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Resolutions approved in 2018

Workshop on operational EwE models to inform IEAs (WKEWIEA)

2018/2/IEASG01 The **Workshop on operational EwE models to inform IEAs (WKEWIEA)**, chaired by Maria Angeles Torres* (Spain), Maciej Tomczak* (Sweden) and Eider Andonegi* (Spain) will meet in Barcelona, Spain, on 26-30 November 2018 to:

- a) Explore the practicalities of integrating information from existing Ecopath with Ecosim and Ecospace models
- b) Explore their utility towards informing IEA in ICES areas – explore their potential to inform ICES products such as the Ecosystem Overviews, as an integral part of the ecosystem advice

WKEWIEA will report by 31 December 2018 for the attention of the IEASG – SCICOM/ACOM Committees.

Supporting information

Priority	The current activities of this Group of experts will lead ICES into issues related to how ecosystem models, and in particular EwE -Ecospace models, can support informing IEAs for different ICES regions. Consequently, these activities are considered to be aligned with the ICES science plan and have a very high priority.
Scientific justification	EwE models are being used in different regions along the Northeast Atlantic to understand the ecosystem dynamics and the effects of different human activities posing on them. ToR a) will explore how the available information from different ICES ecoregions could be used to feed and maximize the utility of these ecosystem models. Different regional IEA groups withing ICES are using EwE models, but focusing mainly on fisheries as the unique human activity. ToR b) will explore the potential of this EwE-Ecospace models to: <ol style="list-style-type: none"> 1) Simulate the cumulative effects of the different human activities on these ecosystems (fishing, aquaculture, invasive species, tourism, etc.). 2) Simulate the effects of natural stressors (natural environmental variability and climate change) on these ecosystems. 3) ow to use the outputs of these models to best inform IEAs at local, regional and international scale.
Resource requirements	Access to ICES Data Centre. Experts from the ICES Secretariat at the meeting. Getting people both from the data & information centre and from the ecosystem approach section in ICES would be acknowledged.
Participants	20–25 members and guests.
Secretariat facilities	None, since the meeting will be hosted by CSIC in Barcelona.
Financial	No financial implications.
Linkages to advisory committees	Advisory group on ecosystem overviews
Linkages to other committees or groups	ICES IEA regional groups, IEASG, WGSAM, WGIPEM, WGECO
Linkages to other organizations	Ecopath International Initiative, UBC, European Marine Board, FAO

Workshop on methods to develop a swept-area based effort index (WKSABI)

2018/2/IEASG02 The **Workshop on methods to develop a swept-area based effort index (WKSABI)**, chaired by Kai Wieland, Denmark, and Henrik Degel*, Denmark, will be established and will meet at ICES Headquarters, Copenhagen, on 8–9 January 2019 to:

- a) Adopt and agree on an effort estimate based in trawl swept-area, valid for all surveys available in DATRAS, independent of ecoregion and survey
 - i) Check and validate the calculations of missing data of the variables related to the swept-area effort estimates submitted by the different countries and surveys;
 - ii) Propose common strategies to reduce missing data in the crucial variables;
 - iii) Define common calculations, when possible, across surveys and countries;
 - iv) Define species groups for which the swept area estimates should be based on door spread (e.g. cod) or wing spread (e.g. flatfish, marine litter) and those for which swept area derived from bottom trawls may not be used (e.g. pelagic fish) because it does not account for differences in vertical opening in respect to depth and here indices in n/hr should be maintained instead;
 - v) BITS and NeAtl IBTS: Define by survey the first possible year for which the required data checking and interpolation of missing values can be done with a reasonable effort and draft a realistic time line to finish this task;
 - vi) NS-IBTS: Define year (after 2014) by country for which new algorithms for interpolation of missing values should be used and provide updates.
- b) Define and describe i) a size-based indicator, and ii) a marine litter indicator based on this swept-area index:
 - i) Run scenarios based on key changes in variables, in order to assess the robustness of the index and describe caveats and shortcomings of the assumptions;
 - ii) Adopt a methodology for the treatment of the main assumptions to be made

WKSABI will report by **March/April 2019** to the attention of IEASG and DIG.

Supporting information

Priority	
Scientific justification	<p>The importance of swept-area estimation has been strongly emphasized by IBTSWG in 2013 following recommendations by WGISDAA (Working Group on Improving use of Survey Data for Assessment and Advice) in 2012. Swept-area is suggested as an alternative to haul time, because it would remove possible bias resulting from different riggings or gear specifications.</p> <p>The large fish indicator (LFI) is the proportion of total fish biomass of a defined suite of species sampled in a particular survey programme that exceeds a specified threshold length. It is an important community indicator that integrates different stocks in a unique regional indicator. The LFI is one of the DCF indicators and is used by OSPAR in the Ecological Quality Objective (EcoQO), by HELCOM as a core indicators of biodiversity, related to the food webs MSFD descriptor D4 and used in ICES Advice. LFIs may also be used in the future as a standard product in the ICES Ecosystem Overviews and will be calculated every year.</p>
Resource requirements	
Participants	
Secretariat facilities	A meeting room at ICES Q will be facilitated for the dates of the workshop. In addition, assistance from the ICES Data Centre and Advisory Department will be provided.

Financial	No financial implications.
Linkages to advisory and science committees	There are linkages to IEASG, SCICOM, ACOM, and DIG.
Linkages to other groups	EGs coordinating surveys in DATRAS (IBTSWG, BIFS, WGMAL, WGNSSK, WGCSE, WGBEAM)
Linkages to other organizations	JRC, OSPAR, HELCOM

ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea (WGIAB)

2018/MA2/IEASG03 The ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea (WGIAB), chaired by Saskia Otto, Germany, Martin Lindegren, Denmark, Lauréne Pécuchet, Finland, and Matilda Valman, Sweden, will generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	8-12 April	Palma de Mallorca, Spain	Interim report by 29 May 2019 to IEASG	
Year 2020	TBD	Copenhagenm Denmark	Interim report by TBD 2020 to IEASG	
Year 2021	TBD	TBD	Final report by TBD 2021 to IEASG	

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Conduct an ecosystem indicator analysis (combining natural and social sciences) across a number of Baltic Sea sub-systems including (i) robustness testing with respect to confounding multiple stressor effects and management suitability, (ii) threshold determination, and (iii) ecosystem trend and state evaluations.	This ToR will provide sub-system-specific suites of ecosystem indicators and respective thresholds to support the development of Integrated Ecosystem Assessments and Ecosystem-based Fisheries Management. The work relies on previous and ongoing work across HELCOM and ICES EGs, including WGSOCIAL, WGCERP, and SICCOME	1.9, 6.6, 7.1,	1 year	-Research article(s) on ecosystem indicator testing and ecosystem state assessments - Report cards displaying the state of Baltic Sea sub-systems using selected indicator suites - Intermediate results reported in interim reports 2019 and 2020 as well as the final report.
b	Conduct vulnerability analyses for the combined social – ecological system of Baltic Sea sub-systems to the cumulative	This ToR will investigate the consequences of cumulative external threats on the Baltic Sea ecosystems,	6.5	2 years	- Research article(s) on the vulnerability of Baltic Sea sub-systems to cumulative drivers

	effects of climate change, fisheries and eutrophication using an exposure – sensitivity approach.	identifying vulnerable components of both the social and ecological sub-systems as a basis for model-based management strategy evaluation exercises. This ToR relies on previous and ongoing work across ICES EGs, including WGSOCIAL and SICCME			- Intermediate results reported in interim reports 2019 and 2020 as well as the final report. -output to Ecosystem Overview
c	Conduct a multi-model exercise exploring management strategies that best adapt vulnerable social – ecological system components of Baltic Sea sub-systems to the cumulative effects of multiple external drivers.	This ToR will provide important context to management and decision making processes within the Baltic Sea ecosystem-based management landscape.	6.4, 6.5, 7.1	2 years	-Research article(s) on management strategy evaluations of social – ecological systems components to multiple external drivers, - Intermediate results reported in the final report.

Summary of the Work Plan

Year 1	Annual meeting, intersessional work on social- ecological indicator suites development.
Year 2	Annual meeting, intersessional work on vulnerability analyses to multiple external drivers.
Year 3	Annual meeting, intersessional work on management strategy evaluations of vulnerable social-ecological system components.

Supporting information

Priority	WGIAB aims to conduct and further develop Integrated Ecosystem Assessments for the different sub-systems of the Baltic Sea, in support of implementing the ecosystem approach in the Baltic Sea.
Resource requirements	Assistance of the Secretariat in maintaining and exchanging information and requirements data to potential participants. Assistance of especially the ICES Data Centre to collect and store relevant dataseries.
Participants	The Group is normally attended by some 20 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	WGBFAS

Linkages to other committees or groups	WGINOSE, WGNARS, WGEAWESS, WGINOR, WGIBAR, WGCAMEDA, WGSOCIAL, WGMARS, SICCOME, WGCERP
Linkages to other organizations	HELCOM

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

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	16-20 March	Brussels, Belgium	Interim report by 17 April 2020 to IEASG	Marie Maar will stop end 2020 and a new chair will take over during 2020
Year 2021	March/April	Copenhagen, Denmark	Final report by 7 May 2021 to IEASG	

ToR descriptors

ToR	Description	Background	<u>Science Plan codes</u>	Duration	Expected Deliverables
a	<p>Improve model interactions between trophic levels by:</p> <ul style="list-style-type: none"> -investigating the importance of spatio-temporal scales for trophic match-mismatch -assessing human activities effects on ecosystems, including cumulative impacts 	<p>Fundamental science lying behind the structural and parametric needs for these type of models.</p> <p>Important for IEA groups and WKEWIEA.</p> <p>Linked to Marine Ecosystem Research Program</p>	2.2, 2.5	Annually	<p>Report or paper on how human activities affecting marine ecosystems can be described in the models</p> <p>Report on knowledge gaps related to improving lower-to-higher trophic level models couplings</p> <p>Seek to establish contact to the social science EGs Where appropriate peer reviewed publications are envisioned</p>
b	Improve lower trophic level models by investigating:	More research is needed to improve model description of diversity, adaptation and traits in	1.3, 1.9	Annually	Collaborative paper on productivity and drivers across

	<p>- parametrization of functional diversity (community structure, traits) and adaptations</p> <p>- patterns and drivers of plankton phenology and productivity across models and ecosystems</p> <p>- benthic-pelagic coupling in models</p>	<p>lower trophic level models.</p> <p>The benthic-pelagic coupling are important for nutrient and energy fluxes and should be better described in the models</p> <p>IEA groups, WGZE and BEWG.</p>			<p>models and ecosystems</p> <p>Where appropriate peer reviewed publications are envisioned</p>
c	<p>Improve higher trophic level models by investigating:</p> <p>-effects of connectivity, climate and habitat on emerging species distribution, to support management and fisheries</p> <p>- key process formulation (mortality, physiological rates...)</p> <p>-movement algorithms</p>	<p>Understanding the connectivity between networks of MPA under influence of climate change is vital. Connectivity is also essential to defining the spatial structure of stocks and better understanding of the recruitment process.</p> <p>Fundamental research is needed to improve the description of key physiological processes in models</p> <p>Important for IEA EGs, spatial planning EG, BEWG, WGBIOP, and for advise.</p> <p>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)</p>	1.3, 1.4	Annually	<p>Collaborative report or paper on the influence of climate on connectivity</p> <p>Collaborative report or paper on movement algorithms used in modelling</p> <p>Appropriate peer reviewed publications are envisioned</p>
d	<p>Assessment of model skill evaluation methods by:</p> <p>-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</p>	<p>The lack of systematic evaluation of ecosystem model performance and sensitivity currently limits their use in an operational and management context.</p> <p>Evaluation is challenged by the complexity of the models themselves, as well as model vs. sparse datasets comparisons,</p>	1.3, 5.3	Annually	<p>Review paper on model skill assessments methods together with WGSAM</p> <p>Appropriate peer reviewed publications are envisioned</p>

feasibility of the currently existing approaches and identify possible weakness	where characterizing different types of variability (mean or trend; interannual or seasonal; rare or extreme events etc.) are needed.
- 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 among 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 committees 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.

