

## 2013/MA2/SSGRSP05

The **Working Group on Integrating Ecological and Economic Models (WGIMM)**, chaired by Jörn Schmidt, Germany, J. Rasmus Nielsen, Denmark and Eric Thunberg, USA, and will meet at (venue and dates to be decided) XX–XX 2016, to work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2015	11-12 May	WebEX Conference call	Interim report by 15 April to SSGIEA	Meeting now to be held as a WebEx Conference call.
Year 2016	To be decided	To be decided	Interim report by DATE to SSGIEA, SCICOM & ACOM	
Year 2017			Final report by "DATE" to SSGIEA, SCICOM & ACOM	

The Ecosystem Approach to Fisheries Management (EAFM) is now the basis for Fisheries Management as legally laid out in the United Nation Convention on the Law of the Sea (UNCLOS) and subsequent meetings (Rio 1992, Johannesburg 2002, Rio 2012). The FAO (2003) guidelines for an Ecosystem Based Approach to Fisheries state that the understanding and management of fisheries should explicitly take into account interactions between stocks as well as social and economic considerations. Though it is acknowledged that only human activities can be managed, their optimal management will depend on the ecosystem in which they take place. Hence, the direct and indirect impact of fisheries on the marine ecosystem and vice versa must be assessed and predicted to provide management advice in support of the Ecosystem Based Approach to Fisheries Management. This entails a move from single species to multispecies and to ecosystem assessments, including the explicit incorporation of the economic components. To fulfil the needs for a sound science, tools need to be developed, which take these interactions into account. The aim of this expert group is to collect globally available models, to discuss their further development and to develop a sound basis for evaluating these tools, including testing their robustness. It will also analyse the needed characteristics for the use in advisory context. Another overarching goal is to make most of these models available in an online repository.

### ToR descriptors

ToR	Description	Background	Science Plan topics addressed	Duration	Expected deliverables
a	Collect globally available coupled ecological-economic models and characterize them with respect to their applicability (academic, advice, evaluation)	Serves as the basis for further work of WGIMM and provides deliverables for the wider community		1 <sup>st</sup> year, will be continued over all 3 years	Online Repository with explanation of the different models
b	Develop a framework for evaluation and comparison of these models	Models are a method to evaluate or explore specific hypotheses within systems and such need to fulfil the requirements of every other method of reproducibility		2 <sup>nd</sup> year	White paper of good practice, manuscript for peer reviewed journal
c	Analyse the potential, capability and performance of the models and	Fisheries is increasingly competing for space, especially in coastal		3 years	White paper, manuscript for peer reviewed journal

	frameworks with respect to spatial and regional explicit bio-economic evaluation of fisheries management in context of marine spatial planning and broader cross sector marine management on regional basis	areas, but also for the high seas marine spatial planning will become the basis for decision making in the future		
d	Identify further the data and information required as well as expertise needed for integrated bio-economic modelling of fisheries and application of socio-economic evaluation methods on short and long term basis enhancing the above	The models are increasingly data demanding and the collection and access needs to be harmonized. It will be of crucial importance with respect to limited resources to identify the data, which will be needed to feed the models and to serve as a sound scientific basis for decision making	3 Years	White paper
e	Discuss how different stakeholder groups can be incorporated in the process of model development. These participatory processes will be of increasing importance to “answer the right questions” and to make these models usable beyond the academic sphere	This is also part of ToR a, but needs to be taken explicitly, because it will influence future developments	2 <sup>nd</sup> year	Nested workshops with stakeholders
f	Develop innovative ways of communicating the increasingly complex results from these models to decision makers, but also the wider public	A transparent communication of complex results is the basis to increase literacy of fisheries related issues both for decision makers and the public	3 <sup>rd</sup> year	Schemes for decision support systems

### Summary of the Work Plan

Year 1	Repository set up, general White paper
Year 2	Workshops with stakeholder involvement, peer reviewed publication, white paper on evaluation schemes
Year 3	Decision support schemes

### Supporting Information

Priority	High. There is an increasing demand for the development and evaluation of coupled ecological-economical models in advice giving bodies, including ICES. However, the possibilities to coordinate the expertise of economists, sociologists, and ecologists to develop and evaluate further bio-economic models and management evaluation
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	frameworks is still not fully used. The goal will be to further couple economic and sociological expertise directly with the ecological understanding within ICES and socio-economic scientific communities (e.g. IIFET) to enhance the quality of integrated assessments and the value of the advice.
Scientific justification	<p>The incorporation of bio-economics in fisheries assessment might lead to a better result and an enhanced communication with fisheries industry, fishermen, managers and other stakeholders as the advice could be made on the basis of a deepened understanding of:</p> <ul style="list-style-type: none"> <li>• The economic and sociological incentives of fishermen and industry the bio-economic interaction between different fisheries and both biological and economical consequences of different management scenarios and transaction costs of different policies coupled with the existing sound biological knowledge within ICES;</li> <li>• The complexity of fisheries management evaluation tools which can meet the increased demands for marine spatial planning and broader cross sector marine management evaluation;</li> <li>• The performance, characteristics and scientific and advisory capabilities of the models for application and implementation to give better advice on potentials for implementation.</li> </ul>
Relation to Strategic Plan	The group will directly feed goals 1, 2 and 3 of the ICES strategic plan: “Develop an integrated, interdisciplinary understanding of the structure, dynamics, and the resilience and response of marine ecosystems to change“, „Understand the relationship between human activities and marine ecosystems, estimate pressures and impacts, and develop science-based, sustainable pathways“, „Evaluate and advise on options for the sustainable use and protection of marine ecosystems“.
Resource requirements	No specific resource requirements beyond the need for members to prepare for and participate in the meeting.
Participants	Interested scientists, economic modellers, ecological modellers, SCICOM members, ACOM members, Assessment group members, stock assessment experts (as well as selected stakeholder observers, e.g. RACs and managers).
Secretariat facilities	SharePoint site, secretariat support for reporting.
Financial	None
Linkages to advisory committees	The incorporation of economy in fisheries advice should be of basic interest to ACOM and the general scientific overview and further development of interest to SCICOM.
Linkages to other committees or groups	Assessment groups (ACOM). Scientific methods to enable Integrated Marine Management across sectors and implementing an Ecosystem Based Approach to Fisheries Management has significant scientific focus and is relevant for ICES SCICOM and several ICES groups hereunder.
Linkages to other organizations	Contact and agreement on scientific collaboration has been established with the International Institute of Fisheries Economics and Trade (IIFET).