# Integrated Ecosystem Assessments Steering Group EGs Resolutions

## Resolutions approved in 2019

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Working Group on Ecosystem Assessment of Western European Shelf Seas (WGEAWESS)</td>
</tr>
<tr>
<td>2</td>
<td>Working Group on Maritime Systems (WGMARS)</td>
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<td>4</td>
<td>Working Group on Comparative Analyses between European Atlantic and Mediterranean marine ecosystems to move towards an Ecosystem-based Approach to Fisheries (WGCOMEDA)</td>
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<td>7</td>
<td>Working Group on Integrated Assessments of the Barents Sea (WGIBAR)</td>
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<td>13</td>
<td>Working Group on Integrated Ecosystem Assessment of the Greenland Sea (WGIEAGS)</td>
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<td>15</td>
<td>Working Group on the Northwest Atlantic Regional Sea (WGNARS)</td>
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<tr>
<td>20</td>
<td>Workshop on methods and guidelines to link human activities, pressures and state of the ecosystem in Ecosystem Overviews (WKTRANSPARENT)</td>
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<tr>
<td>21</td>
<td>ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea (WGIAB)</td>
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<td>23</td>
<td>Working Group on Integrative, Physical-biological, and Ecosystem Modelling (WGIPEM)</td>
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<tr>
<td>25</td>
<td>Working Group on Common Ecosystem Reference Points (WGCERP)</td>
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<td>28</td>
<td>ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment (IEA) for the Central Arctic Ocean (WGICA)</td>
</tr>
<tr>
<td>31</td>
<td>Second Workshop on integrated trend analyses in support to integrated ecosystem assessment (WKINTRA2)</td>
</tr>
<tr>
<td>32</td>
<td>Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholder Participation (WKKEMSSP)</td>
</tr>
<tr>
<td>34</td>
<td>Workshop for the production of the Azorean Ecoregion Ecosystem Overview (WKAZOREco)</td>
</tr>
<tr>
<td>36</td>
<td>Workshop for the production of the Oceanic North East Atlantic Ecoregion Ecosystem Overview (WKABNJ)</td>
</tr>
<tr>
<td>38</td>
<td>Workshop on ecological valuing of areas of the Barents Sea (WKBAR)</td>
</tr>
<tr>
<td>39</td>
<td>Workshop on Challenges, Opportunities, Needs and Successes for including human dimensions in IEAs (WKCONSERVE)</td>
</tr>
<tr>
<td>40</td>
<td>Working Group on Integrated Assessments of the Norwegian Sea (WGINOR)</td>
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## Resolutions approved in 2017

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<thead>
<tr>
<th>Resolution</th>
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<tbody>
<tr>
<td>43</td>
<td>Working Group on SOCIAL indicators (WGSOCIAL)</td>
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## Resolutions approved in 2016

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<tr>
<th>Resolution</th>
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<tbody>
<tr>
<td>46</td>
<td>Working Group on Integrated Assessments of the North Sea (WGINOSE)</td>
</tr>
</tbody>
</table>

IEASG Expert Groups dissolved in 2019
Resolutions approved in 2019

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

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in Chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>16-20 march TBC</td>
<td>Palermo, Italy with WGCOMEDA</td>
<td>Interim report by Date Month May to IEASG</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>Galway, Ireland</td>
<td>Interim report by Date Month May to IEASG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>Canaries?</td>
<td>Final report by Date Month May to IEASG</td>
<td></td>
<td></td>
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</table>

ToR descriptors

<table>
<thead>
<tr>
<th>ToR</th>
<th>Description</th>
<th>Background</th>
<th>Science Plan codes</th>
<th>Duration</th>
<th>Expected Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Review and update the Bay of Biscay/Iberian Coast (BoB-IC) and Celtic Seas (CS) ecoregion Ecosystem Overviews (EO).</td>
<td>Linked to ICES advice and WKEO3.</td>
<td>6.1, 6.5, 6.6</td>
<td>Ongoing</td>
<td>Ecosystem overviews (EO).</td>
</tr>
<tr>
<td>b</td>
<td>Compare and contrast among sub-ecoregion level ITAs to identify and report on commonalities and divergences among areas, with a focus on climate variability.</td>
<td>Responding to requests for standardisation of ecosystem advice products and inclusion of climate change information in Ecosystem Overviews. Linked to WKINTRA, WGS2D, WGOOFE and the commitment to provide advice in the context of EAFM.</td>
<td>1.4, 1.9, 6.5</td>
<td>3 years</td>
<td>Inform IEAs/E O. Results in the final report or/and as a collaborative paper.</td>
</tr>
<tr>
<td>c</td>
<td>Investigate and report on the sub-regional spatio-temporal entities constituting the Bay of Biscay/Iberian Waters and Celtic Seas ecoregion, and the multiple pressures relevant at these scales</td>
<td>Linked to WKEWIEA, WKIRISH, ToR B and previous group ToRs. Investigation of scaling issues related to summarising information from locally relevant scales/models.</td>
<td>1.3, 2.4, 6.5</td>
<td>3 years</td>
<td>Inform IEAs/E O. Results in the final report or/and as a collaborative paper.</td>
</tr>
</tbody>
</table>
d. Explore and describe the potential for incorporating additional products (e.g. MSFD indicators, model outputs, social indicators) from ICES EGs and other processes (e.g., OSPAR, EEA, STECF) into the Ecosystem Overviews. Strongly linked to ToR A, WGCEP, WGSOCIAL, WKEO3 and MSFD. Maximising efficiency across relevant groups for EO development, eliminating redundancy. 4.1, 6.5, 6.6 3 years Ecosystem overviews. Collaborative network with improved workflow.

e. High resolution Ecospace models for selected case studies within WGEAWESS ecoregions to identify opportunities to support marine spatial planning. Working together with ToR C to explicitly incorporate spatial aspects into regional modelling work, investigating opportunities for trade-off analyses and inclusion of socio-economic considerations. 6.1, 6.3, 6.6 3 years Regional modelling products.