Working Group on Common Ecosystem Reference Points (WGCERP)

2018/MA2/IEASG05 A Working Group on Common Ecosystem Reference Points (WGCERP), chaired by Mary Hunsicker*, USA, Xiujuan Shan*, China, Benjamin Planque*, Norway, and Saskia Otto*, Germany, 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	September 2019	Gothenburg, Sweden	Interim report by 1 December 2019 to IEASG	
Year 2020	November 2020	Same as PICES annual science meeting	Interim report by 31 December 2020 to IEASG	
Year 2021	To be decided	To be decided	Final report by 31 December 2021 to IEASG	Election of new chairs

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Review regional and national policy and management drivers for the establishment of reference points across ICES member nations.	The motivations behind establishment of reference points vary between nations. This needs to be described and understood before developing common reference points.	6.2, 6.3	year 1	Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e
b	Review previous efforts to identify suitable ecological/ecosystem indicators relevant to fisheries management in the ICES areas. (Year 1)	Some reference points for ecological/ecosystem indicators already exist. They need reviewing in the light of ToR a) before developing common reference points.	5.3, 6.1	Year 1	Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e
c	Produce shortlist a set of indicators that are applicable in most systems studied and cover: single populations, communities, trophic interactions, food webs and spatial distributions.	Some indicators have been (or have the potential to be) used in many different ecosystems. Building on work by e.g. WGECCO, OLAS II , OSPAR, these key indicators need to be shortlisted before reference points can be evaluated.	1.3, 6.2, 6.6	Year 1	Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e
d	When ecosystem reference points already exist, identify the methodology used for their determination.		1.3, 6.2	Year 1	Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e
e	When ecosystem reference points already		1.3, 2.2, 6.2	Year 1	Report of the review in ICES or

	exist, identify if they could change (or have already changed) under different climatic or ecological regimes				as peer reviewed publication. Combined review based on ToRs a-e
f	Develop conceptual models to examine ecosystem drivers (climate forcing, fishing) and responses using selected ecosystem reference points.	Ecosystem indicators are attached to mental (conceptual) models of ecosystems. The conceptual models need to be explicitly presented together with the reference points.	1.3, 2.2, 6.2	Year 2	Contribution to ICES ecosystem overviews through the provision of conceptual models of ecosystem functioning.
g	Establish a framework to test the performance of the selected indicators and of the calculation of the associated reference points, using simulated data.	Similar to what is done in MSE (management strategy evaluation), ecosystem reference points need to be evaluated through simulation studies...	4.1	Year 2	Report within ICES and as peer reviewed publication. Combined with ToR h.
h	Evaluate the performance of selected - existing and proposed - ecosystem reference points for single species populations, communities, trophic interactions, food webs and spatial distributions in the ICES areas.	...and these simulation studies should be performed on a set of representative case studies.	4.1, 5.1, 5.3	Year 3	Report within ICES and as peer reviewed publication. Combined with ToR g.
i	Identify ecosystem components that respond rapidly to changes in biophysical drivers and could potentially serve as indicators of loss of resilience and ecosystem change.		1.3	Year 3	
j	Provide a set of recommendations for integrated assessment working groups and Ecosystem overviews for the definition of ecosystem indicators and their limit reference points.	IEA groups thrive to produce quantitative assessments of ecosystem state that are well grounded in policy, scientifically sound, experimentally tested and interpretable in a management context.	6.1, 6.3, 6.6	Year 3	Recommendations to ICES IEA groups and for the further development of Ecosystem Overviews. Peer review publication.

Summary of the Work Plan

Year 1	Review and synthesis of existing policy drivers and methodological developments for ecosystem indicators and associated reference points to support EAFM/EBFM in the ICES areas.
Year 2	Develop methodologies to assess the performance of ecosystem indicators and associated reference points.
Year 3	Evaluate the the performance of ecosystem indicators and associated reference points in selected case studies. Use the results as a basis to provide guidelines to IEA groups for establishing ecosystem

reference points.

Supporting information

Priority	Legal national and international frameworks such as the EU MSFD , ELCOM and OSPAR convention require the determination of ecosystem status based on indicators and their reference points. While the selection of suitable indicators has advanced substantially the determination of reference points is still debated and presently lacking clear management and scientific underpinning. Thus the priority should be considered high. The work planned in WGCERP will directly address ICES science priority area 6 Developing tools, knowledge and evidence for effective conservation and management and some elements of priority are 2 (Understanding ecosystems) and 3 (Impacts of human activities).
Scientific justification	ICES groups on integrated ecosystem assessment provide a number of indicators of ecosystem status and trend to support ecosystem based fisheries management, also through inclusion in the Ecosystem Overviews. Earlier, ICES Expert Groups have recognised that for these indicators to be used in a management framework, there is a need for the establishment of reference points. The scientific background for reference points is well established for single species. A similar scientific effort is required to support the establishment and evaluation of reference points for ecosystem/ecological indicators.
Resource requirements	No major resourcing
Participants	Researchers from across the ICES network.
Secretariat facilities	Support for meetings at ICES Q, when appropriate.
Financial	No financial implications for ICES.
Linkages to ACOM and groups under ACOM	Link to ACOM through the development of Ecosystem Overviews and advice.
Linkages to other committees or groups	Within ICES links across all ICES IEA working groups and to WGEKO, WGBIODIV, JWGBIRD, WGCOMEDA. The planned work of WGCERP build up from previous ICES workshop, namely WKFooWI, WKFISDIS and WKECOFRAME.
Linkages to other organizations	Links to PICES Working Groups working on similar topics (WG36 WG28, WGCEP, S-CCME WGNPESR).

ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment (IEA) for the Central Arctic Ocean (WGICA)

2018/MA2/IEASG06 A Joint ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment of the Central Arctic Ocean (WGICA), chaired by John Bengtson (USA), Sei-Ichi Saitoh (Japan), and Hein Rune Skjoldal (Norway) 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	8-10 May	Sapporo, Japan	Interim report by 1 September 2019 to IEASG	
Year 2020	To be decided	To be decided	Interim report by 1 September 2020 to IEASG	
Year 2021	To be decided	To be decided	Final report by 31 December 2021 to IEASG	Change of chairs

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Review and consider approaches and methodologies for conducting an IEA of the CAO ecosystem.	WGICA has produced a first version IEA report for the CAO. Before producing an updated and extended version, the basic approach and methodologies should again be considered.	2.2, 6.1, 6.5	Year 1	Report outcome in the 2019 interim report.
b	Review and report on ongoing and recent changes and events in the CAO ecosystem associated with changes such as in sea ice, oceanographic circulation, and hydrographic properties.	There is a need to follow developments in the CAO resulting from the predicted further loss of sea ice and other physical changes associated with global climate change.	1.1, 2.2, 6.5	Years 1-3	New information will be reported in interim reports in 2019 and 2020. A more full account will be given as part of a second version IEA report for the CAO in 2021.
c	Continue to examine effects of climate change on the CAO ecosystem by compiling and reviewing information on changes in response to the ongoing 'Great melt', and assess likely consequences to the CAO ecosystem of projected future changes associated with further loss of sea ice and other climate-related changes (i.e. a climate impact assessment).	This activity was started in the first 3-year period, and some information is included in the 2018 IEA report. There is a need to continue and carry out a more detailed assessment of the documented and/or inferred biological and ecological changes associated with the large physical changes that have already taken place (e.g. loss of half the area and $\frac{3}{4}$ of volume of summer sea ice).	1.1, 1.3, 6.1, 6.5	Years 1-3	Progress will be reported in interim reports in 2019 and 2020. A more full account will be given as part of the new version of the IEA report for the CAO in 2021.

d	Assess the consequences of recent and ongoing climatic and oceanographic changes on transport pathways (physical and biological) and potential effects of contaminants in the CAO ecosystem.	This is a new activity which relates to assessment of pollution in the CAO. Pollution can be expected to be one of the more serious threat to the CAO ecosystem and should be included in an IEA.	2.1, 2.5, 6.1	Years 2, 3	Progress will be reported in interim report in 2020. Aspects of pollution will be included in the new IEA report for the CAO in 2021.
e	Review and report on new studies on fish as well as other biological components of the CAO ecosystem.	The information on many parts of the CAO ecosystem is still limited. New information is expected to come over the next few years as research ice-breakers pay more attention and use scientific echosounders and other observation techniques to record fish and other organisms in the water column and at the seafloor.	5.2, 6.1, 6.5, 6.6	Years 1-3	Progress will be reported in interim reports in 2019 and 2020. A more full account will be given as part of the new version of the IEA report for the CAO in 2021.
e	Continue to identify priority research needs and monitor how identified knowledge gaps (needed to improve IEA and management effectiveness) are being addressed and filled.	A by-product of doing the first version IEA of the CAO is a priority list of research needs. It is necessary to monitor how knowledge gaps are filled that will improve new versions of IEA.	1.3, 2.2, 3.1, 6.1, 6.5	Years 2, 3	Progress will be reported in the interim report in 2020 and outcome reported in 2021.
f	Prepare an Ecosystem Overview for the CAO ecosystem	This will be an addition to the series of Ecosystem Overviews prepared by ICES.	6.5, 6.6	Years 2, 3	Draft version will be reported in the interim report in 2020 and final version reported in 2021.

Summary of the Work Plan

Year 1	Review IEA methodologies for IEA of the CAO. Review and report new information and changes in the CAO ecosystem.
Year 2	Review and report new information and changes in the CAO ecosystem. Address pathways and effects of contaminants, make an initial list of research needs, and prepare draft Ecosystem Overview.
Year 3	Prepare a second version IEA report for the CAO with information on status and trends, including impacts of climate change, pollution, and other relevant human pressures. Report on research needs and prepare final draft of Ecosystem Overview.

Supporting information

Priority	<p>WGICA is one of several groups in ICES that do integrated ecosystem assessments, which is one of the priority action areas for ICES. Being a WG for the central Arctic Ocean, WGICA also contributes to the Arctic research action area. Jointly sponsored by PICES and the PAME working group of the Arctic Council, WGICA represents a collaborative effort that links ICES work in the wider Arctic Mediterranean Sea (the Nordic Seas and the central Arctic Ocean) with expertise on the Pacific Arctic through PICES.</p> <p>The work planned in WGICA will directly address ICES science priority area 6 Developing tools, knowledge and evidence of effective conservation and management and some elements of priority area 2 (Understanding ecosystems) and 3 (Impacts of human activities).</p>
Scientific justification	<p>ICES IEA EGs provide science based assessments of ecosystem status, trends and vulnerabilities to support implementation of the ecosystem approach to management.</p> <p>ToR a – The CAO is a data-deficient system where much of the data and knowledge comes from research activities, while monitoring is a more limited source of information. Based on the first version IEA report for the CAO, as well as experiences from the other IEA WGs in ICES, the approach and methods for IEA for the CAO will be considered prior to producing a second version IEA report in 2021.</p> <p>ToR b – The CAO is on a trajectory of reduction of sea ice with considerable interannual variability. Trends and events will be reported to draw attention to the ongoing changes in the CAO.</p> <p>ToR c – The purpose and aim of this item is to provide a careful evaluation and summary of what we can say about the biological and ecological effects of climate change over the recent decades up to present. This can in turn be used for projections of likely effects of continued warming and loss of sea ice over next decades.</p> <p>ToR d – This item addresses pollution with focus on contaminant pathways (physical and biological) and potential effects in foodwebs of the CAO. The scale of activity will depend on the expertise available in the WG.</p> <p>ToR e – It is expected that new information will be forthcoming on occurrence of fish and other biota in the CAO from planned research activities. There is for instance increased awareness that scientific echosounders on research ice-breakers can provide valuable information. We will report on developments and include new information in the next IEA report.</p> <p>ToR d – This is an item meant to provide guidance to the research community at large on priority research issues to improve the knowledge base for continued IEA work.</p> <p>ToR e – This will add to the suit of Ecosystem Overviews prepared and published by ICES.</p>
Resource requirements	No major resourcing.
Participants	Experts from ICES, PICES, and PAME
Secretariat facilities	Support for meetings at ICES HQ, when appropriate.
Financial	No financial implications for ICES.
Linkages to ACOM and groups under ACOM	Link to ACOM through the development of Ecosystem Overviews and advice.
Linkages to other committees or groups	Within ICES links across all ICES IEA working groups and to HAPISG EGs on human pressures on marine ecosystems, such as pollution.
Linkages to other organizations	This is a joint ICES, PICES, and PAME WG.

