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THE DEPARTMENT OF  
AGRICULTURE, FISHERIES & FOOD  
AN ROINN TALMHAÍOCHTA, IASCAIGH AGUS BIA



*Marine Institute*  
Foras na Mara



*Casadh na Taoide*

## **Beaufort Award**

# **Ecosystem Approach to Fisheries Management (EAFM)**

## **Work Programme**

- WP.1 Ecosystem Definition**
- WP.2 Baseline Information**
- WP.3 Fishing Impacts and Approaches to Management**
- WP.4 Inter-Species Interactions: Impacts of Top Marine Predators**
- WP.5 Ecological Modelling**
- WP.6 Decision Making Framework**
- WP.7 Stakeholder Engagement / Tools for Consensus Building**
- WP.8 Economic Evaluation**
- WP.9 Synthesis**
- WP.10 Management Plans**
- WP.11 Project management**

<b>WORK PACKAGE No.:</b>	WP 1
<b>Work Package Title:</b>	Ecosystem Definition
<b>WP Leader:</b>	Paul. Connolly
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To select a suite of candidate ecosystem areas that represent a range of ecosystem scales and that might be used to develop EAF for the waters around Ireland</li> <li>• To develop a pragmatic criteria for the selection and evaluation of the boundaries of these ecosystem areas</li> <li>• To select a final set of ecosystem areas for the project based on these criteria and that ensure a match between the fisheries management boundaries and ecosystem area boundaries</li> <li>• To identify human activities and their impacts in each of the Ecosystem areas</li> <li>• To identify relevant stakeholders in each Ecosystem areas</li> <li>• To identify relevant oceanographic, biogeographic, ecological, management and policy areas for these ecosystem areas and synthesise into Ecosystem descriptions</li> <li>• To identify candidate ecosystem components (indicators) which are important to the health of the Ecosystems areas</li> <li>• To provide a first crude estimate on the health of each ecosystem based on the ecosystem components (indicators)</li> <li>• To identify relevant data sets for each Ecosystem area for input to WP 2</li> </ul>	
<b>Deliverables</b>	
D1.1 A set of ecosystem areas that will form the basis for the project D1.2 A set of pragmatic ecosystem selection criteria from a range of scales D1.3 A comprehensive inventory of human impacts in each ecosystem area D1.4 A comprehensive inventory of stakeholder involved in each ecosystem area D1.5 A comprehensive inventory of relevant oceanographic, biogeographic, ecological, management and policy areas for the ecosystem	

<b>WORK PACKAGE No.:</b>	WP 2
<b>Work Package Title:</b>	Baseline information
<b>WP Leader:</b>	Gerry. Sutton
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To mobilise all scientific disciplines to acquire baseline information</li> <li>• To implement best practice in data management and data sharing</li> <li>• To map the case study areas identified in WP 1</li> <li>• To identify best practice in EAF with supporting evidence from academic literature and international case study material</li> </ul>	
<b>Deliverables</b>	
D2.1 Ecosystems Features GIS Atlas Prototype D2.2 Fully functioning Ecosystems Features GIS Atlas D2.3 Report – Review of practical worked examples of the successes and failures of EAF in a global context to identify models of best practice potentially transferable to an Irish context.	

<b>WORK PACKAGE No.:</b>	WP 3
<b>Work Package Title:</b>	Fishing Impacts and Approaches to Management
<b>WP Leader:</b>	Emer. Rogan
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To develop a detailed inventory of the impacts of fishing on target and non target species, habitats and communities in each ecosystem area</li> <li>• To use the Ecological Risk Assessment for Fisheries Impacts (ERAEF) tool for the fisheries in each ecosystem area.</li> <li>• To develop a set of mitigation measures in the form of an action plan for the main fisheries based on the outputs from the ERAEF analysis</li> <li>• To focus on specific approaches to reduce cetacean by catch</li> </ul>	
<b>Deliverables</b>	
D3.1 A detailed list of fisheries impacts on target, non target, habitats and communities for the main fisheries in each ecosystem area D3.2 ERAEF analyses completed for each fishery D3.3 An Action plan for the introduction of various mitigation measures to the main fisheries D3.4 A catalogue of best practice with regard to minimizing discards and by catch D3.5 A stakeholder framework will be established to achieve buy in and uptake for various mitigation measures D3.6 A detailed analyses of cetacean-fisheries interactions D3.7 Spatially explicit cetacean and fisheries distribution maps for mitigation options	

<b>WORK No.:</b>	WP 4
<b>Work Package Title:</b>	Impacts of top marine predators
<b>WP Leader:</b>	M. Cronin
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To assess the trophic interactions between top marine predators and fisheries in Ireland</li> <li>• To determine abundance estimates of pinniped and seabird populations in the study sites</li> <li>• To determine food consumption of pinniped and seabird populations in the study sites</li> <li>• To determine the at-sea distributions of pinnipeds and seabirds in Ireland</li> <li>• To identify the determinants of habitat use by these top marine predators</li> <li>• To quantify the spatial overlap between fisheries and top marine predators in the study sites</li> </ul>	
<b>Deliverables</b>	
D4.1 Spatially explicit top marine predator food consumption estimates. D4.2 Top marine predator foraging distribution maps. D4.3 Quantification of overlap between top marine predators and fisheries in study sites. D4.4 Identification of geographical 'hot-spots' of marine mammal/seabird-fisheries interactions.	

