosed basin in the world, featured by high biodiversity, habitat heterogeneity and heavy human pressure on the coastal system. The basin is divided into several regional seas based on biogeographic and morphological considerations. The Strait of Sicily (SoS) separates the western and eastern Mediterranean sub-basins and includes the Sicilian and Tunisian shelves. The Strait of Sicily is recognized as a biodiversity hot spot in the Mediterranean. Most important human uses of the area are fishing, aquaculture, conservation, shipping and tourism. Other important uses are oil drilling and extraction, deployment of gas pipelines and communication cables.

Key features

- Internationally shared fisheries (Italy-Malta-Tunisia-Egypt-Libya).
- Multi-fleet and multi-species fisheries: bottom trawl, artisanal vessels, purse seiners.
- High biodiversity and habitat heterogeneity.
- Priority areas for conservation.
- International management plan (GFCM MP [1]) adopted for bottom trawl fisheries in 2017.

The MareFrame Road

4 face to face meetings: with 30 participants

4 FAO-GFCM meetings

http://bit.ly/CaseStudyMediterraneanStraitofSicily

Participants profile:
Fishers representatives from Italy and Malta, Fishers, NGOs (Oceana, Greenpeace), FAO, Advisory Council (MEDAC), National and regional fisheries managers, researchers.

What

Management objective: The main aim is to provide advice for the long-term biological and socio-economic sustainability of trawl fisheries targeting deep-water rose shrimp and hake considering trophic interactions among the stocks as well as the main environmental drivers affecting the ecosystem. Four main management objectives have been identified by the stakeholders: i) rebuilding overexploited stocks; ii) long-term continuity of the fishing activities; iii) same rules for all the fishing fleets; iv) good environmental status.

A set of alternative management strategies have been evaluated in relation to a set of objectives and criteria. Some performance criteria refer to the EU policies: the CFP (Common Fisheries Policy) and the MSFD (Marine Strategy Framework Directive), (e.g. to achieve Maximum Sustainable Yield –MSY– no later than the year 2020 or the development of regional, multi-stock long-term management plans). Other criteria include the socio-economic performance of the fishery as measured by profits, costs and total number of fishing days during the year.

[1] GFCM General Fisheries Commission for the Mediterranean

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Tools

Two ecosystem models, a visualization tool and multi-criteria analysis as a decision support tool. A complex ecosystem model (ATLANTIS) helps to represent the high complexity of the Mediterranean ecosystem and forecast the impact of management measures on key ecosystem processes, functional groups, populations and fisheries. Additionally, GADGET provides an accurate description of the fisheries exploiting hake, deep-water rose shrimp and horse mackerel. It includes Italian, Tunisian and Maltese trawl and smallscale fleets and account for hake cannibalism and predation on the other two stocks.

Decision Support Tools: The stakeholders' goals and concerns have been identified in several co-creation workshops in Sicily. The indicators articulating them have been structured hierarchically in two value trees, for GADGET and ATLANTIS respectively, identifying the "things that matter". The main aspects are continuation of fishing activities, rebuilding the overexploited stocks of hake and deep-water rose shrimp, having the same rules for all fleets irrespective of their nationality, and reaching a healthy ecosystem status.

Results

The two models are used to simulate the effects of technical management measures on the achievement of the maximum sustainable yield for the target species within 2020 as well as on the economic performance of the fleets and the status of relevant ecosystem components. GADGET is designed for short term tactical advice whilst ATLANTIS is mostly used for providing mid-term strategic advice for ecosystem based management. Management scenarios and their likely consequences for the "things that matter" have been explored using the two models. Visit the Mediterranean case study at the Web for all details.

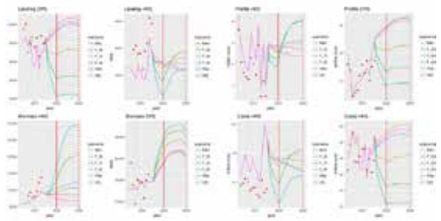


Figure 1: Atlantis model: results of simulations of alternative management scenarios for hake (HKE) and deep-water rose shrimp (DPS). BAU: business as usual; F_05: DPS FMSY; F_15: intermediate F reduction; F_25: HKE FMSY; FRA: Fisheries Restricted Areas; SEL : improved gear selectivity.