Second Workshop on integrated trend analyses in support to integrated ecosystem assessment (WKINTRA2)

2018/2/IEASG07 **The second Workshop on integrated trend analyses in support to integrated ecosystem assessment (WKINTRA2)**, chaired by Saskia Otto, Germany, and Benjamin Planque, Norway, will meet in Gothenburg, Sweden, on 13–15 September 2019.

The general objective of the workshop is to develop good practices in the application of integrated trend analyses (ITA) and interpretation of their results for integrated ecosystem assessment. The workshop will:

- a) Identify key properties of multivariate ecological datasets that need to be reproduced in simulated data ([Science plan codes](#) 4.1, 4.2, and 6.5);
- b) Identify simulation approaches that can be used to produce a set of contrasted multivariate ecological time-series ([Science plan codes](#) 4.1, 4.2, and 6.5);
- c) Generate simulated datasets and anonymously archive them, together with relevant meta-data, for the purpose of further ITA evaluations ([Science plan codes](#) 4.1, 4.2, and 6.5).

WKINTRA2 will report by 15 November 2019 for the attention of IEASG.

Supporting Information

Priority	The use of ITA is widespread in the ICES integrated ecosystem assessment community, and recent publications have challenged the interpretation of its results. Thus, the priority should be considered medium to high.
Scientific justification	The first workshop on integrated trend analyses in support to integrated ecosystem assessment (WKINTRA) recognized some of the limitations in the ITA methods currently used as a standard tool by ICES IEA groups. It was recommended to approach the evaluation problem through simulation studies, in a way similar to that used earlier in ICES for stock assessment models (ICES, 1993). The second workshop (WKINTRA2) will develop and compare numerical simulation protocols and algorithms, with the aim of simulating few contrasted ecosystem datasets. These will form the basis of ITA methods evaluation. ICES 1993. Reports (3) of the working group on "Methods of fish stock assessment". Report No. 191. pp. 249. https://doi.org/10.17895/ices.pub.4607
Resource requirements	No major resourcing
Participants	Statisticians and researchers from across the IEASG network.
Secretariat facilities	None.
Financial	No financial implications for ICES.
Linkages to advisory committees	Link to ACOM through the development of ecosystem overviews
Linkages to other committees or groups	Links across all ICES IEA working groups
Linkages to other organizations	Links to IEA groups in the Arctic and PICES Working Groups working on similar topics.

Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholder Participation (WKKEMSSP)

2018/2/IEASG08 The **Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholder Participation (WKKEMSSP)** within the ICES Working Group on Integrated Assessments of the North Sea (WGINOSE), chaired by Andrea Belgrano, Sweden, Andrew Kenny, UK, and Erik Olsen, Norway will be established and will meet in Gothenburg, Sweden, 22 May 2019 to scope for key ecosystem interactions and future modelling scenarios for human use that are most relevant to stakeholders and managers in the Kattegat. Specifically, WKKEMSSP will:

- a) Contribute to developing strata specific decision support tools (WGINOSE ToR d) by developing and exploring scenarios for future conditions and human use of the Kattegat sea area using the Mentalmodeller tool, a scoping tool that allows transparent stakeholder participation in identifying key links between the natural ecosystem, pressures, human activities and management objectives.

WKKEMSSP will report by June 2019 for the attention of the IEASG Committee.

Supporting information

Priority	WKKEMSSP is essential to WGINOSE to be able to deliver on its ToRs and subregional analysis of the North Sea ecosystem
Scientific justification	Term of Reference a) This workshop is a part of the regionalization of Integrated Ecosystem Assessment carried out by the WGINOSE group. Kattegat is one of 14 subregions of the North Sea for which WGINOSE is developing separate models and analyses to evaluate trends, ecosystem state and pressures.
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	10 – 20 participants will be expected.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	There are no obvious direct linkages with the advisory committees.
Linkages to other committee: or groups	WGINOSE, WGIBAR, WGINOR, WGIAB
Linkages to other organizations	NOAA IEAs

Workshop for the production of the Azorean Ecoregion Ecosystem Overview (WKAZOREco)

2018/2/IEASG09 A Workshop for the production of the Azorean ecoregion Ecosystem Overview (WKAZOREco), chaired by Mário Rui Pinho, Portugal and Maria de Fatima Borges, Portugal will meet in Horta- Faial (Azores, Portugal), on 28-31 May 2019 to:

- (a) review the available content drafted (intersessionally) by ICES expert groups for the Ecosystem Overview (EO) of the ICES Azorean Ecoregion, summarise when needed and fill in the gaps;
- (b) prepare a complete draft ecosystem overview (EO) for this ecoregion taking into account the ICES technical guidelines for EOs and previous EOs published;
- (c) Produce a conceptual model that links Activities-Pressures-State for the Azorean region with a method that is traceable and transparent;
- c) list gaps in knowledge and provision of current or future operational products required to regularly update the EO.

In their work, WKAZORECO shall describe the main environmental drivers for the Azorean region, by linking the main Azores-specific human activities to pressures in the ecosystem. The workshop will use the identified pressures, and link them to the state/impact of the Azorean ecosystem components (substrate, foodwebs, productivity, zooplankton, benthic habitat, fish, marine mammals and seabirds). When possible/appropriate temporal trends of the each ecosystem component should also be described.

Address the climate change issues according to the new guidelines updated in ADGECO (2018).

To the extent possible, the new overview should take into account agreements reached during the WKEO3 (April 2019).

The ICES EOs are integral part of ICES strategic plan to implement ecosystem approach in the ICES regions. As such, the Azorean EO will contribute to implement an ecosystem based management (EBM) in the region and will be aimed at informing both the scientific community as well as assisting Regional Seas Commissions and policy makers.

WKAZOREco will report to the attention of ACOM and SCICOM by 14 of June of 2019.

Supporting information

Priority	<p>The overviews are seen as a progression towards operational implementation of the ecosystem approach and as such are aimed at informing expert working groups and assisting Regional Seas Conventions and policy makers. ACOM aims to develop this product for all ICES Ecoregions.</p> <p>This workshop is an essential step to underpin a sound scientific basis for the Azorean ecoregion by recording sources and discussions on the decisions. The work of this workshop will feed directly into Advisory process and will allow comparison between published ecoregions. Consequently, these activities are considered to have a very high priority.</p>
Scientific justification	<p>Environments and ecosystems vary over time, sometimes with a trend and sometimes with a step change. The regional ecosystem overviews are intended to provide advisory groups with information on natural variability, trends and step changes in the dynamics of their respective ecosystems based on the best available evidence that are expected to influence the advice.</p> <p>They will also summarise the impacts that human activities have on the state of living and non-living resources of the ecosystem components through the main ranked pressures in the region. This information needs to consider both spatial and temporal variability, with priority given to changes that would lead to the most significant modifications to the advice.</p> <p>To support emerging policy developments, those developing advice on the impacts of specific sectors (e.g. fisheries catch options, contaminants, bycatch, seabird abundance, sensitive areas etc) will need to understand and respond to the implications of their advice for a range of ecosystem components and attributes, with priority given to those impacts that may compromise known management objectives.</p> <p>This development of ecosystem overviews is one of a number of ICES initiatives to integrate the advice on managing human's impacts on marine ecosystems of the ICES area; ICES still does not have a good understanding of the distribution and scale of anthropogenic pressures across the marine system or a suitable ensemble of tools available to estimate their cumulative effects.</p> <p>The process will be iterative with a number of phases which will increase the relevance, impact and quality of the ecosystem overviews.</p>
Resource requirements	ICES data centre, secretariat and advice process.
Participants	The participation will be aimed to reflect the scientific diversity needed to fulfill the objectives of the workshop. If requests to attend exceed the meeting capacity available ICES reserves the right to allocate participants based on the experts' relevant qualifications. Participants join the workshop at national expenses. Participation of stakeholders is not committed.
Secretariat facilities	Data Centre, Secretariat support and meeting room
Financial	No financial implications.
Linkages to advisory committees	The Ecosystem Overviews are part of the ICES advice and the products of the workshop will enter into the ICES Advisory process to be approved by ACOM.
Linkages to other committees or groups	Several ICES working groups may contribute with text and data to the content of this EO (WGDEEP, WGWIDE, WGMME, WGBIRDS, WGZE, BEWG, WGITMO, WKEO3, WKOFFSORE etc) as well as ACOM and SCICOM.
Linkages to organizations	The work of this group may be used or is closely aligned with work under OSPAR, the EEZ/NEAFC and National Programmes.

Workshop for the production of the Oceanic North East Atlantic Ecoregion Ecosystem Overview (WKABNJ)

2018/2/IEASG10 WKABNJ- Workshop for the production of the Oceanic North East Atlantic Ecoregion Ecosystem Overview

A Workshop for the production of the Oceanic North East Atlantic ecoregion Ecosystem Overview (WKABNJ), chaired by Francis Neat, UK and Odd Aksel Bergstad, Norway, will meet in Copenhagen (Denmark), on 2-4 September 2019 to:

- (a) Review the content gathered and drafted (intersessionally) by the chairs, including ICES work in the ABNJ, for the Ecosystem Overview (EO) of the Oceanic North East Atlantic ecoregion and identify knowledge gaps;
- (b) Prepare a complete draft ecosystem overview (EO) for this ecoregion in line with the ICES technical guidelines for EOs and previous EOs published;
- (c) Produce a conceptual model that links Activities-Pressures-State for the Oceanic-NEA region with a method that is traceable and transparent;
- (c) List gaps in knowledge and provision of current or future operational products required to regularly update the EO.

In their work, WKABNJ shall describe the main environmental drivers for the ABNJ of the Oceanic NEA region and link the main region-specific human activities to pressures on the ecosystem. The workshop will link these pressures to the state/impact of the Oceanic NEA ecosystem components (substrate, foodwebs, productivity, zooplankton, benthic habitat, fish, marine mammals and seabirds). When possible/appropriate temporal trends of each ecosystem component will also be described.

Address the climate change section according to the new guidelines updated in ADGECO (2018).

To the extent possible, the new overview should take into account agreements reached during the WKEO3 (April 2019).

The ICES EOs are integral part of ICES strategic plan to implement the ecosystem approach. The Oceanic NEA EO will contribute to implementing ecosystem based management (EBM) in the region and will be aimed at informing both the scientific community as well as states and intergovernmental management authorities and organizations.

WKABNJ will report to the attention of ACOM and SCICOM by 20 September 2019.