<b>WORK PACKAGE No.:</b>	WP5
<b>Work Package Title:</b>	Ecological Modelling
<b>WP Leader:</b>	K. Farnsworth & R. Rogan
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To provide necessary understanding for setting management objectives both for the short- and long term To adopt participatory and rapid appraisal research methods</li> <li>• To contribute to enabling the adoption of participatory and rapid appraisal research methods</li> <li>• To enable an assessment of the match between fisheries management system boundaries and ecosystems boundaries</li> <li>• To improve collaboration between environmental and fishery management organisations</li> <li>• To improve knowledge on ecosystem impacts and their reversibility</li> <li>• To develop and provide models which can support the work of and guide the thinking in WPs 3, 4, 6 and 10.</li> </ul>	
<b>Deliverables</b>	
<p>D5.1 A computer based model of a fished ecological community based on size-spectrum theory;</p> <p>D5.2 A manuscript for publication describing this and its practical use;</p> <p>D5.3 An analysis of a study area's fished community using the model;</p> <p>D5.4 An advanced education for a PDRA, 3 PhD students and other scientists and students coming into contact with the Work Package.</p> <p>D5.5 A system for spatially resolving computer based models of fished ecological communities based on size-spectrum theory;</p> <p>D5.6 A manuscript for publication describing this and its practical application for a chosen study area;</p> <p>D5.7 An analysis of the spatial ecology of study area's fished community using the model;</p> <p>D5.8 Ecological indicators of community health based on size-spectrum theory;</p> <p>D5.9 A manuscript for publication describing these and their practical use;</p> <p>D5.10 Analysis of a study area's fished community using these indicators, with recommendations;</p> <p>D5.11 Computer based eco-system models of selected areas</p> <p>D5.12 A manuscript on feeding ecology of cetaceans</p> <p>D5.13 Manuscripts on outputs from models for specific areas</p> <p>D5.14 Spatially explicit cetacean food consumption estimates</p> <p>D5.15 Calculation of primary productivity required to sustain top predators</p> <p>D5.16 Likely impact of commercial fisheries on cetaceans.</p> <p>D5.17 Document on feeding requirements of cetaceans and other top predators</p>	

<b>WORK PACKAGE No.:</b>	WP 6
<b>Work Package Title:</b>	Decision making framework
<b>WP Leader:</b>	V. Cummins & M. Mellett
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To identify opportunities and limitations of current policy and legislative frameworks for the advancement of EAF in Ireland</li> <li>• To make recommendations on the science policy interface to ensure uptake of the outcomes of the EAF approach to fisheries research in the Irish fisheries policy and management framework.</li> <li>• To identify how use conflict can be resolved through new governance models that emphasise the potential added value of greater direct stakeholder involvement in the decision making process.</li> <li>• To identify the most appropriate levels for decentralised decisions and actions in line with the principle of subsidiarity, and in the context of enforcement versus compliance scenarios.</li> <li>• To guide the development of tools to improve the relevance of ecosystem models to decision making and management processes.</li> <li>• To influence the development of management plans in WP 10y recommending innovative models for participatory governance and science policy interfaces.</li> </ul>	
<b>Deliverables</b>	
D6.1	Report on legislative, policy, institutional and stakeholder frameworks governing current approaches to fisheries management in Ireland
D6.2	Report on conflict analysis within the Irish fishing industry and recommendations for alternative approaches to decision making
D6.3	Literature review of best practice in approaches to collaborative enquiry
D6.4	Report on research methodology for collaborative enquiry within EAF including process, tools and outcomes.
D6.5	Indicators for monitoring multidisciplinary working processes
D6.6	Organisation of capacity building seminar to promote collaborative enquiry within the Irish EAF project.

<b>WORK PACKAGE No.:</b>	WP 7
<b>Work Package Title:</b>	Stakeholder engagement – Tools for Consensus Building
<b>WP Leader:</b>	Dr Keith D Farnsworth (QUB) & V. Cummins (UCC)
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To coordinate all stakeholder interaction in recognition of stakeholder engagement appearing as a cross cutting theme in a number of other WPs (e.g. WP 3 &amp; 10).</li> <li>• To identify EAF stakeholders' groups and their representatives including practitioners such as fisheries scientists, ecologists, resource managers and economists, governance institutions, public interest, lobby and user groups including fishers and coastal communities, and the general public.</li> <li>• To map and clarify the interrelationships among stakeholders and between stakeholders and the issues.</li> <li>• To engage with representatives of all stakeholders (scientific and industry in particular) external to the project in promoting awareness of successful project activities.</li> <li>• To develop decision support tools to facilitate effective stakeholder participation in and understanding of EAF.</li> </ul>	
<b>Deliverables</b>	
D7.1	D7.1 Report containing the results and analysis of the stakeholder mapping exercise.
D7.2	D7.2 Database of stakeholder contacts (internal project access only).
D7.3	D7.3 Project website.
D7.4	D7.4 Various workshops and publication of any outcomes on website.
D7.5	D7.5 ESF network application submitted.
D7.6	D7.6 Decision support tool(s).