Summary of the Work Plan

Year 1

The main tasks will be related to drafting the outline for the papers/process for ToRs B&C, and identifying which group members can apply the agreed upon methodology (within their limited resources). Start the process for reviewing the BoB-IC Ecosystem Overviews.

The group will continue to identify data and outputs that may be potentially valuable to IEAs, EAFM, and particularly the Ecosystem overviews (Tors A, D & E). The group will work to improve communication with other relevant groups (e.g. WGS2D, WGOOFE, WGSOCIAL, WGCOMEDA, WGIAB, WGMARS, WGBIE, WGIPEM).

Year 2

Continue with Year 1 activities while liaising with relevant ICES WG and external groups (e.g. OSPAR) as relevant. Progress agreed upon methodologies for ToRs B&C, write papers. Advance ToR E, developing regional models (scope of model development/ number of case studies will be dependent funding).

Year 3

Continue with Year 2 activities while liaising with relevant ICES WG membership. Finalise papers.
### Supporting information

**Priority**

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. Recently questions have arisen in relation to how to identify relevant scales for various processes, and how to summarise ecoregion level information from disparate, non-continuous data (e.g. surveys using different gears, different modelling approaches, and different socio-economic contexts). Furthermore, standardisation of approaches has become a key topic, particularly as ecosystem assessment moves more towards the realms of advice. This presents particular challenges in the face of such diversity.

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), 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).

**Resource requirements**

There is no resource implication for ICES. Working group program is based on synthesis of data and results from existing data sources and in line with existing funding/scientific programs. Scope of activities is dependent on this funding. Assistance from the ICES Secretariat and IEA Steering group Chair will be useful in identifying and making connections with relevant groups.

**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 steering group, ICES 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, WGCERP, WGSAM, WKIrish, along with stock assessment groups such as WGHANSA, WGBIE, WGCSE, WGMIXFISH. Collaborations for the new ToRs have been instigated with WGSOCIAL, WGS2D, WGCOMEDA and WGMARS. The work and membership of this group is also critical to workshops such as WKEWIEA and WKINTRA which are co-chaired by group members, and feedback to the work of WGEAWESS.

**Linkages to other organizations**

DC- MAP- DG MARE, MSFD DG ENV, OSPAR.
## Working Group on Maritime Systems (WGMARS)

**2019/FT/IEASG02**  
A **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.

<table>
<thead>
<tr>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in Chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2020</td>
<td>April 20-24 Washington, DC, USA</td>
<td>Interim report by 1 June 2020</td>
<td></td>
</tr>
<tr>
<td>Year 2021</td>
<td>TBD - Europe</td>
<td>Interim report by TBD</td>
<td></td>
</tr>
<tr>
<td>Year 2022</td>
<td>TBD - Europe</td>
<td>Final report by TBD</td>
<td></td>
</tr>
</tbody>
</table>

### ToR descriptors

<table>
<thead>
<tr>
<th>ToR</th>
<th>DESCRIPTION</th>
<th>BACKGROUND</th>
<th>SCIENCE PLAN CODES</th>
<th>DURATION</th>
<th>EXPECTED DELIVERABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Analyse how the use of behavioural economics can support IEA/EBM implementation</td>
<td>Policy evaluation in IEA requires insight into human behaviour in order to (1) predict how users respond to policy interventions, and (2) how stakeholders judge trade-offs between conflicting objectives.</td>
<td>6.3, 7.4, 7.5</td>
<td>Years 1, 2, 3</td>
<td>Peer-reviewed paper on behavioural economics for policy evaluation</td>
</tr>
<tr>
<td>b</td>
<td>Review and provide guidelines for conceptual modeling to assist Regional Seas WGs</td>
<td>Conceptual modeling, including through the use of, for instance, Mental Modeler or Bow-Tie Analysis, can aid scientists from different fields, as well as scientists and stakeholders, to facilitate improvements to their IEA activities.</td>
<td>5.3, 6.2, 7.5</td>
<td>Year 1, 2, or 3</td>
<td>At least one workshop with one or more ICES Regional Seas or other IEA-related WGs</td>
</tr>
<tr>
<td></td>
<td>Evaluate the current use of ICES IEAs in support of management and advice</td>
<td>ICES has prioritized the use of IEAs, e.g., in the Regional Seas WGs, as a tool for understanding tradeoffs in fisheries policies.</td>
<td>1.9, 3.2, 6.1</td>
<td>Years 1,2</td>
<td>Peer-reviewed paper on the current status of IEAs in the regional seas WGs</td>
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<tr>
<td>d</td>
<td>Apply Social Network Analysis as a tool to assess ICES network connectivity and preparedness to address IEAs and the ICES Science Plan</td>
<td>Review of existing SNA paper drafts and relevant reports from previous WGMARS work; finish and submit the current SNA draft that was initiated with the ICES Science Fund; initiate updated analyses for ICES IEA EGs.</td>
<td>6.3, 7.4, 7.5</td>
<td>Years 1,2,3</td>
<td>Peer-reviewed paper on the SNA of ICES</td>
</tr>
<tr>
<td>e</td>
<td>Analyse and compare the implementation and linkages of IEA/EBM/MSP and fisheries in the EU, individual European member states, and the US</td>
<td>ICES supports the use of EBM and IEAs, while many EU states support MSP. There is a need to connect science done for both purposes and IEA (supported by ICES) is a tool that could be used with either EBM or MSP.</td>
<td>7.4, 6.1, 6.6</td>
<td>Years 1,2</td>
<td>ICES Report</td>
</tr>
</tbody>
</table>

### Summary of the Work Plan

| Year 1 | Map the use of EBM, IEA, and MSP in a variety of contexts. |
| Year 2 | Explore techniques for understanding stakeholder behaviour as well as facilitating stakeholder involvement. |
| Year 3 | Explore uses of our work and how ICES stakeholders interact to support ICES advice. |

### Supporting information

**Priority**
The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries and ecosystem-based maritime management, especially with regard to the integration of different sustainability dimensions in the consideration of human maritime activities. Consequently, these activities are considered to have a very high priority.