Supporting information

Priority	<p>The overviews are seen as a progression towards operational implementation of the ecosystem approach and as such are aimed at informing expert working groups and assisting Regional Seas Conventions and policy makers. ACOM aims to develop this product for all ICES Ecoregions.</p> <p>This workshop is an essential step to underpin a sound scientific basis for the management of the ABNJ by recording sources of information and discussions on the decisions by the experts. The work of this workshop will feed directly into the Advisory process and will allow comparison between published ecoregion EOs. Consequently, these activities are considered to have a very high priority.</p>
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Scientific justification	<p>Environments and ecosystems vary over time, sometimes with a trend and sometimes with a step change. The regional ecosystem overviews are intended to provide advisory groups with information on natural variability, trends and step changes in the dynamics of their respective ecosystems based on the best available evidence that are expected to influence the advice.</p> <p>They will also summarise the impacts that human activities have on the state of living and non-living resources of the ecosystem components through the main pressures in the region. This information needs to consider both spatial and temporal variability, with priority given to changes that would lead to the most significant modifications to the advice.</p> <p>To support emerging policy developments, those developing advice on the impacts of specific sectors (e.g. fisheries catch options, contaminants, bycatch, seabird abundance, sensitive areas etc) will need to understand and respond to the implications of their advice for a range of ecosystem components and attributes, with priority given to those impacts that may compromise known management objectives.</p> <p>This development of ecosystem overviews is one of a number of ICES initiatives to integrate the advice on managing the human impacts on marine ecosystems of the ICES area. ICES still does not have a good understanding of the distribution and scale of anthropogenic pressures across the marine system or a suitable ensemble of tools available to estimate their cumulative effects.</p> <p>The process will be iterative with a number of phases which will increase the relevance, impact and quality of the ecosystem overviews.</p>
Resource requirements	ICES data centre, secretariat and advice process.
Participants	<p>The participation should reflect the diverse scientific competence needed to fulfill the objectives of the workshop. If requests to attend exceed the meeting capacity available, ICES reserves the right to allocate participants based on the experts' relevant qualifications. Participants join the workshop at national expense. Participation of stakeholders is not committed.</p>
Secretariat facilities	Data Centre, Secretariat support and meeting room
Financial	No financial implications.
Linkages to advisory committees	The Ecosystem Overviews are part of the ICES advice and the products of the workshop will enter into the ICES Advisory process to be approved by ACOM
Linkages to other committees or groups	Several ICES working groups may contribute with text and data to the content of this EO (WGDEEP, WGDEC, WGWIDE, WGMME, WGBIRDS, WGZE, BEW, WGITMO, WKEO3, WKAZOREco etc) as well as ACOM and SCICOM.
Linkages to other organizations	<p>The work of this group may be used or is closely aligned with work under OSPAR, the EEA, NEAFC and National Programmes. Organizations with legal mandates to take binding action in the ABNJ: NEAFC, EU, States, and OSPAR. Additional IGOs of interest to this work: : NAMMCO, IWC, ICCAT, ISA, IMO, some of them with management mandates in the ABNJ.</p>

Workshop on ecological valuing of areas of the Barents Sea (WKBAR)

2018/2/IEASG11 A Workshop on ecological valuing of areas of the Barents Sea (WKBAR), chaired by Adriaan Rijnsdorp, Netherlands, Markku Viitasalo, Finland, and Mariano Koen-Alonso Canada, will meet in Copenhagen, Denmark, on 23-24 May 2019 to:

- a) Agree definitions. Develop a set of criteria that can be used to identify special/valued areas in the Barents Sea.
- b) Propose a candidate framework. Suggest a framework (or frameworks) for identification of special/valued areas in the Barents Sea.
- c) Exemplify the potential for practical use in management. Showcase data products emergent from the framework expected to be readily usable by ocean/fisheries managers in supporting decision making in the Barents Sea in a Marine Spatial Planning context.

Prior to the workshop, the Chairs will prepare a review of the recent work done by the HAV-1 project and the ICES working on the integrated assessment of the Barents Sea (WGIBAR). The review, along with background material will be prepared by chairs and invited experts to address the TORs. Based on interaction with the experts the group of chairs will ensure the completion of the workshop report.

ICES WKBAR will report to the attention of ACOM by 3 June 2019.

Supporting information

Priority	High, in response to a special request from the Joint Norwegian-Russian Commission on Environmental Protection, Norwegian-Russian Working Group on Marine Environment.
Scientific justification	<p>The ongoing implementation of ecosystem-based management approaches in the Barents Sea includes Marine Spatial Planning as one of the tools expected to be used for integrated management. In this context, identification and delineation of ecologically special/valued areas, as well as their regular updating and mapping, constitute key pieces of information for the spatial management of human activities. At the present time there is no agreed definition of what constitutes an ecologically special/valued area nor a common framework to identify, delineate and/or update them. Therefore, this workshop will:</p> <p>TOR a “Agree definitions”. Based on the work of the HAV-1 project and the ICES working on the integrated assessment of the Barents Sea (WGIBAR), allow:</p> <ol style="list-style-type: none"> i. Development of an ICES review summarizing the criteria and approaches used to define special/valued areas in the Barents Sea. ii. Agreement on a definition of value, and criteria to identify special/valued areas. <p>TOR b “Propose a candidate framework”. Suggest a framework (or frameworks) for identification of special/valued areas in the Barents Sea that makes the best use possible of existing data streams, provides a structured operational mechanism for integration of these multiple data sources, and allows for regular updating. The framework should:</p> <ol style="list-style-type: none"> i. identify a methodology(s) for the selection of biological/ecological components, and setting the valuation criteria and rules to score area/habitat value and aggregate scores across components. ii. be based on environmental value of several ecosystem components, including: seabirds, fish, benthic organisms/habitats and marine mammals. iii. establish a common approach to map special/valued areas. iv. be able to accommodate seasonal or monthly frequency “windows”, to consider traits related to “Special importance for life history stages of species” in line with the CBD EBSA criteria.

	TOR c “Exemplify the potential for practical use in management”. Showcase data products emergent from the framework expected to be readily usable by ocean/fisheries managers in supporting decision making in the Barents Sea in a Marine Spatial Planning context. This should be demonstrated by: <ol style="list-style-type: none"> i. use of worked examples to identify potential data flows and data management best practices ii. guidance to ensure data products can be disseminated as web-based maps for decision-makers in Norway and Russia and others it may concern
Resource requirements	ICES Data Centre and ICES Secretariat.
Participants	Workshop with researchers If requests to attend exceed the meeting space available ICES reserves the right to refuse participants. Choices will be based on the experts' relevant qualifications for the Workshop. Participants join the workshop at national expense.
Secretariat facilities	Data Centre, Secretariat support and meeting room
Financial	None
Linkages to advisory committees	Direct link to ACOM and SCICOM.
Linkages to other committees or groups	Links to WGIBAR
Linkages to other organizations	none

Workshop on Challenges, Opportunities, Needs and Successes for including human dimensions in IEAs (WKCONSERVE)

2018/2/IEASG12 A Workshop on Challenges, Opportunities, Needs and Successes in including human dimensions in IEAs (WKCONSERVE), chaired by Alan Haynie, USA, Jörn Schmidt, Germany, Mette Skern-Mauritzen, Norway, and Eva-Lotta Sundblad, Sweden will meet on **8–10 October 2019** in ICES HQ Copenhagen, Denmark to:

- a) Summarize social and economic data, indicators and relevant research done across ICES IEA regions and other IEA regions, including in ICES Groups (WGSOCIAL; WGECON, WGSEDA, WGRMES, WGMARS) (Science Plan codes 6.4, 7.1, 7.3)
- b) Identify goals for including social and economic data and analyses in IEAs (Science Plan codes 6.5, 6.6, 7.2)
- c) Develop a roadmap for including social and economic data and analyses in IEAs (Science Plan codes 6.5, 6.6, 7.2).

WKCONSERVE will examine the current status of economics and social sciences across ICES IEA groups, assess needs and opportunities for greater integration, and develop practical steps to do this across the ICES area.

ICES WKCONSERVE will report to the attention of IEASG by **31 October 2019**.

Supporting information

Priority	High; this WK is seen as strategic for the development of IEA groups in the ICES area and in advancing the integration of the human dimension in IEAs and in ICES more generally. WKCONSERVE aims to bridge the SIHD and IEA communities to develop tools to improve the ICES community's ability to provide advice in the context of the ecosystem-based approach to management.
Resource requirements	Assistance of the Secretariat in maintaining and exchanging information and requirements data to potential participants.

Participants	Chairs and members of IEASG and SIHD-related expert groups
Secretariat facilities	ICES Headquarters meeting room; SharePoint site, secretariat support with rooms and for reporting
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	IEASG groups are ACOM/SCICOM groups, the WK is relevant for the next generation of Ecosystem Overviews and Fishery Overviews.
Linkages to other committees or groups	WGINOSE, WGNARS, WGEAWESS, WGINOR, WGIBAR, WGCAMEDA, WGIAB, WGSOCIAL, WGMARS, WGECON, WGICA, WGIPEM, WGSEDA, WGRMES
Linkages to other organizations	IIFET, MARE, PICES, IMBER, MSEAS, NOAA IEA.

Working Group on Integrated Assessment of the Norwegian Sea (WGINOR)

2018/MA2/IEASG13 The Working Group on Integrated Assessment of the Norwegian Sea (WGINOR), chaired by Per Arneberg, Norway and Anna H. Ólafsdóttir*, Iceland, 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 November	Bergen, Norway	Interim report by 15 January 2020 to IEASG	New incoming Co-Chair, Anna . Ólafsdóttir, Iceland
Year 2020	23-27 November	Tórshavn, Faroe Island	Interim report by 15 January 2021 to IEASG	
Year 2021	22-26 November	Reykjavík, Iceland	Final report by 15 January 2022 to IEASG	

Terms of Reference a) – f):

ToR	Description	Background	Science Plan Codes	Duration	EXPECTED Deliverables
A	Perform integrated assessment of the pelagic ecosystem in the Norwegian Sea and develop a framework for identifying warning signals for management.	Addresses needs in the Science Plan for developing understanding of the ecosystem and its responses to human impact and other challenges. In addition, start developing a framework for ecosystem-based advice that can be used by WGWIDE, OSPAR and similar recipients.	6.5	years 1-3	WG report to SCICOM and ACOM January following each year

b	Utilize multispecies and ecosystem models to evaluate effects of single and multispecies harvest control rules on fishing yield and ecosystem state of the pelagic ecosystem in the Norwegian Sea.	Addresses needs in the Science Plan for developing ecosystem-based advice for sustainable use of marine ecosystems resources.	5.3	years 2-3	WG report to SCICOM and ACOM January following year 2 and 3
c	Initiate development of forecast products (1-5 years) for key indices of ocean climate in the Norwegian Sea.	Aims at providing better understanding of links between the physical environment and productivity of the pelagic ecosystem in support of integrated ecosystem assessment.	1.2	years 1-3	WG report to SCICOM and ACOM January following each year
d	Develop a food-web assessment of the pelagic ecosystem in the Norwegian Sea, including hindcasts and conditional forecasts of the main species or trophic groups.	Aims at providing better understanding of energy flow in the food-web of the pelagic ecosystem in support of integrated ecosystem assessment.	5.2	years 1-3	WG report to SCICOM and ACOM January following each year
e	Establish a dialogue between WGINOR and relevant pelagic fisheries stakeholders and managers in Norway, Faroe Island and Iceland.	Aims at steering the work of the group so that it addresses management needs.	6.4	years 1-3	WG report to SCICOM and ACOM January following each year
f	Update the ecosystem overview based on the ICES guidelines.	Summarizes key achievements in developing an understanding of the ecosystem and its responses to human impact and other challenges.	6.5	year 3	WG report to SCICOM and ACOM January following year 3

Summary of the Work Plan:

Year 1	Initiate work with ToRs c,d and e and framework for warning signals in ToR a. Do interim IEA as part of ToR a.
Year 2	Continue work on ToRs c,d and e. Start work with the climate change part of ToR f. Start work with ToR b. Do interim IEA and assess warning signals as a part of ToR a.
Year 3	Do full IEA with assessment of warning signals as part of ToRa. Update the ecosystem overview. Continue work on ToRs b, c, d, and e.