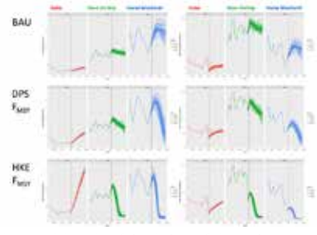


Figure 2: Gadget model results of simulations of alternative management scenarios for hake (HKE) , deep-water rose shrimp (DPS) and horse mackerel (HOM).

Resources

http://mareframe.mapix.com/strait-of-sicily

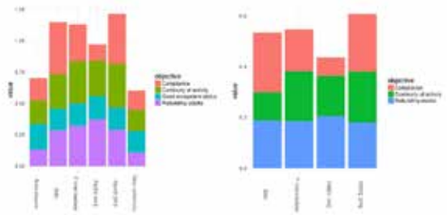
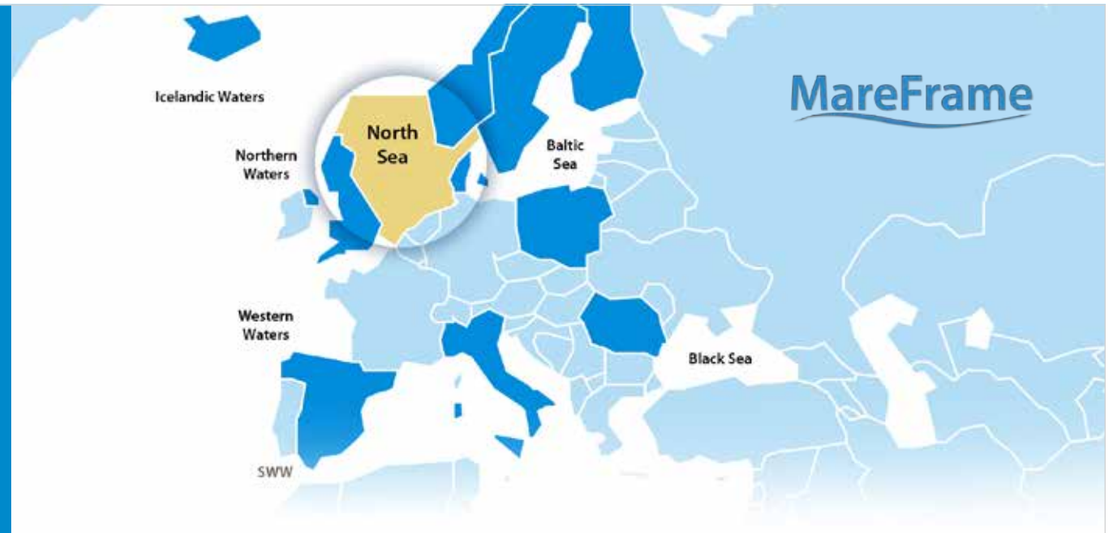


Figure 3: Multi Criteria Analysis results based on Atlantis (left) and Gadget (right) simulations. Total and partial scores of different management options in relation to four management objectives.

Key Takeaways

- Trawl fisheries play a key role for the exploitation of commercial stocks in the region either from a socio-economic point of view, in particular in Italy, and for their impacts on the ecosystem.
- In the last ten years Italian trawlers have suffered a decline in both productivity and economic performance due to a combination of overexploitation and poor socio-economic conditions.
- In 2016 the GFCM established a multiannual management plan for the fisheries targeting European hake or deep-water rose shrimp in GSA 12-16 (Strait of Sicily), as defined in Resolution GFCM/33/2009/2.
- The Case Study can support the future implementation of the GFCM management plan facilitating the inclusion of a more holistic approach and the provision of a strategic advice for ecosystem based management.
- Management strategies building on fishing restricted areas or impliyng rose shrimp MSY will best meet the stakeholder objectives.
- The fishery profits depend mainly from deep-water rose shrimp which account for about 40% of the trawlers landings in the period 2004-2015. Hake can be considered as a commercial by-catch of the fishery.
- Hake is a predator of deep-water rose shrimp and horse mackerel.
- Hake rebuilding toward MSY implies a loss in profits of the fleet in the short-medium term due to major reductions in deep-water rose shrimp landings.
- Species interactions (prey-predator) play a key role on fishery productivity.
- Management scenarios are built on alternative strategies which include reduction of fishing effort and fishing mortality toward FMSY, implementing FRAs, or implementing more selective trawl nets to reduce by catch of small hake and rose shrimp.

http://bit.ly/CaseStudyMediterraneanStraitofSicily



North Sea Case Study

The North Sea is an area characterized by a diversity of eight fishing nations with different local and overlapping fishing opportunities, resulting in an area with different patterns and targets of fishing. Management complexity is further increased by two aspects: 1) that the EU does not have sole management of stocks (agreements have to be made between the EU and Norway, and 2) the need of addressing biological interactions (predatory and prey dynamics and food competitions), which raises conflicts of interest between and within demersal and pelagic fisheries.

