

WGIPEM – Working Group on Integrative, Physical–biological, and Ecosystem Modelling (Approved by SCICOM/ACOM Forum)

2015/MA2/SSGIEA04

A **Working Group on Integrated Physical-biological and Ecosystem Modelling (WGIPEM)**, chaired by Morgane Travers-Trolet, France and Marie Maar, Denmark*, work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2016	6– 8 June	Brest, France	Interim report by 15 July 2016 to SSGIEA, SCICOM and ACOM	
Year 2017	12-16 June	Oristano (Sardinia), Italy	Interim report by 28 July 2017 to SSGIEA, SCICOM and ACOM	
Year 2018	16-20 April	ICES HQ	Final report by 1 June 2018 to IEASG, SCICOM and ACOM	

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN		EXPECTED DELIVERABLES
			TOPICS ADDRESSED	DURATION	
a	<p>Advance and increase the reliability of Multispecies and Ecosystem models to allow for a strategic advice on an ecosystem based approach. This includes improvement of bench-marking, model stress tests, validation, sensitivity testing approaches and inter-model comparisons.</p> <p>Provide tools and methods like coupled bioeconomic models to enumerate trade-offs between management options.</p>	<p>MS and Ecosystem models are a fundamental tool for understanding ecosystem structure and function and for making forecasts and understanding trade offs. But the lack of evaluation of their performance and sensitivity currently limits their use in an operational context</p> <p>Links to all EG using MS and Ecosystem modelling (e.g. WGSAM, WGIMM, Working Groups on Integrated Assessment)</p>	1.3, 1.4, 3.3, 5.2	annually	<p>Reports on model use in advice, and descriptions of tools and/or methods suitable for assessing model performance in an operational context. Where appropriate peer reviewed publications are envisioned.</p>

b	<p>Identify ways to make the best use of models and model outputs for management purposes. Maintain an interface for the public and scientific community by providing tools, outputs and algorithms through e.g. through the WGIPEM webpage, workshops or conference sessions dealing with stakeholder engagement to finally increase visibility and end-user confidence in coupled physical-biological and ecosystem modelling approaches.</p> <p>Determine the potential use of models to improve sampling strategies and inform survey designers.</p>	<p>Ecosystem models can appear as "too complex" for an unfamiliar public. To facilitate their use for management purposes, it is important to propose tools to help the general understanding of these complex models.</p>	5.2	annually	<p>Annual update of the WGIPEM webpage. Report of the several initiatives describing ecosystem models online.</p> <p>Where appropriate peer reviewed publications are envisioned.</p>
c	<p>Identify gaps in knowledge that need to be closed and spot emerging fields in coupled physical-biological and ecosystem modelling approaches to improve process descriptions and ecosystem responses to anthropogenic and environmental drivers to eventually and on the longer term be able to give model based strategic management advices.</p>	<p>Some aspects of ecosystem models (spatial dimension, human behavior, zooplankton representation, physiology...) still need improvement, and some of those might have a stronger role in the simulated outputs of management scenarios. Research interest will focus first on filling these gaps of knowledge.</p>	1.3, 1.4, 3.3, 5.2	2 years	Report

d	Discuss and provide basis for setting up future scenarios of anthropogenic pressure and climate variability. Based on the different scenarios, provide estimates of ecosystem states, functioning or services. Determine factors influencing species distribution. Discuss overarching interdisciplinary standards to be used in future scenarios.	Scenario testing is one of the core uses of these models, and this will provide the basis for user groups to develop such scenarios – all appropriate modelling EG, in particular SICCME, WGIMM and Working Groups on Integrated Assessment.	1.3, 1.4, 3.3, 5.2	3 years	Reports as appropriate – presentation of likely scenarios at ASC? Peer reviewed publications
e	Improve and develop routines to describe behaviour of species and man and to include evolution and adaptation in coupled physical-biological and ecosystem modelling approaches.	The effects of the choice made for representing behavior/evolution/adaptation can be tested before being integrated in more complex models (all modelers might be interested), by identifying the different options and possibly test them using a stand-alone model			Code made available to the community, associated with a report
f	Advance our understanding of bottom up and top down controls within foodwebs, Identify drivers and rules of trophic coupling, the evolution of cascades and match-mismatch processes.	Fundamental science lying behind the structural and parametric needs for these type of models	1.3, 1.4, 3.3, 5.2	3 years	Peer reviewed conclusions paper
g	Provide tools to improve our understanding of habitat connectivity to support and advice spatial management plans.	Networks of MPA represent a key response to climate change. Understanding the connectivity between these is vital. Connectivity is also essential for defining the spatial structure of stocks and better understanding of the recruitment process. Important for spatial planning EG, and for advise	1.3, 1.4, 3.3	3 years	Summary report, and ASC presentations. Peer reviewed paper

h	Identify and include key physiological processes and mortality sources in models to understand recruitment dynamics, life cycle dynamics and population drivers.	Base line research work to best fit the models to purpose. Linked to all modelling EG	1.3, 1.4, 3.3	Annually	Report, and ASC presentations as appropriate
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Summary of the Work Plan

Year 1	Annual meeting to report on the state-of-the-art of some of the identified topics in ToRb and their related gaps of knowledge – Update of the previous established model code library for sub-routines of biophysical and ecosystem models – Specific workshop on some of the identified topics
Year 2	Annual meeting to report on the state-of-the-art of the identified topics in ToRb, identification of gaps of knowledge and actions to take to fill some of them – Joint meeting with other expert groups – update of the WGIPEM website – Specific workshop on some of the identified topics
Year 3	Final report on the state-of-the-art and gaps of the identified topics in ToRb – Joint meeting with other expert group – Specific workshop on some of the identified topics – update of the WGIPEM website