Supporting information

Priority	WGINOR aims to conduct and further develop Integrated Ecosystem Assessment for the Norwegian Sea, as a step towards implementing the ecosystem approach, addressing core priorities in the ICES strategic plan.
Resource requirements	Term of Reference a) The two international fish-plankton surveys in the Norwegian Sea have in recent years been developed in the direction of ecosystem surveys that capture several key components of the ecosystem. This provides a firm foundation for performing an

integrated assessment of the Norwegian Sea pelagic ecosystem. A framework for assessing warning signals will be developed with input from relevant projects at the involved institutions.

Term of Reference b)

This will build on model approaches developed for this ToR during several years within WGINOR.

Term of Reference c)

This will be based on ongoing research projects and oceanographic information collected during cruises in the Norwegian Sea and surrounding waters and supplied by satellite-based monitoring. Resources must be found in the participating institutions to complete development of the forecast system.

Term of Reference d)

The basis for developing the model-based foodweb assessment is the data from the ecosystem cruises and model work done in the involved institutions. The work will draw on ongoing projects with a similar scope. Some resources must also be found in the involved institutions to complete the work.

Term of Reference e)

This will be based on experiences made during fishing industry scoping exercise at IMR, Bergen, Norway in 2018 and will not require additional resources.

Term of Reference f)

Update of the elements of the ecosystem overview established before 2019 will be done based on existing projects and management initiatives, such as the Norwegian ecosystem-based management plan for the Norwegian Sea. The new elements focusing on climate change will be developed with a basis in ongoing projects and other assessment processes, such as IPCC. Additional resources will be required in the participating institutions to complete the latter work, in particular related to projections and assessments of anticipated effects of climate change in future.

Participants

The Group is normally attended by some 15-20 members and guests.

Secretariat facilities

None.

Financial

No financial implications.

Linkages to ACOM and groups under ACOM

WGINOR has provided text to the section on "Ecosystem considerations for widely distributed and migratory pelagic fish species" in the WGWIDE report.

Linkages to other committees or groups

Linkages to other organizations

The work done in the group is highly relevant to other assessment initiatives, in particular the Norwegian ecosystem-based management plan for the Norwegian Sea and OSPAR.

IEASG Expert Groups dissolved in 2018

2017/1/IEASG01	WKSIED-BESIO - SIHD Workshop on Balancing Economic, Social, and Institutional Objectives in Integrated Assessments	Christine Röckmann, The Netherlands, Alan Haynie, USA, and Jörn Schmidt, Germany
2017/1/IEASG02	WKEAMA - PAME (Joint EA-EG) / ICES Workshop on the development of guidelines for Ecosystem Approach to management (EAM) in the Arctic	Hein Rune Skjoldal, Norway, and Elizabeth Logerwell, USA

2017/2/IEASG03	WKSCIENCE2ADVICE - Workshop on translating science into advice	Simon Jennings, ICES, and Eskild Kirkegaard, ICES
2017/2/IEASG05	WKINTRA - Workshop on integrated trend analyses in support to integrated ecosystem assessment	Saskia Otto, Germany, and Benjamin Planque, Norway
2013/MA2/SSGRSP06	WGLMEBP - Working Group on Large Marine Ecosystem Programme Best Practices	Hein Rune Skjoldal, Norway, and Rudolf Hermes, Thailand
2018/2/IEASG01	WKEWIEA - Workshop on operational EwE models to inform IEAs [Pending publication of the report]	Maria Angeles Torres, Spain, Maciej Tomczak, Sweden, and Eider Andonegi, Spain
2018/2/IEASG02	WKSABI - Workshop on methods to develop a swept-area based effort index [Pending publication of the report]	Kai Wieland, Denmark, and Henrik Degel, Denmark,

Resolutions approved in 2017

Working Group on SOCIAL indicators (WGSOCIAL)

2017/MA2/IEASG04 A Working Group on SOCIAL indicators (WGSOCIAL), chaired by Lisa L. Colburn (US), Amber Himes-Cornell (FAO) and Marloes Kraan*, the Netherlands, will be established and will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in chair, etc.)
Year 2018	25-29 June	ICES HQ, Copenhagen, Denmark	Interim report by 15 August to IEASG	Incoming chair, Marloes Kraan, the Netherlands,
Year 2019	11-15 March	FAO, Rome, Italy	Interim report by 26 April	
Year 2020	TBD	TBD	Final report by Date	

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	To map the current work and identify future needs for social science in ICES, giving consideration to useful connections to international marine/ fisheries social science organizations such as the Society for Applied Anthropology.	This is primarily a scoping exercise within ICES, but also ensures coordination of activities with other international bodies and links to the wider scoping work in the Strategic Initiative for the Human Dimension (SIHD).	5.4, 6.6	Years 1, 2	Annual reporting
b	To identify and report on culturally relevant social indicators and community data gaps that point to priorities for data collection, research, institutional needs, and training in all ICES member countries; and where possible propose systems to collect missing data.	To aid prioritization of data collection to enable qualitative and quantitative analyses of social issues for ecosystem overviews and integrated ecosystem assessments and future advice requests. The ToR also links to ICES Data Centre.	4.2, 5.4, 6.6, 7.1, 7.2, 7.7	Years 1, 2	Annual reporting
c	To define and report on the information flow needed to provide trade-off analysis of fishing impacts on communities and stakeholder groups.	To develop a system to support potential future advice requests and development of ecosystem overviews and integrated ecosystem assessments.	5.4, 5.8, 6.5, 7.3, 7.5, 7.6	Years 2, 3	Annual reporting

d	To assess and report on the social and cultural significance of commercial fishing for selected coastal regions in the ICES area	To support future potential advice requests and development of ecosystem overviews and integrated ecosystem assessments.	2.7, 5.8, 6.6, 7.1, 7.2, 7.7	Years 2, 3	Annual reporting, potentially also scientific manuscript
e	To coordinate the provision of culturally relevant social indicators, and analysis with economic and ecological information.	Contribution to the development of a framework for collective reporting of social, economic and ecological data and information.	2.7, 4.3, 6.5, 6.6,, 7.1, 7.2, 7.7	Years 1-3	Annual reporting

Summary of the Work Plan

Year 1	Start mapping the current work and identify future needs for social science and community impact assessment in ICES (ToR a) and identifying social data gaps (ToR b). Briefly brainstorm and discuss ideas on how to address and organize work under the remaining ToRs in year 2. Establish close connections with other relevant groups within and outside ICES (ToRs a and e). Produce Interim Report.
Year 2	Work towards completion of ToR a and ToR b. Start work on defining the information flow needed to provide trade-off analysis (ToR c) and assessing the social and cultural significance of commercial fishing (ToR d). Work with other relevant groups within and outside ICES (ToR e). Produce Interim Report.
Year 3	Finalize ToR c, d, and e, including the manuscript. Discuss and plan strategies and concrete steps for future work. Produce Final Report.

Supporting information

Priority	<p>Nations are concerned about fish stocks and marine ecosystems, not least because they can contribute to human wellbeing; therefore, these natural resources have a societal value. The social dimension is increasingly an integral part of marine science and scientific advice regarding the use and conservation of marine resources.</p> <p>Demand for science and advice to address social and societal considerations is increasing, but ICES does not engage many social scientists in its existing work. The Strategic Initiative on the Human Dimension (SIHD) has served to raise the profile of social science in ICES in the last few years, but, with a few exceptions, SIHD efforts are not comprehensively supported and informed by the work of ICES EG. Further, none of the existing EG that address social issues are focusing primarily on the development of social metrics and core social analyses that are demanded in parts of the ICES network (e.g. further development of ecosystem overviews).</p> <p>The benefits of expanding the engagement of ICES in social science were highlighted in the outcomes of recent meetings, especially the “Understanding marine socio-ecological systems” (MSEAS) Conference which ICES co-sponsored in Brest, France, in 2016. Others drivers include high level aspirations for Blue Growth in European countries and globally, and a desire to understand social consequences of human-induced changes in the sea (WGHIST). Although there is no official request of social indicators, there is a recognition in ICES that it would be desirable to add social metrics to ICES ecosystem overviews and thus to recognize people and their livelihoods as part of the ecosystem. Further, in the longer term, ICES growing engagement in aquaculture science will likely lead to overviews of aquaculture activity that will also require social inputs.</p>
Resource requirements	The group will rely on ongoing international and national research projects to support involvement of WGSOCIAL members.
Participants	This is a new Group, expected to be attended by some 15–20 participants.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	In the longer term the EG will be ready to support ACOM in addressing advisory requests from ICES clients if these are forthcoming.
Linkages to other committees or groups	<p>The subject area of this EG has close linkage with the following ICES groups: WGSEDA, WGECON, WGIMM, WGRMES, WGNARS, WGHIST and the Strategic Initiative SIHD.</p> <p>Frequent interaction with WGECON and SIHD will be especially important to ensure the smooth and efficient introduction of further social and economic science into the ICES network</p>
Linkages to other organizations	Society of Applied Anthropologists, NOAA Fisheries Human Dimensions and IEA Program, PICES, IMBER Human Dimension group, Future Coasts

Resolutions approved in 2016

Working Group on Ecosystem Assessment of Western European Shelf Seas (WGEAWESS)

2016/MA2/SSGIEA01 The Working Group on Ecosystem Assessment of Western European Shelf Seas (WGEAWESS) chaired by Marcos Llope*, Spain and Debbi Pedreschi*, Ireland and Eider Andonegi, Spain, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2017	20-24 March	Lisbon, Portugal	Interim report by 30 April to SSGIEA	
Year 2018	5-9 March	Nantes, France	Interim report by 30 April to IEASG	
Year 2019	8-12 April, 2019	Cadiz, Spain	Interim report by 29 May to IEASG	Change in Chairs for third meeting

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Continue metadata compilation for all ecosystem components available for IEA development	Process initiated and completed for specific subregions in previous ToR. Other subregions in draft.	1.9, 6.1, 6.6	3 years, progress updated annually	Database linked to ICES for Regional Sea Programmes
b	Continue evaluation of data and trends for a regional Integrated Ecosystem Assessment. Identify ecosystem trends relevant to stock assessment and management	Linked to WKECOVER, WKRISCO, WKDECOVER, and the commitment to provide advice in the context of EBAFM	1.9, 2.1, 6.1	3 years	Report IEAs and provide advice to fisheries groups as appropriate
c	Review and update the regional Ecosystem overviews	Linked to ACOM-SCICOM advice	6.5, 6.6, 2.1	3 years	Ecosystem overviews
d	Develop and apply ecosystem models to fill identified gaps in empirical data for use in IEAs	This would be linked to activities conducted under previous ToRs	2.2, 5.2, 6.1 or 6.6	3 years	Regional modelling products
e	Development of Interreg Atlantic Area proposal	Funding is being sought to increase the resources and participation of the group	1.9, 6.1, 2.1	1 year	Successful fund capture

Summary of the Work Plan

Year 1	The main task will be the development of a proposal for Interreg funding. The group will also be involved with providing advice to WKIrish. We will continue to identify and catalogue datasets available that would be potentially valuable in an IEA and EBAFM. Ongoing analysis of important
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	trends in ecosystem indicators. Improve communication with relevant advice groups (fisheries stock assessment).
Year 2	Continue with Year 1 activities while liaising with relevant ICES WG membership. Development of ecosystem models to fill identified gaps in empirical data for use in IEAs. Scope of IEA and model development will be dependent on successful Interreg funding.
Year 3	Continue with Year 2 activities while liaising with relevant ICES WG membership. Development of ecosystem models to fill identified gaps in empirical data for use in IEAs. Scope of IEA and model development will be dependent on successful Interreg funding.