Key features

- Complex governance setting. A combination of regulation governs the fisheries: Total Allowable Catches, principle of relative stability, a mixture of technical measures (mesh size and gear restriction, minimum landing size and closed areas) are all applied for management of the fisheries.
- In August 2016 the European Commission presented a proposal for establishing a multi-annual plan for demersal stocks in the North Sea, aiming to ensure exploitation of demersal stocks according to the principles of Maximum Sustainable Yield and Ecosystem Approach to Fisheries Management (EAFM), and to facilitate the introduction of the landing obligation.
- There is a need to identify and evaluate the long and short term trade-offs of the transitional measures needed to progress towards an EAFM.

The MareFrame Road

7 face to face meetings: Launch of case study (London, May 2014); Follow up (Hamburg, November 2015); (The Hague, 25th February 2016); (The Hague, 11th April 2016); (Aberdeen, 13th July 2016.) Den Haag April 2017.

3 remote meetings: Updates models (PelAC Webex, March 2015); (NSAC Webex, Apr.2015); (PelAC WebEx, Feb. 2016)

15 participants: (average number of participants, including MareFrame team)

Participants profile Members of the North Sea AC & Pelagic AC (representatives of the fishing industry, eNGOs and policy-makers)

What

The case study concern is multi-species management in the North Sea with a focus on the complex tradeoffs involved. It accounts both for the interactions between species and the mixed nature of the fishery that links the fishing mortality of different species. The case study aims to develop an interactive tool that allows stakeholders to identify and evaluate the long-term trade-offs on the various players caused by any proposed management action. Trade-offs are related to biological outputs (catch by species, Spawning Stock Biomass and where possible discards/unsalable catch); environmental impacts (bottom disturbance and by-catch) and economic results considering value, costs (labour and other) and profit. A Traffic Light Panel also gives the status of various indicators of interest to particular groups of stakeholders compared to their levels of concern.

The Case study includes 12 main species and circa 120 fleets.

http://bit.ly/CaseStudyNorthSea

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Management objective – the stakeholder's general concerns are associated to the needs of

- Achieving the largest average catch over time, in technical terms referred as Maximum Sustainable Yield.
- Meeting the Landing Obligation[2].
- Avoiding the risk of incompatible regulations.
- Equitable distribution of losses/gains across fleets and countries.

What criteria have been selected by the stakeholders?

- Achieve sustainable and economically viable fisheries (pelagic and demersal profit and employment).
- Maintain the ecosystem structure of the North Sea (structure in terms of fish composition; impacts on seabed and by-catch of non-commercial fish species).

Tools

The T-ONS (Trade-offs North Sea Model, aka "The Green Model") is a multi-species model of the North Sea designed to calculate and illustrate the main long-term trade-offs involved in fisheries management, trade-offs which are triggered by changes in species fishing mortality. These changes are handled by means of sliders for each one of the 12 species considered in the model or by means of pushing the pre-programmed scenario buttons.

The model provides default settings for the seven different management scenarios agreed with stakeholders.

Results

The Green model is a tool that allows different stakeholders to have an informed dialogue, based on the same data and on the same pre-agreed concepts, on the consequences of any chosen scenario. In principle, stakeholders can sit jointly together to investigate different management scenarios in the pursuit of a possible compromise, or they can sit independtly to investigate how their own ideas of managment scenarios would perform by adjusting the fishining mortality for the 12 species considered by the model.

The Traffic Lights Panel will give an imnmediate indication of the performance, thereby allowing stakeholders to consider revising their positions.

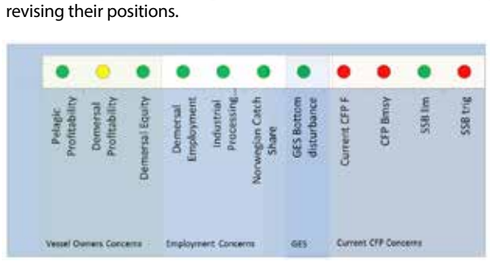

Figure 1: Traffic light display for *business as usual* pre-defined scenario. This shows red when particular stakeholders concerns are seriously violated, yellow when they are at uncomfortable levels and green at levels they would be happy with.