**Resource requirements**
Resource requirements are covered by WGMARS members, including through already funded projects and in some cases with institutional support.

**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**
There are no obvious direct linkages.

**Linkages to other committees or groups**
There is a very close working relationship with the IEASG. WGMARS is also very closely connected to the Strategic Initiative on Human Dimensions and involved in its activities.

**Linkages to other organizations**
WGMARS is very relevant to the Regional Seas Working Groups, and involved in Workshops such as WKINWA, WKBESIO, WKCONSERVE, and others. WGMARS reaches out to various stakeholders and EBM professionals outside of ICES.
Working Group on Comparative Analyses between European Atlantic and Mediterranean marine ecosystems to move towards an Ecosystem-based Approach to Fisheries (WGCOMEDA)

2019/FT/IEASG03

The Working Group on Comparative Ecosystem-based Analyses of Atlantic and Mediterranean marine systems (WGCOMEDA), chaired by Sofia Henriques*, Portugal, M. Cristina Mangano*, Italy, Paris Vasilakopoulos*, Italy and Romain Frelat*, Netherlands, will work on ToRs and generate deliverables as listed in the Table below.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MEETING DATES</th>
<th>VENUE</th>
<th>REPORTING DETAILS</th>
<th>COMMENTS (CHANGE IN CHAIR, ETC.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2020</td>
<td>4-6 May</td>
<td>Palermo, Italy</td>
<td>No annual report</td>
<td>Four new co-chairs to pursue the development of WGCOMEDA activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Meeting hosted by the University of Palermo (distem)</td>
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</tr>
</thead>
<tbody>
<tr>
<td>Year 2021</td>
<td>May</td>
<td>Pending decision of the group</td>
<td>No annual report</td>
<td></td>
</tr>
<tr>
<td>Year 2022</td>
<td>May</td>
<td>Pending decision of the group</td>
<td>Final 3-year cycle report by July 2022 to SSGIEA.</td>
<td></td>
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Tor descriptors

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<thead>
<tr>
<th>ToR</th>
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<th>Science plan codes</th>
<th>Duration</th>
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<tbody>
<tr>
<td>a</td>
<td>Assess the functional biodiversity of demersal and benthic assemblages across Mediterranean and Atlantic systems</td>
<td>A) The topic is a follow up from the work in the previous cycles aiming to improve: (1) the use of functional traits to assess the structure and functioning of marine assemblages (integrating different taxonomic groups) and (2) the assessment of functional biodiversity patterns across Mediterranean and Atlantic systems</td>
<td>1.4; 1.9; 2.2</td>
<td>3 years</td>
<td>1. Define the core functional traits across different taxonomic groups in order to integrate the current approaches</td>
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<td></td>
<td></td>
<td>B) The tor will provide better understanding of ecosystems functioning and improve our ability to predict the impact of environmental and human-induced changes.</td>
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<td></td>
<td>2. Compile trait data for phytoplankton, zooplankton, fish and invertebrate species to standardize the use of traits</td>
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<td>3. Identify possible methods to deal with dynamic traits on space and time, i.e. Those which are demographic (e.g. Fecundity) or ontogenetic (e.g. Diet) dependent</td>
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<td></td>
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<td>4. Understand spatio-temporal dynamics and patterns of functional diversity and respective drivers (trait biogeography; co-occurrence of traits)</td>
</tr>
</tbody>
</table>
b) Integrate the complexity of marine biota to understand how ecosystem structure and connectivity support the stability of communities

A) The topic is a follow up from the 1.4; work in the previous cycles and addresses issues on integrating multi-trophic interactions for IEA 5.2

B) Ecosystem structure and connectivity is known to affect community stability, but empirical evidences are still weak. Embracing the complexity of marine ecosystems (e.g. By integrating trophic interactions) will strengthen the input and guidance for ecosystem-based management.

3 years

1. Review existing food webs models across Mediterranean and Atlantic systems

2. Identify possible methods to predict species interactions from traits and extend multi-trophic interaction network in data-poor regions

3. Understand spatio-temporal dynamics of food webs and identify the link between structure and stability across ecosystems

4. Understand past and predict future vulnerabilities of communities to fishing disturbances or biological invasions.

c) Investigate resilience and mechanisms of change in complex marine systems impacted by anthropogenic and environmental drivers

A) The topic is a follow up from the work in the previous cycles and aims to study systems undergoing changes in the NE Atlantic and the Mediterranean to uncover synchronies and analogies across them.

1.9; 6.5

3 years

1. Review and update existing information on the temporal development of ecosystems in the NE Atlantic and the Mediterranean.

2. Develop and test different types of Integrated Assessments: e.g. Ecosystem-based, traits-based, population-based etc.

3. Quantify the resilience of different system states and elucidate the specific role of different stressors.

4. Compare the system dynamics and temporal occurrence of shifts in different
5. Improve our **prediction capability on future shifts** in complex marine systems through a better understanding of the past dynamics.

| d | Explore options to integrate ecological and socio-economic dimensions to support integrated fisheries advice and marine management |
| B) The tor will be organised around 3 main activities and expected deliverables: scooping and systematic review, evidence mapping and synthesis, comparative analysis of case studies. |

A) New topic incorporating social and cultural aspects in order to support the implementation of IEA in regional ecosystems.

1. Scoping exercise mostly focused in the Mediterranean Sea to check for existing literature and to ensure coordination of activities with other international bodies and existing wgs within and outside ICES (e.g. ICES wgsocial, JRC, GFCM).

2. Evidence mapping to highlight the current work and identify future needs and gaps for social science in Med.

3. Case studies assessing and reporting the social and cultural significance of commercial fishing (coastal regions in both the Med and Atlantic). Selection and provision of relevant indicators and analysis with economic and ecological information.