Supporting information

Priority	<p>Heavy pressure on shelf seas (biodiversity loss, climate changes, fisheries), lack in understanding of large marine ecosystem functioning and the context of ecosystem health indicators development for the Marine Strategy Framework Directive require to address those research topics at the relevant scale i.e. the regional approach.</p> <p>The EAWESS working group will focus on North Atlantic European continental shelf. Regional area of interest includes the Celtic Seas (Celtic Sea, Irish Sea, West of Scotland, Western English Channel), Bay of Biscay (French continental shelf, Cantabrian Sea) and Western Iberia (Iberian Upwelling, Gulf of Cadiz), involving five countries (Ireland, UK, France, Spain and Portugal). The choose of such limits is justified by :</p> <p>bio-geographical (transitional region between subtropical and Subarctic gyres)</p> <p>chemo-physical continuum: large opened and connected areas dominated by soft bottom, closely linked by regional ocean circulation process, offering 'coast-shelf-slope' and latitudinal environmental gradient</p> <p>management unit (ICES, OSPAR)</p> <p>already existing scientific networks (e.g. IBI-ROOS)</p>
Resource requirements	There is no resource implication for ICES. Working group program is based on synthesis of data and results from existing scientific program, and coordination of surveys and observations networks. However, involvement of ICES Data Centre would useful to help with sharing and harmonizing data.
Participants	The Group is normally attended by some 8 members plus guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	Direct link to IEA, ACOM-SCICOM advice.
Linkages to other committees or groups	There is a very close working relationship with all the groups of IEASG. It is also very relevant to the Working Group on WGECO ,WGSAM, WKIrish, WGRMES and WGMSFDemo
Linkages to other organizations	DC- MAP- DG MARE, MSFD DG ENV, OSPAR, WWF

Working Group on the Northwest Atlantic Regional Sea (WGNARS)

2016/MA2/SSGIEA02 Working Group on Northwest Atlantic Regional Sea (WGNARS), chaired in 2016 by Sean Lucey*, USA and Robert Gregory, Canada, will work on ToRs and generate deliverables as listed in the Table below:

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2017	6-10 March	Halifax/Dartmouth, Nova Scotia, Canada	Interim report on 12 April 2017 to SSGIEA	New Canadian Chair will be appointed
Year 2018	5–9 March	Falmouth, USA	Interim report on 6 April 2018 to IEASG	
Year 2019	29 April – 3 May	Dartmouth Nova Scotia, Canada	Final report on 7 June 2019 to IEASG	New US Chair will be appointed

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Develop the scientific support for an integrated assessment of the Northwest Atlantic region to support ecosystem approaches to science and management. Compile and provide guidance on best practices for each step of integrated ecosystem assessment.	a) Science Requirements: see below b) Advisory Requirements: none	1.3, 6.1, 6.6	3 years (2017,2018,2019)	Summary review paper of lessons learned for each step of the process in the Northwest Atlantic using results from 2019, ToRs b, c, d, e below. Brief interim progress reports to ICES (2017, 2018).
b	Adopt process for evaluating current suite of indicators and assess their ability to provide proactive management advice.	Will utilize methodology akin to gap analysis. Will update and employ indicator performance testing and risk assessment methods reviewed in 2013 for both driver and response indicators. Requires participation by scientific experts in oceanography, habitat, biology, fisheries and other biophysical system uses, and social and economic systems.	1.1, 2.4, 7.1	2 years (2017,2018)	Best practices for quantitative approach to evaluating time-series indicators and integrating qualitative information/knowledge into IEA process (2017). Documentation of knowledge gaps, prioritized using qualitative models developed in 2016 and other appropriate approaches (2018).
c	Develop process for distilling information for management use.	Will require participation by scientific experts in oceanography, habitat, biology, fisheries and other system uses, and	4.3, 6.4	2 years (2017,2018)	Best practices surrounding the communications of indicator meaning, uncertainty, and results to stakeholders (2017,2018).

	social and economic systems.				
d	Assess system productivity under shifting oceanographic processes and improve integration into IEA products.	Will develop concept of habitat beyond a mediating component, and fully link to benefits derived from the system using semi-quantitative and qualitative models. Will reconcile place-based and process based models, and shifting drivers.	2.3, 6.6	2 years (2017,2018)	Updated qualitative models from 2016 MSE with more rigorous treatment of linkages between ecological system drivers, habitat, and benefits (2017,2018).
e	Evaluate approaches to integrating multi-spatial scale models into integrated management advice.	Will assess and develop advice from multiple models at different spatial resolution. Will expand analysis in ToR f beyond current focus on a single underlying "model" assessed through multiple qualitative software packages.	5.4, 6.6	2 years (2018,2019)	Develop suite of alternative models that can be used in MSE context (2018,2019).
f	Evaluate ecosystem trade-offs using a range of management strategy evaluation (MSE) methods.	Assess robustness of strategies to underlying assumptions. Evaluation of uncertainty surrounding models and indicators using simulation.	5.1, 7.3, 7.6	1 year (2019)	Use results of ToR b, c, d, e to investigate robustness of management strategies to different underlying assumptions in scale, system linkages, and baseline (2019).

Summary of the Work Plan

Year 1	Develop process for assessing and communicating indicators, refine existing models.
Year 2	Develop alternative models representing marine ecological and human systems at multiple scales.
Year 3	Evaluate the robustness of alternative management strategies to achieve candidate operational objectives given alternate models developed.

Supporting information

Priority

A regional approach to marine science is essential to address high priority research topics in the ICES Science Plan associated with understanding ecosystem functioning, particularly climate change processes (1.1), biodiversity (1.3) and the role of coastal-zone habitat in ecosystem dynamics (1.4), as well as understanding the interactions of human activities with marine ecosystems, particularly fishing (2.1) and impacts of habitat changes (2.4). Identifying potential objectives and evaluating alternative management strategies to achieve them addresses the development of options for sustainable use of ecosystems, specifically marine living resource management tools (3.1) and operational modelling combining oceanography, ecosystem, and population processes (3.2). Work identifying candidate ecosystem-based management objectives and evaluating potential trade-offs through MSE contributes to socio-economic understanding of ecosystem goods and services and forecasting the impact of human activities (3.4). Therefore, our work plan addresses all three thematic areas in the ICES Science Plan and multiple high priorities in each.

Resource requirements	Components of the integrated approach, such as ocean observation systems, ecosystem surveys, development of integrated modelling approaches and management objectives are being maintained by member countries, and this programme will coordinate and synthesize existing programmes.
Participants	The Group is normally attended by some 25-35 members and guests. However, expertise needed for each ToR differs, so total participants over 3 years could be >50.
Secretariat facilities	Report preparation and dissemination.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	During the development stage there will be no direct linkages with advisory committees, but the integrated approach is expected to eventually support advice for implementing IEAs in NW Atlantic subregions and may link to future ICES IEA advice in other regions.
Linkages to other committees or groups	There is a close working relationship with a number of the working groups and workshops under the IEASG (e.g. the Workshop on Benchmarking Integrated Ecosystem Assessments) and other groups and workshop within ICES (e.g. the Working Group on Marine Systems).
Linkages to other organizations	The NAFO Working Group on Ecosystem Science and Assessment has made progress toward similar objectives and will be a resource for collaboration.

Working Group on Integrated Assessments of the Barents Sea (WGIBAR)

2016/MA2/SSGIEA03 A Working Group on the Integrated Assessments of the Barents Sea (WGIBAR), chaired by Elena Eriksen, Norway, and Anatoly Filin, Russia, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2017	16–18 March	Murmansk, Russia	Interim report by 30 April 2017	
Year 2018	9–12 March	Tromsø, Norway	Interim report by 30 April 2018	
Year 2019	12–14 February	Murmansk, Russia	Final report by 29 April 2019	

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
A	Prepare relevant datasets that can be used to describe and analyse fluctuations and changes in the Barents Sea ecosystem	Science and advisory requirements	6.1	Year 1,2 and 3	Updated multivariate datasets (Year 1,2 and 3). Develop new spatially disaggregated time-series (Year 1 and 2)
B	Prepare an annual report on the status and trends of the Barents Sea ecosystem based on integrated analysis of multivariate datasets and other relevant information	Science and advisory requirements	1.3; 2.1; 6.5	Year 1, 2 and 3	Annual reports of the status, drivers, pressures, trophic interactions and expected changes
C	Identify knowledge gaps and priority research items that when addressed, can improve future integrated ecosystem assessments	Science and advisory requirement	3.1, 3.2	Year 1, 2 and 3	Annual status reports
D	Explore the use of available ecosystem and multispecies models as an analytical tool in integrated ecosystem assessment for the Barents Sea	Science and advisory requirements	2.5; 5.3; 6.1;	Year 1, 2	Annual meeting report
E	Provide recommendations to improve the monitoring of the Barents Sea ecosystem for integrated ecosystem assessments	Science and advisory requirements	3.1, 3.2	Year 1	Annual meeting reports

Summary of the Work Plan

Year 1	<p>Prepare relevant datasets and other relevant information, including pollution, that can be used to describe fluctuations and changes in the Barents Sea ecosystem and prepare an annual report on the status and trends of the Barents Sea ecosystem based on integrated analysis of multivariate datasets.</p> <p>Review and discuss available ecosystem and multispecies models as an analytical tool in integrated ecosystem assessment for the Barents Sea</p> <p>Identify knowledge gaps and priority research items that can improve future integrated ecosystem assessments and provide recommendations to improve the monitoring.</p> <p>Map collaboration partners, their needs and advantage from the cooperation.</p>
Year 2	<p>Prepare relevant datasets and other relevant information that can be used to describe fluctuations and changes in the Barents Sea ecosystem and prepare an annual report on the status and trends of the Barents Sea ecosystem based on integrated analysis of multivariate datasets.</p> <p>Identify knowledge gaps and priority research items that can improve future integrated ecosystem assessments.</p> <p>Explore the use of the ecosystem /multispecies models as an analytical tool in integrated ecosystem assessment for the Barents Sea.</p>
Year 3	<p>Prepare relevant datasets and other relevant information that can be used to describe fluctuations and changes in the Barents Sea ecosystem and prepare an annual report on the status and trends of the Barents Sea ecosystem based on integrated analysis of multivariate datasets.</p> <p>Identify knowledge gaps and priority research items that when addressed, can improve future integrated ecosystem assessments.</p> <p>Summarize literature from the last few years on the Barents Sea ecosystem</p>

Supporting information

Priority	<p>High, the IEA WGs are seen as key strategic steps toward implementing the ecosystem approach to investigation and harvesting in the differen ecosregions</p>
Scientific justification	<p>Term of Reference a) and b)</p> <p>The annual report of the status and trends of the Barents Sea ecosystem, based on multivariate data and analyses, is the first step to understand ecosystem functionality, to detect early signals on major changes in the Barents Sea ecosystem and to uncover knowlegde gaps.</p> <p>Term of Reference c)</p> <p>In the process of assessing the state of the Barents Sea some knowlegde gaps will become evident. Research effort could then be targeted towards filling these gaps, either by WGIBAR or by other research projects.</p> <p>Term of Reference d)</p> <p>Several models (multispecies and ecosystem) are developed or under development for the Barents Sea. Exploring these models as analytical tools in understanding the ecosystem dynamics and human impact in the Barents Sea will help bridge the gap between integrated ecosystem assessment and advice and will also allow WGIBAR to interact with other groups working on similar issues (e.g. stock assessment WGs in the Barents Sea, multispecies groups such as ICES WGSAM)</p> <p>Term of Reference e)</p> <p>When knowlegde gaps are detected, monitoring could be targeted and improved in order to fill the knowlegde gaps. This will link science and monitoring and increase the relevance of both to the assessment of the Barents Sea ecosystem.</p>