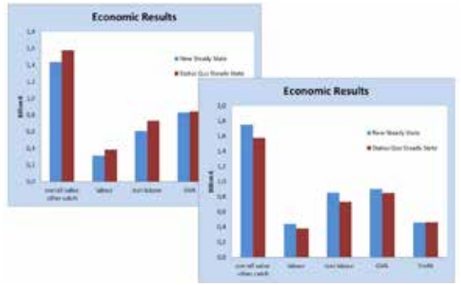

Figure 2: Overall results under the *Max Economic Yield* pre-defined scenario (top) and the *Max Gross Value Added* pre-defined scenario (bottom).

Resources

- **General** *http://mareframe.mapix.com/north-sea.html*
- **Research: publications** Pope, J (forthcoming). Multi-species management in the North Sea: evaluating long term trade-offs of various scenarios by means of the Green Model
- **Others** EP (2016) Briefing, Multiannual plan for North Sea demersal fisheries. *http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/589814/EPRS_BRI(2016)589814_EN.pdf*

Key Takeaways

http://bit.ly/CaseStudyNorthSea

- The trade-offs between various criteria for the different North Sea fleets are complex and thus best dealt with by seeing them all clearly presented in one model.
- Different stakeholder groups have widely different objectives and compromise is therefore needed. It may be easier to achieve this by trying to avoid the worst levels of the criteria of most concern to the various groupings. To address both problems models are best seen as indicating promising directions of change rather than overall best situations.

[2] The reformed CFP has introduced the Landing Obligation for the North Sea from the 1st of January 2015 for industrial fisheries and certain small pelagic fisheries; and from the 1st of January 2016 for the first set of demersal species.

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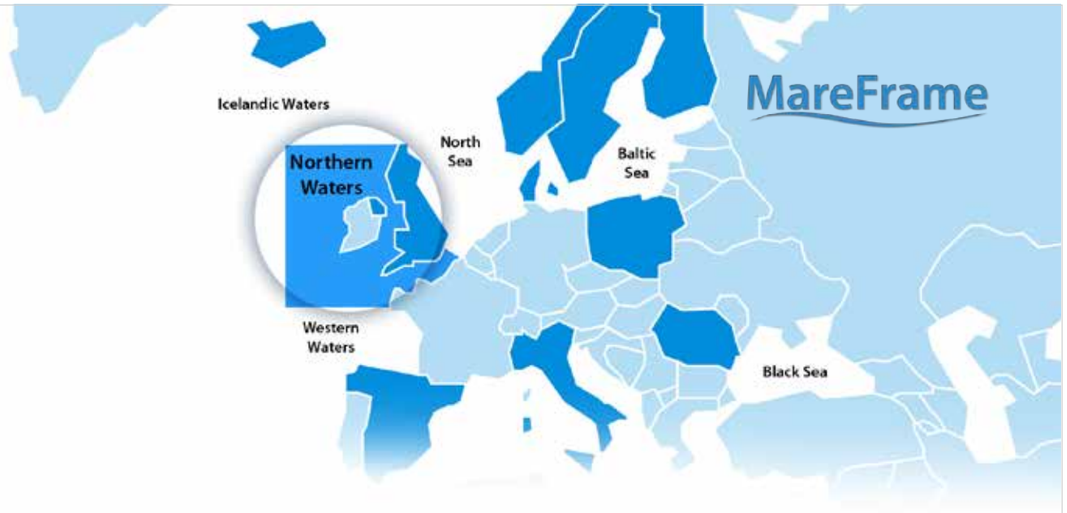

Northern Waters Case Study

The West coast of Scotland ecosystem comprises the shelf area west of Scotland (ICES subarea VIa) which covers inshore and offshore waters from the west coast of Scotland to 12°W of longitude. The West coast of Scotland ecosystem support several valuable fisheries: a demersal fishery, a pelagic fishery and a shellfish fishery targeting Nephrops.

Key features

- Internationally shared fisheries (Scotland, Northern Ireland, England, France, Spain, Germany).
- Multiple fisheries (demersal trawl, pelagic trawl, Nephrops trawl).
- Increase in sea mammal populations in recent years.

The MareFrame Road

5 face to face meetings: Dublin (22/05/2014); Aberdeen (30/09/2015); Paris (03/02/2016); Aberdeen (26/05/2016) First Decision Support Framework workshop in Aberdeen (25.08.2016).

4 remote meetings including the Second Decision Support Framework workshop via video-conference (12/06/2017).