4. Framework for collective reporting (database) to support future potential data collection, data analysis and advice development in a context of integrated ecosystem assessments.

5. Trade-off exploration to assess the socio-cultural and economic significance of commercial fishing (work with other relevant ICES wgs)
### Summary of the Work Plan

**Year 1**

1.1 Definition of the core functional traits across different taxonomic groups. This activity will be developed in order to integrate the current approaches among trophic levels (i.e. What traits should we use to understand linkages between plankton, fish and benthic invertebrates) - Deliverable tor a1. Then, we will start the collection and compilation of standardized trait data for phytoplankton, zooplankton, fish and invertebrate species in order to create a common trait database – toward Deliverable tor a2.

1.2 Reviews and update databases of (i) existing food webs models, (ii) temporal development of ecosystems and (iii) socio ecological systems approaches across Mediterranean and Atlantic systems - Deliverables tor b1, tor c1 and tor d1. All the 3 tors (b, c and d) start with a revision activity of data from the scientific and grey literature as well as a survey of current work from participants of the working group. Temporal dynamics of ecosystems could be informed by time-series of the abundance of different taxa (e.g. From scientific surveys) and/or fisheries-related data (e.g. Fisheries landings) - Deliverables tor c1. The scoping exercise of socio-ecological systems is followed by an evidence mapping (data analysis from the systematic review - Deliverables tor d1) that will depict the current work and identify future needs and gaps for social science when dealing with ecosystem-based approach - Deliverable tor d2.

1.3 Networking activities to ensure coordination with other international bodies and existing wgs within and outside ICES.

**Year 2**

2.1 Completion of the common trait database - deliverable tor a2 - and identification of methods to deal with dynamic traits on space and time, i.e. Those which are demographic (e.g. Fecundity) or ontogenetic (e.g. Diet) dependent - deliverable tor a3 - and to predict species interactions from traits and extend multi-trophic interaction network in data-poor regions - deliverable tor b2.

2.2 Development and testing of different types of Integrated Assessments (e.g. Traits-based linking to tor a2, ecosystem-based, population-based) - deliverable tor c2, in order to quantify the resilience of different system states and elucidate the specific role of stressors - deliverable tor c3.

2.3. Case studies assessing and selecting relevant indicators dealing with socio-ecological systems - Deliverable tor d3, e.g. The social and cultural significance of commercial fishing (coastal regions in both the Mediterranean and the Atlantic).

**Year 3**

3.1 Spatio-temporal analysis of functional diversity dynamics - deliverables tor a4 - and of food webs structure - deliverables tor b3 – in order to understand past dynamics and identify drivers of change across ecosystems in NE Atlantic and the Mediterranean Sea.

3.2 Assessment of future vulnerability and stability of Mediterranean and Atlantic ecosystems to different human pressures, through looking at functional changes and developing resilience indicators - deliverables tor a5 – and by using food web structure to indicate the ecosystem resilience to disturbances (e.g. Fishing disturbances or biological invasions) - deliverables tor b4.

3.3 Comparison of the temporal occurrence of shifts in different ecosystems of the NE Atlantic and the Mediterranean Sea to improve our prediction capability on future shifts in complex marine systems through a better understanding of the past dynamics - Deliverables tor c4 and c5.
**3.4 Collective reporting (database) to assess the socio-cultural and economic significance of commercial fisheries** and support future potential data collection, data analysis, trade-off elaboration and advice development in a context of integrated ecosystem assessments of commercial fishing - Deliverables for d4 and 5.

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**Supporting information**

**Priority**

The aim of this working group (WG) is to investigate both cross-systems and system-specific key questions to guide research and improve the ecosystem approach to management of living marine resources of the European Seas. To this end, we use existing data and analysis from regional systems of the North East Atlantic Ocean and Mediterranean Sea. A **comparative approach of marine ecosystems** is essential to learn how Mediterranean and Atlantic ecosystems are structured, how they function, and also to identify which are the more sensitive species or ecological processes to be managed within the ecosystem dynamics. Therefore, this WG aims at strengthening the scientific basis for regional and integrated ecosystem approach of coastal and marine living resources through a comparative platform of research.

During the previous two cycles, WG COMEDA established a strong network of collaboration that will continue contributing to the comparative knowledge of Atlantic and Mediterranean systems. The new tasks build up on past research of the group and propose to use novel approaches to assess the **functional diversity, resilience, connectivity and complexity of marine assemblages**, both across biological groups and between Mediterranean and Atlantic systems. Additionally, a new topic (tor d), related with ecosystem services, aims to **integrate the socio-economic dimension** with the advanced biological knowledge in order to better understand the effects of both anthropogenic changes and management options in the ecosystems.

Close collaboration with other WGs of the SCICOM/ACOM Steering Group on Integrated Ecosystem Assessments (SGIEA) such as WGIAB, WGEAWESS, WGSOCIAL and WGMARS will provide a solid basis to develop the research topics and tor d of this new COMEDA cycle. Furthermore, during this new cycle we will invite colleagues working on ecosystem services and on linking socio-economic and ecological dimensions to the meetings to develop and improve COMEDA’s current knowledge. The new tor d shows the commitment of the group to develop applied research to support integrated fisheries advice and marine management.

**Resource requirements**

Information from ICES, GFCM, and JRC – STECF WG databases are the main input for this group. No additional resources are identified, although participation of some experts (especially early career scientists) to working group meetings depends on funding availability.

**Participants**

The Group is normally attended by some 20–25 members and guests.