Resource requirements	The research programmes which provide the main input to this group are already established, and resources are already committed.
Participants	12-15 people are expected to attend
Secretariat facilities	SharePoint site, secretariat support for reporting.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	It is very important to link this group to ACOM and ensure cooperation between science and advice
Linkages to other committees or groups	IEASG, all IEA groups, stock assessment groups (e.g. AFWG, NIPAG, and WGWIDE), WGSAM, WGECO
Linkages to other organizations	Arctic Council, Norwegian-Russian Environmental Commission Norwegian Russian Fisheries Commission

Working Group on Integrated Assessments of the North Sea (WGINOSE)

2016/MA2/SSGIEA04 A Working Group on North Sea Integrated Assessments (WGINOSE), chaired by Andrew Kenny, UK, and Erik Olsen, Norway, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2017	March 13 - 17	Bergen, Norway	Interim report by 1 May to SSGIEA	
Year 2018	16-20 April	ICES HQ, Denmark	Interim report by 1 May IEASG	
Year 2019	20–24 May	Gothenburg, Sweden	Interim report by 24 June IEASG	
Year 2020	4-8 May	Baltic Sea Center, Stockholm University, Sweden	Final report by 5 June to IEASG	

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Up-date strata specific ecosystem trends analysis utilising data from ICES Data Centre and other data sources, e.g. CPR, OSPAR, EEA and Member States.	a) Science Requirements b) Advisory Requirements c) Requirements from other EGs	1.3, 1.9, 6.5	Years 1, 2 & 3	Regional sea state trend analysis for inclusion in eco-region overviews annually
b	Identify and develop additional strata and associated monitoring programmes for the inshore/coastal areas of the	a) Science Requirements b) Advisory Requirements	6.5	Years 1, 2 & 3	Regional sea state trend analysis for inclusion in eco-region overviews annually

	North Sea and the Norwegian Trench.	c) Requirements from other EGs			
c	Establish data pathways and obtain data to operationalise the integration of human activity and pressure data, distinguishing between fixed structures (e.g. pipelines, windfarms) and on-going activities (e.g. dredging, fishing, shipping, underwater noise, litter), accidents (emergency response).	a) Science Requirements	6.5, 6.6	Years 1, 2 & 3	Recommendations and actions giving rise to the on-going improvement to flow of data between EWG, the ICES Data Centre and WGINOSE
d	Develop strata specific decision support tools to support ecosystem management and advice (e.g. BBNs and expert systems, ecosystem models, ecosystem goods and services modelling) in collaboration with end users (OSPAR, DG-ENV, DG-MARE)	a) Science Requirements	6.1, 6.4, 6.6	Years 1, 2 & 3	Results which explore the balance and trade-offs between ecosystem protection and sustainable marine resource development
e	Contribute to the coordination and integration of strata specific assessments with the development of integrated ecosystem monitoring in the North Sea, e.g. redesign of the Q3 IBTS surveys.	a) Science Requirements b) Advisory Requirements c) Requirements from other EGs	3.2	Years 1, 2 & 3	Regional sea state trend analysis for inclusion in eco-region overviews annually

Summary of the Work Plan

Year 1	The first year will focus on completing the assessment of North Sea strata structure and functions analysis as well as preparing a draft paper to be submitted in a peer review journal "appropriate spatial scales for North Sea Integrated Ecosystem Assessments"
Year 2	Mapping of human activity pressures data at scales appropriate to assessment strata in the North Sea, and to operationalise processes for up-dating the inclusion of such data on an annual basis
Year 3	Finalisation of modelling approaches to support the provision of ecosystem based management advice.

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the development of Integrated Ecosystem Assessments for the North Sea (a data rich ecosystem) as a step towards implementing the ICES Science Plan and the ecosystem approach, these activities are considered to have a very high priority.
Resource requirements	Assistance of the Secretariat in maintaining and exchanging information and data to potential participants, especially the services of the ICES Data Centre to generate data tables for analysis from selected variables held in the database.
Participants	The Group is normally attended by some 10–20 members and guests.
Secretariat facilities	None.
Financial	No financial implications.

Linkages to ACOM and groups under ACOM	Relevant to the work of ACOM and SCICOM
Linkages to other committees or groups	There is a very close working relationship with all the groups of IEASG. It is also very relevant to the EWG identified in WGAME 2013 report.
Linkages to other organizations	OSPAR, EU, NAFO, NEAFC

Working Group on Comparative Analyses between European Atlantic and Mediterranean marine ecosystems to move towards an Ecosystem-based Approach to Fisheries (WGCOMEDA)

2016/MA2/SSGIEA05 The Working Group on Comparative Analyses between European Atlantic and Mediterranean marine ecosystems to move towards an Ecosystem-based Approach (WGCOMEDA), chaired by Manuel Hidalgo, Spain, Marta Coll, Spain, Hilmar Hinz Spain, and Christian Möllmann, Germany, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2017	24-28 April	Lisbon, Portugal	Interim report by 1 July 2017 to SSGIEA	Christian Möllmann enters as a new co-chair for the period 2017-2019. Back-to-back meeting with WGEAWESS and WGIAB.
Year 2018	29-31 May	Sète, France	Interim report by 29 June to IEASG.	
Year 2019	8-12 April	Palma de Mallorca, Spain	Final report by 29 May to IEASG.	

ToR descriptors

ToR	Description	Background	<u>Science Plan codes</u>	Duration	Expected Deliverables
a	Provide a more complete understanding of the structural and functional role of ecological stability across different types of ecosystems.	a) The scientific and applied development of this ToR is sustained by the all the outcomes obtained in the previous 3-years of WG, that evidence which are the strategic and needed lines to follow up the research on this topic, and combining information from both seas (Atlantic and Mediterranean).	1.3, 1.4, 1.9	3	Scientific collaborative papers for several scientific questions : 1. The relative influence drivers and structural properties of communities for different type of ecosystems both in both seas (Atlantic and Mediterranean). 2. The relative contribution of different functional groups to the stability of different systems. 3. Mechanisms affecting the non-stationary pattern on stability . 4. Relationship between temporal and spatial stability. 5. Mechanisms affecting ecological stability in the pelagic realm .

		<p>b) The ecological and applied importance of understanding the mechanisms affecting the stability of natural systems for IAF justifies the work and research to be developed in this ToR.</p> <p>c) The ToR will benefit from the attendance of scientists from other WGs from IEASG such as WGIAB or WGEAWESS, and the designed back-to-back meetings with WGIAB and WGEAWESS. This guarantees a good coordination with other WGs of IEASG.</p>		
b	<p>Use of functional traits information to assess the structure and functioning of demersal and benthic communities across Mediterranean and Atlantic systems; and to predict their vulnerability to fishing disturbance.</p>	<p>a) This topic is directly addressing two main themes of ICES Strategic Science plan i.e. EFD Ecosystem Process and Dynamics and EPI Ecosystem pressures and Impacts. The TOR will provide further insights into the development of indicator that may help with the management of ecosystem goods and services and help to devise management strategies that may help to mitigate human impacts on these.</p> <p>b) The TOR is directly related to outcomes obtained</p>	1.3, 1.9, 2.2	3
				<p>1. Database on demersal fish and benthic invertebrate traits for species used within the analyses including where possible real data from a regional scale data e.g. median size, maturity etc.</p> <p>2. Methodology to assess the resistance/resilience of demersal and benthic communities with respect to their trait composition to fishing.</p> <p>3. Collaborative scientific papers comparing functional properties of demersal and benthic communities across regional seas and their vulnerability to fishing disturbance.</p>

		in the previous 3-years of WG, where the general ideas and work flows have been developed. Based on these previous outcomes the current TOR aims to complete a cross Mediterranean Atlantic comparison			
c	Further develop the analysis of the link between ecological stability and ecosystem properties (structure and functioning)	<p>a) The scientific development of this ToR is sustained by the outcomes from the previous 3-years of WG with the aim to follow up in the research on this topic. It will combine information from both seas (Atlantic and Mediterranean).</p> <p>a) This topic is addressing several main themes of ICES Strategic Science plan i.e. EFD Ecosystem Process and Dynamics and EPI Ecosystem pressures and Impacts. The TOR will provide insights into the knowledge needed to understand ecosystem dynamics that could help with guidelines needed for the management of marine resources.</p>	1.7, 1.9, 6.1	3	<p>1. Database on ecosystem properties of Mediterranean and Atlantic marine ecosystems</p> <p>2. Methodology to assess the links between ecological stability and ecosystem properties.</p> <p>3. Collaborative scientific papers comparing ecosystem stability and ecosystem properties across regional seas and their vulnerability to fishing disturbance and environmental factors.</p>
d	Identify ways and products to support the implementation of IEA in regional ecosystems	Scientific results achieved under ToRs a, b and c will be translated into products that can be used in regional IEA implementation;	6.1, 6.5, 6.6	3	Scientific report on potentials to use WGCAMEDA results for regional IEA implementation (addressed towards regional IEA groups)

i.e. better
ecosystem
indicators, models
for indicator
testing or
management
strategy
evaluation.

Summary of the Work Plan

Year 1	<p>WGCOMEDA will be based on the results achieved during its first 3 years to define which are the research topics that will continue and which are the new ones for the ToRs A, B, and C.</p> <p>An important element in this new cycle is the work to be developed in the ToR D that will be done in close collaboration with members of WGIAB or WGEAWESS. It aims at identifying the main elements of the work developed in progress by COMEDA that may have potential implementation in ICES IEA programme. The group will focus in identifying potential to use the scientific results of WGCOMEDA in the work of the regional IEA expert groups. This will be achieved by back-to-back meetings (with WGIAB and WGEAWESS) and direct communication with chairs.</p>
Year 2	<p>Develop the analyses and modelling defined for each ToR</p> <p>The group will use the knowledge obtained in previous research, and the new scientific objectives agreed in the discussions of the first year to develop the statistical analysis and ecological modelling required. This will be developed for each research topic agreed.</p> <p>During the second year the group will start developing products derived from the scientific results of WGCOMEDA for regional IEA implementation.</p>
Year 3	<p>Final discussion and synthesis of all the research topics</p> <p>The group will discuss the final results and outcome for the different research topics along the ToR A, B, C and D.</p> <p>Implementation of the strategic knowledge gained in the WG into the ICES IEA programme</p> <p>The group will produce a document outlining the use of WGCOMEDA scientific results in the regional IEA contexts.</p>