7 participants: Advisory Council (NWWAC), Fish producers' association (SWFPA), Fish producers' organisation (WSFPO), NGO (WWF)

What

Challenges:

- The stocks of cod and whiting in VIa are currently depleted and show little to no signs of recovery.
- The increase of the grey seal population and the associated increased predation on gadoid species is thought to have contributed to the decline of the cod stock.
- In recent years the valuable Nephrops fishery has become an increasingly important in VIa, partly due to the coincidental collapse in gadoid stocks. However this fishery operates in areas that are important grounds for juvenile gadoids. As a result, bycatches and subsequent discards of juvenile fish are important, particularly for whiting. This is likely to jeopardise the Nephrops fleet amid the landings obligation, and could also impede stock rebuilding.

Management objectives:

- Rebuild the depleted stocks of cod and whiting.
- Identify the optimum exploitation pattern to simultaneously achieve biological and economic sustainably.
- Achieve Good Environmental Status.

http://bit.ly/CaseStudyNorthernWaters

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MareFrame

Tools

Two ecosystem models available to model the West of Scotland case study:

- Ecopath with Ecosim: an end-to-end foodweb model which encapsulated the whole foodweb from plankton to mammals, modelled as biomass pools.
- Gadget: a length- and age- based multispecies model allowing detailed modelling of a few key species.

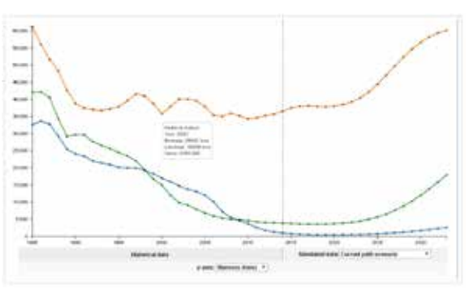
The Decision Support Tool is the Multi Criteria Analysis which allowed stakeholders, with the help and guidance from MareFrame researchers, to analyse and compare the outputs from the ecosystem models according to criteria of their choice.

In addition, a visualisation tool is available online for stakeholders and general public alike to screen through the model outputs for each of the management alternative simulated.

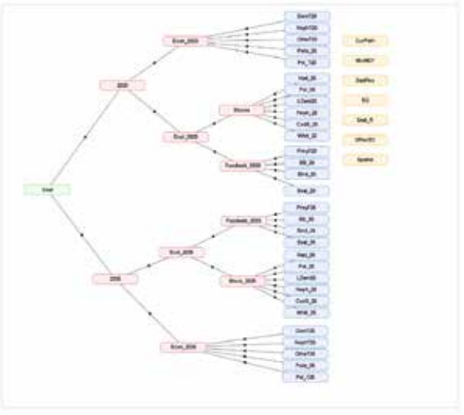
Results

Seven management alternatives were simulated
(see descriptions at *http://mareframe. mapix.com/west-coast-of-scotland.html*).

Outcomes of these alternatives for biomass, landings and value can be viewed and compared online at *http://mareframe.mapix.com/WCOS-scatterplot/scatter-beta-confidence.html*.



Multi-Criteria Analysis



Scenario Model output

Resources

- Project description and aims: *http://mareframe-fp7.org/*
- Case study results: *http://mareframe.mapix.com/west-coast-of-scotland.html*
- Model description: *http://www.nature.com/articles/s41598-017-13220-7*

Key Takeaways

- Cod and whiting recovery would require a substantial reduction in fishing mortality and a reduction in juvenile predation (by saithe in particular).
- Bycatches of juvenile whiting by Nephrops fleet have a significant impact on whiting stock.
- Seal predation appears to have a limited impact on gadoid stocks compared to fishing.

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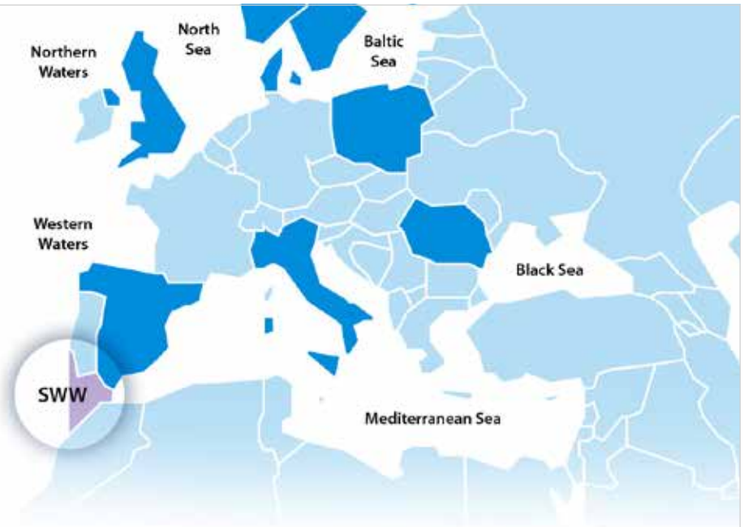