The preliminary list of possible participants is the following:

- Romain Frelat (University of Hamburg, Germany) – Chair and expert on Atlantic ecosystems (North Sea and Baltic Sea).
- Sofia Henriques (University of Lisbon, MARE, Portugal) – Chair and expert on Atlantic ecosystems, global meta-analysis and functional diversity.
- Paris Vasilakopoulos (European Commission - JRC, Italy) – Chair and expert on Mediterranean ecosystems and resilience.
- Maria Cristina Magano (distem, University of Palermo, Italy) – Chair and expert on Mediterranean ecosystems.
- Marta Coll (ICM-CSIC, Spain) – Expert on Mediterranean ecosystems and food webs.
- Manuel Hidalgo (IEO, Spain) – Expert on Atlantic and Mediterranean ecosystems.
- Hilmar Hinz (IMEDEA-CSIC, Spain) – Expert on Atlantic ecosystems and invertebrates’ biodiversity and assemblages.
- Christian Möllmann (Univ. Of Hamburg, Germany) – Expert on Atlantic ecosystems.
- Evangelos Tzanatos (University of Patras, Greece) – expert on Mediterranean ecosystems.
- Bastian Merigot (University of Montpellier, France) – expert on Atlantic and Mediterranean 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).
- Rita Vasconcelos (IPMA, MARE, Portugal) – Expert on Atlantic ecosystems, fisheries management and global meta-analysis.
- Silvia de Juan (IMEDEA-CSIC, Spain) – Expert on Atlantic ecosystems and invertebrates’ biodiversity and assemblages.
- Lucia López (IEO, Spain) – Expert on Mediterranean ecosystems and food webs.
- 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).
- Henk 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.
- Heino Fock (Thuener, Germany) - expert on Atlantic and Arctic ecosystems (Greenland).
- Ignacio Catalan (IMEDEA, Spain) – expert on Atlantic and Mediterranean ecosystems.
- Jaime Otero (IIAM, CSIC, Spain) – expert on Atlantic and Arctic ecosystems.
- Laurene Pucchet (DTU-AQUA, Denmark) – expert on Atlantic and Mediterranean ecosystems.
- Mariano Koen-Alonso (DFO, Canada) – expert on Atlantic ecosystems (West Canada).
- Raul Primiciero (University of Tromsø, Norway) – expert on Arctic ecosystems (Barents Sea).
- Marcos Llope (IEO, Spain) – expert on Atlantic ecosystems.

**Secretariat facilities**  None

**Financial**  No financial implications for ICES.

To facilitate the participation of early-career scientists, WG chairs will apply to marine research consortiums to find financial support for early-career researchers who need travel funding.

**Linkages to ACOM and groups under ACOM**  There are no obvious direct linkages.

**Linkages to other committees or group**  There is a very close working relationship with all the groups IEASG, and especially
- Working Group on Integrated Assessments of the Baltic Sea (WGIAB)
- Working Group on Ecosystem Assessment of Western European Shelf Seas (WGEAWESS)
- Working Group on SOCIAL indicators (WGSOCIAL) (especially tor d)
- Working Group on Maritime Systems (WGMARS) (especially tor d)

It is also very relevant to the Working Groups:
- Working Group on the Integrated Assessments of the Barents Sea (WGIBAR)
- Working Group on Integrated Assessments of the North Sea (WGINOSE)
- Working Group on Integrated Ecosystem Assessment for the Central Arctic Ocean (WGICA)
- Working Group on the Northwest Atlantic Regional Sea (WGNARS)
- Working Group on Biodiversity Science (WGBIODIV) (especially tor b)

**Linkages to other organizations**  None
Working Group on Integrated Assessments of the Barents Sea (WGIBAR)

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.

<table>
<thead>
<tr>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in Chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2020</td>
<td>TBD, February, Russia</td>
<td>Interim report by TBC to IEASG</td>
<td></td>
</tr>
<tr>
<td>Year 2021</td>
<td>TBD, Russia</td>
<td>Interim report by TBC to IEASG</td>
<td></td>
</tr>
<tr>
<td>Year 2022</td>
<td>TBD, Russia</td>
<td>Final report by TBC to IEASG</td>
<td></td>
</tr>
</tbody>
</table>

**ToR descriptors**

<table>
<thead>
<tr>
<th>ToR</th>
<th>Description</th>
<th>Background</th>
<th>Science Plan codes</th>
<th>Duration</th>
<th>Expected Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Prepare relevant data sets that can be used for the integrated assessments of the Barents Sea</td>
<td>Science and advisory requirements</td>
<td>6.1</td>
<td>Year 1, 2, 3</td>
<td>Updated data sets</td>
</tr>
<tr>
<td>b</td>
<td>Perform an integrated analysis of multivariate data sets and other relevant information including model outputs</td>
<td>Science and advisory requirements</td>
<td>1.3; 1.4</td>
<td>Year 1, 2, 3</td>
<td>Annual reports</td>
</tr>
<tr>
<td>c</td>
<td>Analyse spatial patterns and trends with special emphasis on shifting distribution of communities and species, and valuable and vulnerable areas</td>
<td>Science and advisory requirements</td>
<td>2.2; 2.4</td>
<td>Year 1, 2, 3</td>
<td>Annual reports</td>
</tr>
<tr>
<td>d</td>
<td>Prepare an annual report on the status and trends of the Barents Sea ecosystem</td>
<td>Science and advisory requirements</td>
<td>1.3; 2.1; 6.5</td>
<td>Year 1, 2, 3</td>
<td>Annual reports</td>
</tr>
<tr>
<td>e</td>
<td>Provide support to ongoing ecosystem assessments and evaluations in the Barents Sea</td>
<td>Science and advisory requirements</td>
<td>2.2; 2.7; 6.1</td>
<td>Year 1, 2, 3</td>
<td>Annual report</td>
</tr>
<tr>
<td>f</td>
<td>Evaluate the current monitoring of the Barents Sea ecosystem</td>
<td>Science and advisory requirements</td>
<td>3.1; 3.2</td>
<td>Year 1, 2, 3</td>
<td>Annual reports</td>
</tr>
</tbody>
</table>
Summary of the Work Plan