Supporting information

Priority	<p>The priority of this working group (WG) will continue to be the integration of both cross-systems and system-specific key scientific questions to guide research and improve the ecosystem approach to management of living marine resources of the European Seas using existing data and analysis from regional systems at the East Atlantic Ocean and Mediterranean Sea. Particularly, the aim of this new cycle of the WG will be two-fold. First, we will continue developing fundamental research required to sustain the implementation of Integrated Ecosystem Approach (IEA) in the European Seas. Second, the WG will specifically address the challenge of a potential implementation of the research outcomes into the ICES IEA program.</p> <p>The working procedures will be based on developing and strengthening the scientific basis for regional and integrated ecosystem approach of coastal and marine living resources through a comparative platform of research. During the first three years, the WG COMEDA succeeded in the development of a network and platform of collaboration, and evidenced that a comparative approach of marine ecosystems is essential to learn on how Mediterranean and Atlantic ecosystems are structured, how they function, and which are the more sensitive species or ecological processes to be managed within the ecosystem dynamics. The close collaboration envisaged with other</p>
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	<p>WG of IEASG such as WGIAB or WGEAWESS will provide a solid basis to develop the new objective, research topics and ToR of this new COMEDA cycle. During this new COMEDA cycle we will invite colleagues working in the Pacific ecosystems to the meetings and/or activities evidencing the commitment of the group to develop research and applied activities at a comparative large scale.</p>
Resource requirements	<p>Information from ICES and GFCM, and JRC databases were and will continue being the main input for this group. Outcomes from food web models from the Ecopath International Development and Research Consortium will be used, too. No additional resources are identified, although participation of some experts (especially young scientists) to working group meetings depends on funding availability. The participation of young scientists is capital for a development of activities of the WG, and will highly benefit by the back-to-back meetings with members of WGIAB or WGEAWESS.</p>
Participants	<p>The Group is normally attended by 20–25 members and guests. The preliminary list of possible (°) members is the following: Marta Coll (ICM-CSIC, Spain) – Chair and expert on Mediterranean ecosystems Manuel Hidalgo (IEO, Spain) – Chair expert on Atlantic and Mediterranean ecosystems Hilmar Hinz (IMEDEA-CSIC, Spain) – Chair and expert on Atlantic ecosystems Christian Möllmann (Univ. of Hamburg, Germany) – Chair and expert on Atlantic ecosystems Francoise Le Loch (IRD, France) – expert on Atlantic and Mediterranean ecosystems Konstantinos Tsagarakis (Greece) - expert on Mediterranean ecosystems (Aegean Sea) Martin Lindegrem (DYU-AQUA, Denmark) – expert on Atlantic ecosystems (Baltic Sea) Michele Casini (Swedish University of Agricultural Science, Sweden) - expert on Atlantic ecosystems (Baltic Sea) Thorsten Bleckner (Stockholm Resilience Center, Stockholm University, Sweden) - expert on Atlantic ecosystems (Baltic Sea) Henn Ojaveer (University of Tartu, Estonia) – expert on Atlantic ecosystems (Baltic Sea). Sheila Heymans (SAMS, UK) - expert on Atlantic ecosystems (Western Scotland). Marian Torres (University of Algarve, Portugal) - expert on Atlantic ecosystems. Eider Andonegi (AZTI, Spain) – expert on Atlantic ecosystems (Cantabric Sea). Joachim Claudet (CRIOBE, France) – expert on Pacific and Mediterranean ecosystems. Bastian Merigot (University of Montpellier, France) – expert on Atlantic and Mediterranean ecosystems. Evangelos Tzanatos (University of Patras, Greece) - expert on Mediterranean ecosystems. Heino Fock (Thuenen, Germany) - expert on Atlantic and Arctic ecosystems (Greenland). Ignasi Català (IMEDEA, Spain) – expert on Atlantic and Mediterranean ecosystems. Jaime Otero (IIM, CSIC, Spain) - expert on Atlantic and Arctic ecosystems. Lauréne Pécuchet (DTU-AQUA, Denmark) – expert on Atlantic and Mediterranean ecosystems. Mariano Koen-Alonso (DFO, Canada) – expert on Atlantic ecosystems (West Canada). Raul Primicerio (University of Tromsø, Norway) – expert on Arctic ecosystems (Barents Sea). Romain Frelat (University of Hamburg, Germany) – expert on Atlantic ecosystems (Barents Sea). Sofia Henriques (University of Lisbon, Portugal) – expert on Atlantic ecosystems and global meta-analysis.</p>
Secretariat facilities	<p>Report preparation and dissemination</p>
Financial	<p>No financial implications for ICES. Funding will be likely needed to facilitate the participation of young and early-career expert scientists. WG chairs will apply to marine research consortiums to find financial support for those early-career researchers who need travel funding.</p>

Linkages to ACOM and groups under ACOM

There are no obvious direct linkages.

Linkages to other committees or groups

There is a very close working relationship with all the groups of IEASG. Indeed, there will be an effective and operational collaboration through back-to-back meetings planned with WGEAWESS and WGIAB.

Linkages to other organizations

Resolutions approved in 2015

Working Group on Maritime Systems (WGMARS)

2015/MA2/SSGIEA06 The Working Group on Maritime Systems (WGMARS), chaired by Patricia M. Clay, USA and Johanna Ferretti, Germany, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2016	31 October – 3 November	Woods Hole, USA	Interim report by December 2016 to SSGIEA	2016 Meeting postponed until 2017
Year 2017	22–26 May	Woods Hole, USA	Interim report by 28 June 2017 to SSGIEA	(Year 1)
Year 2018	19-23 February	La Hague, NL	Final report by 13 March to IEASG	(Year 2) - Patricia M. Clay, USA as new chair
Year 2019	8-12 April	AZTI San Sebastian, Spain	Final report by 29 May to IEASG	(Year 3) – Christine Röckmann, NL, outgoing chair Johanna Ferretti incoing chair for a year

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
	Understanding the implementation of Integrated Ecosystem Assessments (IEAs) in ICES	ICES has identified Ecosystem Understanding as their key priority. IEAs play an important role in supporting Ecosystem understanding and enable understanding effects of trade-offs between resource users.		3 years	Two annual reports and a final report with our findings will be presented to ICES. Review paper
a	Understanding of IEAs, definitions, framing	Review of existing IEA reports from the relevant ICES groups; interact with ICES IEA groups to follow developments.	3.6, 5.3	year 1	Review paper
b	Identifying IEA end-users and the required extended peer community	IEAs are seen as a important tool that enable evaluation of trade-offs and sustainable marine management. How do IEAs fit in contemporary governance and mangement systems?	6.2, 7.4, 6.6	year 2	Collaborative reporting in the WGMARS Report
c	How have IEAs evolved and how should they be integrated in management advice.	For ICES to provide meaningful IEAs for regional seas or selected marine areas close collaboration between many ICES expert	5.3, 6.1, 2.7	3 years	Collaborative reporting in the WGMARS Report

		groups and the ICES secretariat is anticipated. Cases studies will be used starting with an analyses of WGNARS IEA work in the Northwest Atlantic with key stakeholders.			
d	Analyze interactions between resource users, the governance system and the complex social-ecological marine system with Behavioural Economics	Which findings from Behavioural Economics can be applied to marine ecosystem management settings, including fisheries management. Illustrate how these findings can increase alignment of individual behaviour with societal aims.	3.6, 5.4, 7.5	3 years	Collaborative reporting in the WGMARS Report
e	Stimulate transdisciplinary research by organizing workshops involving scientist from different fields and stakeholders	Practical exercises & case studies for WGMARS transdisciplinary consultation on how to best integrate available knowledge, including stakeholder knowledge, into IEAs	5.3, 6.2, 7.5	Each year at least 1 workshop	Collaborative reporting in the WGMARS Report

Summary of the Work Plan

Year 1	Focus on understanding of IEAs
Year 2	Focus on understanding expectations of IEA end-users
Year 3	Focus on advancing IEA in management advice

Supporting information

Priority	The proposed activities of WGMARS will help ICES achieve their overarching goal of providing future advice based on ecosystem understanding. IEAs are seen as an important tool in understanding how humans interact with the marine ecosystem and enabling justified trade-offs between human use of the marine ecosystem. Consequently, these activities are considered to have a very high priority.
Resource requirements	Ongoing work in the ICES groups that are currently working on the implementation of IEAs for their regional seas serves as input for our work. In addition the WGMARS will work in close collaboration with ICES SID (the strategic initiative on the human dimensions in IEA) and the ICES secretariat.
Participants	The Group is normally attended by some 10–15 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	The focus of the work is on understanding IEAs, with a direct link to the ICES science plan (SCICOM), and future integration of IEAs in management advice, which is very relevant for ACOM.

Linkages to other committees or groups	There is a very close working relationship with all the ICES IEA groups Where necessary we will reach out and collaborate with other ICES committees and groups that should play a role in ICES IEA work.
Linkages to other organizations	

Working Group on the Integrated Assessments of the Norwegian Sea (WGINOR)

2015/MA2/SSGIEA09 A Working Group on the Integrated Assessments of the Norwegian Sea (WGINOR), chaired by Guðmundur J. Óskarsson, Iceland, and Per Arneberg, Norway, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2016	28 November-2 December	Bergen, Norway	Interim report by 9 January 2017 to SSGIEA	
Year 2017	27 November – 1 December	Torshavn, Faroe Island	Interim report by 8 January 2018 to IEASG	
Year 2018	26–30 November	Reykjavik, Iceland	Final report by 7 January 2019 to IEASG	

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Perform up to date integrated assessment for the Norwegian Sea ecosystem focussing on fisheries, but also considering other human pressures.	a) Science Requirements b) Advisory Requirements	1, 6, 7, 9, 19, 20, 27, 30	Years 1-3	Report to IEASG in 2019 and research papers
b	Utilize multispecies and ecosystem models to investigate effects of single and multispecies harvest control rules on fishing yield and ecosystem state for the purpose of developing ecosystem based advice.	a) Science Requirements b) Advisory Requirements	5, 19	Years 1-3	Report to IEASG in 2019 and a research paper
c	Update the Ecosystem Overview for the Norwegian Sea.	a) Science Requirements b) Advisory Requirements	1	Year 3	Ecosystem Overview to IEASG in 2019

Summary of the Work Plan

Year 1	Focus on understanding expectations of IEA end-users, continue the compilation of relevant time-series, and continue the work on integrated assessment for the Norwegian Sea
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Year 2	Focus on, through modelling, single vs. multispecies harvest control rules for development on ecosystem based advice, and outstanding issues for integrated assessment,
Year 3	Focus on advancing IEA in management advice, revise the time series, perform integrated assessment, and update the Ecosystem Overview.

Supporting information

Priority	<p>WGINOR aims to conduct and further develop Integrated Ecosystem Assessments for the Norwegian Sea, as a step towards implementing the ecosystem approach.</p> <p>Term of Reference a)</p> <p>There have been international fish-plankton centred surveys in the Norwegian Sea in May and since the mid 90s. In the most recent years these surveys have transitioned into ecosystem surveys that capture most of the key components of the ecosystem. These data sets are a firm foundation for undertaking integrated assessment of ecosystem status in the Norwegian Sea which is yet to be done. A fairly recent book on the Norwegian Sea ecosystem is a good starting point for the assessment.</p>
Scientific justification	<p>Term of Reference b)</p> <p>At present a multispecies fisheries model and an end to end ecosystem model are being set up for the Norwegian Sea. These models are ideal for investigating the effects of existing single species and alternative multispecies harvest control rules on the ecosystem structure and functioning. Although there is some petroleum exploration in the outskirts of the Norwegian Sea, fishing by far represents the most important antropogenic impact on this ecosystem. The model analyses will be an integrated part of the assessment.</p> <p>Term of Reference c)</p> <p>Update ecosystem overview for the Norwegian Sea.</p>
Resource requirements	Several national and international research projects support the activities indicated and no further resources are needed in the short term. In the long term the group should try to develop an integrated project
Participants	We expect around 15 people to attend.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	It is very important to link this group to ACOM and ensure cooperation between science and advice.
Linkages to other committees or groups	There are linkages to the other regional seas programmes and WGIPS which is the survey planning group and WGWIDE where the stock assessment for the key pelagic Norwegian Sea stocks is performed.
Linkages to other organizations	No recognised links.

Resolutions approved in 2013

Working Group on Integrating Ecological and Economic Models (WGIMM)

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 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	21 December	WebEX Conference call	Interim report by 10 February to SSGIEA, SCICOM & ACOM	
Year 2017	TBD	TBD	Final report by "DATE" to IEASG, 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 codes	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 st 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 nd year	White paper of good practice, manuscript for peer reviewed journal

c	Analyse the potential, capability and performance of the models and 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	Fisheries is increasingly competing for space, especially in coastal areas, but also for the high seas marine spatial planning will become the basis for decision making in the future	3 years	White paper, manuscript for peer reviewed journal
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 nd 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 rd 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 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"> • 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; • The complexity of fisheries management evaluation tools which can meet the increased demands for marine spatial planning and broader cross sector marine management evaluation; • The performance, characteristics and scientific and advisory capabilities of the models for application and implementation to give better advice on potentials for implementation.
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).