WGIPEM - Working Group on Integrative, Physical-biological, and Ecosystem Modelling

2018/MA2/IEASG04 The **Working Group on Integrative, Physical-biological, and Ecosystem Modelling (WGIPEM)**, chaired by Marie Maar, Denmark, Solfrid Sætre Hjøllo, Norway, and Sonja van Leeuwen*, Netherlands will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	25-29 March	Bergen, Norway	Interim report by 3 May 2019 to IEASG	
Year 2020	by correspondence	-	No interim report	Marie Maar will stop end 2020 and a new chair Sonja van Leewen will take over during 2020
Year 2021	22-26 March	Brussels, Belgium	Final report by 7 May 2021 to IEASG	

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Improve model interactions between trophic levels by: -investigating the importance of spatio-temporal scales for trophic match–mismatch -assessing human activities effects on ecosystems, including cumulative impacts	Fundamental science lying behind the structural and parametric needs for these type of models. Important for IEA groups and WKEWIEA. Linked to Marine Ecosystem Research Program	2.2, 2.5	Annually	Report or paper on how human activities affecting marine ecosystems can be described in the models Report on knowledge gaps related to improving lower-to-higher trophic level models couplings Seek to establish contact to the social science EGs Where appropriate peer reviewed publications are envisioned
b	Improve lower trohic level models by investigating: - parametrization of functional diversity (community structure, traits) and adaptations - patterns and drivers of plankton phenology	More research is needed to improve model description of diversity, adaptation and traits in lower trophic level models. The bentho-pelagic coupling are important for nutrient and energy fluxes and should be	1.3, 1.9	Annually	Collaborative paper on productivity and drivers across models and ecosystems Where appropriate peer reviewed publications are envisioned

	and productivity across models and ecosystems - bentho-pelagic coupling in models	better described in the models IEA groups, WGZE and BEWG.			
c	Improve higher trophic level models by investigating: -effects of connectivity, climate and habitat on emerging species distribution, to support management and fisheries - key process formulation (mortality, physiological rates...) -movement algorithms	Understanding the connectivity between networks of MPA under unfluence of climate change is vital. Connectivity is also essential to defining the spatial structure of stocks and better understanding of the recruitment process. Fundamental research is needed to improve the description of key physiological processes in models Important for IEA EGs, spatial planning EG, BEWG, WGBIOP, and for advise. In E2E models, movement are essential, and there is a need to assess the characteristics and impacts of each algorithm in different environments (theoretical and/or realistic)	1.3, 1.4	Annually	Collaborative report or paper on the influence of climate on connectivity Collaborative report or paper on movement algorithms used in modelling Appropriate peer reviewed publications are envisioned
d	Assessment of model skill evaluation methods by: -Comparison of existing "guidelines" and metrics of skill assessment using existing examples and applying these methods to models used by the group to conclude on the feasibility of the currently existing approaches and identify possible weakness	The lack of systematic evaluation of ecosystem model performance and sensitivity currently limits their use in an operational and management context. Evaluation is challenged by the complexity of the models themselves, as well as model vs. sparse datasets comparisons, where characterizing different types of variability (mean or trend; interannual or seasonal; rare or extreme events etc.) are needed.	1.3, 5.3	Annually	Review paper on model skill assessments methods together with WGSAM Appropriate peer reviewed publications are envisioned

- investigate uncertainty analysis (structural, parameters, scenarios) including model ensemble	Links to all EG using multispecies and Ecosystem modelling (e.g. WGSAM, WGIMM, Working Groups on Integrated Assessment).

Summary of the Work Plan

Year 1	Annual meeting to report on the state-of-the-art of the topics in ToRa-d, planning of joint papers and specific workshops on selected topics.
Year 2	Annual meeting to report on the state-of-the-art of the topics in ToRa-d and joint meeting with other expert groups. Specific workshop on some of the identified topics.
Year 3	Annual meeting and final report on the state-of-the-art of the topics in ToRa-d, and joint meeting with other expert groups.

Supporting information

Priority	This group's activities will support the ecosystem approach to fisheries science by combining knowledge of physical and biological processes, and modelling expertise that is required to strengthen our understanding of ecosystem functioning. The group will foster the development of and report on the application of "end-to-end" modelling tools (e.g. Atlantis, Osmose, EwE, size-based model). The activities of the group will foster international collaboration and networking amoung established and young scientists in a rapidly evolving science field, and should be given high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	It is envisioned that this group will attract a large community of biologists / experimentalists, and modellers – with an annual meeting attended by some 15–25 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages, but discussion and/or workshop with other groups are envisioned.
Linkages to other committee or groups	There is a very close working relationship with all the groups of IEASG. It is also very relevant to WGSAM, WGBE, WGS2D.
Linkages to other organizations	There are natural linkages to PICES Working Group 40: Climate and Ecosystem Predictability, and Joint IMBeR/Future Earth Coasts Continental Margins Working Group (CMWG), and the group will seek to establish communication with these organizations.