Year 1
Prepare relevant data sets and other relevant information, including biotic and abiotic ecosystem components and human pressure, that can be used for the integrated assessment of the Barents Sea.
Perform an integrated analysis of multivariate data sets and other relevant information including model outputs
Prepare an annual report on the Barents Sea ecosystem status and describe fluctuations and changes based on trend analyses and integrated analysis of multivariate data sets
Evaluate the current monitoring of the Barents Sea ecosystem
Provide support to ongoing ecosystem assessments and evaluations in the Barents Sea

Year 2
Prepare relevant data sets and other relevant information, including biotic and abiotic ecosystem components and human pressure, that can be used for the integrated assessment of the Barents Sea.
Perform an integrated analysis of multivariate data sets and other relevant information including model outputs
Prepare an annual report on the Barents Sea ecosystem status and describe fluctuations and changes based on trend analyses and integrated analysis of multivariate data sets
Evaluate the current monitoring of the Barents Sea ecosystem
Provide support to ongoing ecosystem assessments and evaluations in the Barents Sea

Year 3
Prepare relevant data sets and other relevant information, including biotic and abiotic ecosystem components and human pressure, that can be used for the integrated assessment of the Barents Sea.
Perform an integrated analysis of multivariate data sets and other relevant information including model outputs
Prepare an annual report on the Barents Sea ecosystem status and describe fluctuations and changes based on trend analyses and integrated analysis of multivariate data sets
Evaluate the current monitoring of the Barents Sea ecosystem
Provide support to ongoing ecosystem assessments and evaluations in the Barents Sea
Revise the Barents Sea ecoregion description in the ICES Ecosystem Overview, including overview of the ecosystem, its current state and changes under the environmental and anthropogenic impacts

Supporting information

Priority
The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very 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 (ToR c and e) is needed.

Participants
The Group is normally attended by some 20–25 members and guests.

Secretariat facilities
SharePoint site, secretariat support for reporting

Financial
No financial implications.

Linkages to ACOM and groups under ACOM
Stock assessment groups in particular AFWG and WGWIDE.

Linkages to other committees or groups
There is a very close working relationship with all the groups WGINOR and WGICA. It is also very relevant to the groups WGSAM, WGOH, WGECO.
Linkages to other organizations

The Joint Russian-Norwegian Fisheries Commission, in charge of joint fisheries management in the Barents Sea.
The Joint Russian-Norwegian Environmental Commission, in charge of joint environmental management in the Barents Sea.
The Norwegian Ministry of Climate and Environment, in charge of Norwegian holistic ecosystem-based management plan for the Norwegian part of the Barents Sea.
Relevant groups within the Arctic Council. PAME/ICES workshop, PICES/ICES workshops.
Norwegian monitoring group under the Norwegian Management Plan

Working Group on Integrated Ecosystem Assessment of the Greenland Sea (WGIEAGS)

2019/FT/IEASG05 Working Group on Integrated Ecosystem Assessment of the Greenland Sea (WGIEAGS), chaired by Jesper Boje*, Denmark/Greenland, and Colin Stedmon*, Denmark, will work on ToRs and generate deliverables as listed in the Table below.

<table>
<thead>
<tr>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in Chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2020</td>
<td>February 11-13 Copenhagen, Denmark</td>
<td>Interim report to ICES by 16 March 2020</td>
<td></td>
</tr>
<tr>
<td>Year 2021</td>
<td>January TBD Nuuk, Greenland</td>
<td>Interim report to ICES by 30th April</td>
<td></td>
</tr>
<tr>
<td>Year 2022</td>
<td>January TBD Copenhagen, Denmark</td>
<td>Final report to ICES by 30th November</td>
<td></td>
</tr>
</tbody>
</table>

ToR descriptors

<table>
<thead>
<tr>
<th>ToR</th>
<th>DESCRIPTION</th>
<th>BACKGROUND</th>
<th>SCIENCE PLAN CODES</th>
<th>DURATION</th>
<th>EXPECTED DELIVERABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Assemble relevent data for describing spatial and temporal changes in the Greenland Sea</td>
<td>The database will contain physical, chemical and biological (incl. higher trophic levels) oceanographic data.</td>
<td>1.1</td>
<td>Years 1-3</td>
<td>Merged database. Metadata to be reported to ICES.</td>
</tr>
<tr>
<td>B</td>
<td>Review and consider methodological approaches and analytical tools for conducting integrated ecosystem assessment for the Greenland Sea</td>
<td>Before starting data analysis, basic discussions on suitable methodological/analytical approaches are required. This can be started after initial datasets are assembled.</td>
<td>1.1</td>
<td>Years 1-3</td>
<td>Report to ICES</td>
</tr>
</tbody>
</table>

Avoid generic terms such as “Discuss” or “Consider”. Aim at drafting specific and clear ToR, the delivery of which can be assessed.
### Summary of the Work Plan

#### Year 1
- Start assembling relevant data that can be used to describe spatiotemporal changes in the Greenland Sea. Create first merged database containing physical, chemical and biological (incl. higher trophic levels) oceanographic data.
- Develop Ecosystem Overview (as advice request).
- Start discussions on methodological approaches and analytical tools for conducting integrated ecosystem assessment.
- Identify additional scientists/partners and invite them to join the EG.

#### Year 2
- Continue assembling relevant datasets and update the database.
- Continue discussions on methodological approaches and analytical tools for conducting integrated ecosystem assessment. Prepare first analysis on the ecosystem status and trends.

#### Year 3
- Finalise the database.
- Prepare manuscript on the status and trends of the Greenland Sea ecosystem.
- Identify knowledge gaps and priority research items that can improve future integrated ecosystem assessments and provide recommendations to improve the monitoring.

### Supporting information

#### Priority
- A status for the region is currently lacking and at the same time the region are experiencing change and is a potential candidate to continue severe changes. Arctic amplification of global warming and increasing meltwater flux from Greenland icesheet are changing the oceanographic conditions. Biological resources are subsequently also shifting in response. This effort will set the baseline in the process to permit sustainable development regional fisheries.