SWW Case Study

The Gulf of Cádiz (South West Spain) is a biologically rich area, essential for the vital cycle of many commercial species including small pelagic species. Among them, the European anchovy (Engraulis encrasicolus) is the primary target of a Spanish fishing fleet of 87 vessels, which reported catches of around 6.000 t value more than 13 M€ (2014). Currently the fishery is managed through a semi-fixed annual threshold for catches (Total Allowable Catch) that may be hampering its biological and economical sustainability.

Key features

- The resource situation is not known with precission: Currently, the scientific advice is based on a qualitative approach relying on survey estimations. There is a need for an appropriate tool to integrate all available information in a statistically robust way that allows to explore fishing possibilities.
- The fishing fleet experiences significant fluctuations of landings.
- Environmental processes (sea surface temperature, intense easterly winds and discharges from Guadalquivir River) force strong fluctuations in anchovy population.
- Uncertainty limits the capability of the sector to adapt to the actual evolution of the resource.

The MareFrame Road

3 face to face meetings: 21 May 2014, 29 October 2015, 29 September 2017

1 meeting with the local fishing organization: 24 October 2014

12 participants attended the meetings: Local fishing organization, Regional government, National government, National branch of the World Wide Fund for Nature, economic researchers at University, responsible of the National Park, Cetaceans conservation organization.

What

The case study aims to improve the adaptive capacity of both management measures and fishing behaviour to the attributes of the anchovy fishery. Using the co-creation approach, the initial research designed for the case study was redefined. A socio-economic component (income, employment and profitability) was included in the model to address the request of "searching for a tool to manage the fishery in a fashion that could smooth the strong fluctuations in favour of more stable income".

Management objectives

- To optimize profitability and sustainability of the resource.
- To define strategies for mitigating the impact of environmental fluctuations on the biology and economy of the fishery.

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MareFrame

Tools

A bioeconomic model, a user-friendly interface and multi-criteria analysis as a decision support tool.

The bioeconomic model jointly considers biological and socioeconomic components. The model allows to evaluate and compare the performance of different policy proposals.

A user-friendly interface has been developed and tested by the stakeholders. The interface uses shiny R package, combining computational power and interactivity.

A multi-criteria analysis (MCA) linked the management objectives/concerns with the models, used to forecast the consequences of management choices on the criteria (things that matter), taking stakeholders' preferences and values as an input to calculate how the different options fit for them.

Results

Four alternative management scenarios were explored and ranked by the stakeholders. Using the tool and quantifying the "things that matter", stakeholders decided that Adaption was the most suitable and feasible alternative. Does it perform better in all the criteria? The answer is no. Other alternatives generate a higher income stability or less jobs at risk, but jointly the selected alternative is perceived as performing better.

Criteria/Management Alternatives	Business as Usual	Adaptation	Insurance	Adaptation and insurance
Annual average benefit for the total fleet	€	€	€€€	€€€
Income stability (SD)				
Number of jobs at risk (% total)				
Risk of fishery collapse 0= no risk 1= max. risk				
Insurance premium			€€€€€ €€€€€	€€€€€ €€

Resources

- **General:** MareFrame DSF Gulf of Cádiz http://mareframe.mapix.com/gulf-of-cadiz.html
- **Research:**
  Rincón, M.M., Mumford, J.D., Levontin, P., Leach, A.W. and Ruiz, J. (2016), The economic value of environmental data: a notional insurance scheme for European anchovy. ICES Journal of Marine Science, 73(4):1033-1041.
  Ruiz, J. Rincón, M.M., Castilla, D., Ramos, F., García del Hoyo, J.J. (2017), Biological and economic vulnerabilities of fixed TACs in small pelagics: An analysis of the European Anchovy in the Gulf of Cádiz. Marine Policy, 78: 171-180.

Key Takeaways

- There are better alternatives than the present management of the stock.
- These alternatives provide better economic and biological sustainability.
- They can be implemented by transparent and user friendly tools to the stakeholders.

http://bit.ly/CaseStudySWW

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MareFrame

Co-creating Ecosystem-based Fisheries Management Solutions

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www.mareframe-fp7.org/