<b>WORK PACKAGE No.:</b>	WP 8
<b>Work Package Title:</b>	Bio-economic modelling and evaluation
<b>WP Leader:</b>	TBC
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To build capacity for bio-economic modelling and evaluation within the EAF Beaufort team to: <ul style="list-style-type: none"> <li>i. Undertake economic evaluation of ecosystem goods and services associated with EAF approach</li> <li>ii. Test the hypothesis that EAF can have a beneficial effect on the local environment and economy</li> <li>iii. Use 'direct use' (e.g. fish, raw materials) and 'indirect non use values' (e.g. ecosystem functions, biogeochemical cycles, energy flows) to capture the components of value associated with marine ecosystems.</li> </ul> </li> </ul>	
<b>Deliverables</b>	
D8.1	Fisheries economist expert working on Beaufort EAF
D8.2	Validated bio-economic models to quantify the indirect values generated by an ecosystems approach
D8.3	Analytical tool for evaluation of the economic impact of EAF
D8.4	Results of analysis of the economic impact of a number of possible different EAF scenarios for the case study areas.

<b>WORK PACKAGE No.:</b>	WP 9
<b>Work Package Title:</b>	Synthesis – Evolving National Fisheries Scientific Advice
<b>WP Leader:</b>	Paul Connolly
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To reform and evolve the Stock Book to deliver more integrated, area based ecosystem advice.</li> <li>• To address the new timing requirements for fisheries scientific advice</li> <li>• To involve third level expertise in the formulation of the advice both through ICES and nationally</li> <li>• To incorporate the results of national and international research projects into advice formulation</li> <li>• To include tacit knowledge of stakeholders into the advice formulation process</li> </ul>	
<b>Deliverables</b>	
D9.1 Recommendations for a new Stock Book format D9.2 New Stock Book format delivered in 2008 et seq. D9.3 Include tacit knowledge of stakeholders into Stock Book advice D9.4 Include research project results into scientific advice formulation D9.5 Increased participation of third level expertise in advice formulation	

<b>WORK PACKAGE No.:</b>	WP 10
<b>Work Package Title:</b>	Management Plans
<b>WP Leader:</b>	Principal Investigator (PI)
<b>Objectives of the Work Package</b>	
<ul style="list-style-type: none"> <li>• To identify the broad issues associated with the fisheries in each ecosystem area</li> <li>• To set the intended outcomes of the fisheries management plans in a set of broad objectives for the fisheries in each ecosystem area</li> <li>• To translate the broad objectives into operational objectives, with direct and practical meaning and against which performance of the fisheries can be evaluated.</li> <li>• To agree on indicators, reference points and performance measures that will ultimately include ecological, social and economic operational objectives.</li> <li>• To formulate a set of rules that achieve each operational objective</li> <li>• To monitor assess and review the management plan for each ecosystem area</li> </ul>	
<b>Deliverables</b>	
D10.1 EAF Management Plan for each Ecosystem area D10.2 Annual Review and Development of EAF Management Plan	

<b>WORK PACKAGE No.:</b>	WP 11
<b>Work Package Title:</b>	Project management
<b>WP Leader:</b>	G. Burnell & V. Cummins
<b><i>Objectives of the Work Package</i></b>	
<ul style="list-style-type: none"> <li>• To ensure that the administrative and technical objectives of the project are met in full in a timely and efficient manner.</li> <li>• To meet the contractual obligations of the Beaufort Award</li> <li>• To ensure good communication among the Beaufort EAF consortium, with the Marine Institute and with external groups.</li> <li>• To oversee the project communication and dissemination strategy</li> <li>• To provide a focal point for any issues arising on the project</li> </ul>	
<b><i>Deliverables</i></b>	
<p>D11.1 Annual financial reports</p> <p>D11.2 Annual technical reports</p> <p>D11.3 Interim technical reports every six months</p> <p>D11.4 Strategic review report in Month 38</p> <p>D11.5 21 progress meetings (every four months) with the EAF Consortium</p> <p>D11.6 Seven annual review meetings between Internal Steering Group and External Review Group</p> <p>D11.7 Implementation of WP8 through collaborative approach with Socio Economic Beaufort and / or separate funding</p> <p>D11.8 Enhanced research capacity through success in sourcing additional funding (e.g. SeaChange and FP7)</p> <p>D11.9 Publication and implementation of Communication and Dissemination Strategy</p> <p>D11.10 Targets for peer reviewed publications and international conference presentations</p>	