#### Resource requirements
- Past and current research programs will provide the data. These will be gathered from public databases and through research networks. There are no current external funds to support the initiative so it will be started with in-kind contributions from DTU and GINR in the form of person months. Once underway national funds will be sought via respective national ministries.
- The research initiatives that may arise from the activity have the opportunity to align with EU framework funding.
Participants

Initiated by DTU and GNIR participation will be seeked from Iceland and Norway, with expertise spanning oceanography and fisheries. Participants from other nations are also welcomed.

Secretariat facilities

SharePoint site. Support for meetings at ICES HQ, when appropriate

Financial

No financial implications

Linkages to ACOM and groups under ACOM

Link to ACOM through development of Ecosystem Overview, NWWG and WGWIDE.

Linkages to other committees or groups

All ICES IEASG expert groups, several EGs under APISG (human pressures) and EPDSG

Linkages to other organizations

Arctic Council, PAME, IASC, NEAFC

Working Group on the Northwest Atlantic Regional Sea (WGNARS)

2019/FT/IEASG06  The Working Group on the Northwest Atlantic Regional Sea (WGNARS), is chaired by Sean Lucey, USA and Robert Gregory, Canada, will work on ToRs and generate deliverables as listed in the Table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in Chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>11-15 May</td>
<td>Woods Hole, USA</td>
<td>Interim report by 19 June to IEASG</td>
<td>New Canadian Chair will be appointed</td>
</tr>
<tr>
<td>2021</td>
<td>TBD</td>
<td>Halifax, Canada</td>
<td>Interim report by TBD to IEASG</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>TBD</td>
<td>Woods Hole, USA</td>
<td>Final report by TBD to IEASG</td>
<td>New USA Chair will be appointed</td>
</tr>
</tbody>
</table>

ToR descriptors
<table>
<thead>
<tr>
<th>ToR</th>
<th>Description</th>
<th>Background</th>
<th>Science plan codes</th>
<th>Duration</th>
<th>Expected Deliverables</th>
</tr>
</thead>
</table>
| a   | Report on recent activities related to Integrated Ecosystem Assessments (IEA) within the United States, Canada, and Regional Fisheries Management Organizations | a) Science Requirements  
|     |             | b) Advisory Requirements  
|     |             | c) Requirements from other EGs | 1.1, 6.5 | 3 years (2020, 2021, 2022) | • Regular reports from US/Canada/NAFO |
| b   | Expand the work already accomplished by WGNARS into other regional ecosystems and/or multiple ocean uses while considering the roles of women and remote, low income, and indigenous communities in the system | 1.2, 2.1, 6.5 | 3 years (2020, 2021, 2022) | • Refined understanding of the system through conceptual models  
|     |             |             |                    | • Exploratory application of risk assessment to a Canadian region  
|     |             |             |                    | • Analysis of cumulative effects including, for example, offshore energy |
| c   | Increase the cross disciplinary capacity of IEAs in the region by engaging with scientists and stakeholders from under-represented disciplines and research communities, including those in the social sciences | 2.7, 6.6, 7.5 | 3 years (2020, 2021, 2022) | • List of research products developed from reaching out and including members of under-represented disciplines and research communities (e.g. papers, reports, indicators) |
| d   | Continue to evaluate and test indicators which are responsive to a changing environment or other conditions, especially those that indicate shifting resources, changes in human behavior, habitat, or extreme events, or can be used as early warning signs of a pending change (leading indicators) | 1.1, 7.1 | 3 years (2020, 2021, 2022) | • Tested and evaluated new indicators that are responsive to a changing environment or other conditions (e.g. SMART indicators)  
|     |             |             |                    | • Completed threshold analysis of existing indicators  
|     |             |             |                    | • Framework for developing spatial indicators |
a  Improve management advice by developing decision support tools that reconcile multiple ocean uses by explicitly addressing tradeoffs within an ecosystem context (e.g., structured decision making, management strategy evaluation, scenario planning)

b  Develop best practices for increasing efficiency in product development that can lead to improved responsiveness to management requests

c  Develop best practices for communicating with a diverse group of stakeholders (i.e., managers, scientists, public), recognizing that effective communication tools may differ across audiences

Summary of the Work Plan

Year 1  ToRs a, b, c, d and f

Year 2  ToRs a, b, c, d, and g

Year 3  ToRs a, b, c, d and e

Supporting information

Priority  The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very 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  The Group is normally attended by some 20–25 members and guests.

Secretariat facilities  None.
Workshop on methods and guidelines to link human activities, pressures and state of the ecosystem in Ecosystem Overviews (WKTRANSPARENT)

2019/WK/IEASG07 Workshop on methods and guidelines to link human activities, pressures and state of the ecosystem in Ecosystem Overviews (WKTRANSPARENT) chaired by Henn Ojaveer*, Denmark, and Mette Skern-Mauritzen*, Norway, will be established and will meet in Copenhagen, Denmark, TBD April 2020 to:

a) Develop guidelines for a diagram-format general overview on the ecosystem structure, with a purpose to offer an easily understandable introduction to the ecoregion ecosystem;

b) Propose ways to link the identified high-priority pressures to ecosystem functions and processes;

c) Review guidelines used in relevant approaches and frameworks for assessing and prioritizing among drivers, stressors and impacts;

d) Adapt a simplified set of best practices to Ecosystem Overviews that ensures transparency in assessments, communication of uncertainties and allowing different approaches being used in different regions depending on data availability, skills and capacity of ICES Expert Groups.

WKTRANSPARENT will report by TBD May 2020 for the attention of the ACOM/SCICOM.

Supporting information

<table>
<thead>
<tr>
<th>Priority</th>
<th>High priority, the Ecosystem Overviews are part of the recurrent advice in the Administrative Agreement (AA) signed between the EU and ICES, and key mechanism for ICES to deliver its advice on ecosystem based management EBM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific justification</td>
<td>This is a direct follow-up from WKEO3 to further advance and develop Ecosystem Overviews, which includes both conceptual/guidance developments as well as addressing issues like considering uncertainty, TAF and FAIR data principles.</td>
</tr>
<tr>
<td>Resource requirements</td>
<td>The national research programmes and ICES EGs which provide the main input to this group are already underway, and resources are already committed.</td>
</tr>
<tr>
<td>Participants</td>
<td>The WK will be attended by experts covering the areas of knowledge related to the ToRs, with a wide range of area coverage.</td>
</tr>
<tr>
<td>Secretariat facilities</td>
<td>ICES Q room facilities and participation from Data Centre and Science/Advice.</td>
</tr>
<tr>
<td>Financial</td>
<td>No financial implications.</td>
</tr>
<tr>
<td>Linkages to advisory committees</td>
<td>Direct link to ACOM</td>
</tr>
<tr>
<td>Linkages to other committees or groups</td>
<td>WGICA, WGINOSE, WGINOR, WGIIBAR, WGEAWESS, WGCOMEDA, WGIAB, WGITMO, WGMME, WGZEB, WGSAM, BEWG, JWGBIRD, WGSFD, WKCONSERVE, WKITRA2.</td>
</tr>
<tr>
<td>Linkages to other organizations</td>
<td>OSPAR, ELCOM, NEAF, PICES, etc.</td>
</tr>
</tbody>
</table>
Resolutions approved in 2018

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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in Chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>8-12 April</td>
<td>Palma de Mallorca, Spain</td>
<td>Interim report by 29 May 2019 to IEASG</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>TBD</td>
<td>Copenhagen, Denmark</td>
<td>Interim report by TBD 2020 to IEASG</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>TBD</td>
<td>TBD</td>
<td>Final report by TBD 2021 to IEASG</td>
<td></td>
</tr>
</tbody>
</table>

**ToR descriptors**

<table>
<thead>
<tr>
<th>ToR</th>
<th>Description</th>
<th>Background</th>
<th>Science Plan codes</th>
<th>Duration</th>
<th>Expected Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>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.</td>
<td>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 SICCME</td>
<td>1.9, 6.6, 7.1, 6.5</td>
<td>1 year</td>
<td>- 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.</td>
</tr>
<tr>
<td>b</td>
<td>Conduct vulnerability analyses for the combined social – ecological system of Baltic Sea sub-systems to the cumulative effects of climate change, fisheries and eutrophication using an exposure – sensitivity approach.</td>
<td>This ToR will investigate the consequences of cumulative external threats on the Baltic Sea ecosystems, 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 HELCOM and ICES EGs, including WGSOCIAL, WGCERP, and SICCME</td>
<td>6.5</td>
<td>2 years</td>
<td>- Research article(s) on the vulnerability of Baltic Sea sub-systems to cumulative drivers - Intermediate results reported in interim reports 2019 and 2020 as well as the final report. - Output to Ecosystem Overview</td>
</tr>
</tbody>
</table>
work across ICES EGs, including WGSOCIAL and SICCME

| 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, WGCOMEDA, WGSOCIAL, WGMARS, SICCME, 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.

| 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

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

- effects of connectivity, climate and habitat on emerging species distribution, to support management and fisheries
- key process formulation (mortality, physiological rates...)
- movement algorithms

Understanding the connectivity between networks of MPA under influence of climate change is vital. Connectivity is also essential to defining the spatial structure of stocks and better understanding of the recruitment process.

Fundamental research is needed to improve the description of key physiological processes in models.

Important for IEA EGs, spatial planning EG, BEWG, WGBIOP, and for advise.

In E2E models, movement are essential, and there is a need to assess the characteristics and impacts of each algorithm in different environments (theoretical and/or realistic)

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| d  | Assessment of model skill evaluation methods by:  
- Comparison of existing "guidelines" and metrics of skill assessment using existing examples and applying these methods to models used by the group to conclude on the feasibility of the currently existing approaches and identify possible weakness  
- investigate uncertainty analysis (structural, parameters, |  |  |
|  | The lack of systematic evaluation of ecosystem model performance and sensitivity currently limits their use in an operational and management context.  
Evaluation is challenged by the complexity of the models themselves, as well as model vs. sparse datasets comparisons, where characterizing different types of variability (mean or trend; interannual or seasonal; rare or extreme events etc.) are needed.  
Links to all EG using multispecies and |  |  |
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scenarios) including model ensemble. 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**

<table>
<thead>
<tr>
<th>ToR</th>
<th>Description</th>
<th>Background</th>
<th>Science Plan codes</th>
<th>Duration</th>
<th>Expected Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Review regional and national policy and management drivers for the establishment of reference points across ICES member nations.</td>
<td>The motivations behind establishment of reference points vary between nations. This needs to be described and understood before developing common reference points.</td>
<td>6.2, 6.3</td>
<td>year 1</td>
<td>Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e</td>
</tr>
<tr>
<td>b</td>
<td>Review previous efforts to identify suitable ecological/ecosystem indicators relevant to fisheries management in the ICES areas. (Year 1)</td>
<td>Some reference points for ecological/ecosystem indicators already exist. They need reviewing in the light of ToR a) before developing common reference points.</td>
<td>5.3, 6.1</td>
<td>Year 1</td>
<td>Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e</td>
</tr>
<tr>
<td>c</td>
<td>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.</td>
<td>Some indicators have been (or have the potential to be) used in many different ecosystems. Building on work by e.g. WGECO, OLAS II, OSPAR, these key indicators need to be shortlisted before reference points can be evaluated.</td>
<td>1.3, 6.2, 6.6</td>
<td>Year 1</td>
<td>Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e</td>
</tr>
<tr>
<td>d</td>
<td>When ecosystem reference points already exist, identify the methodology used for their determination.</td>
<td></td>
<td>1.3, 6.2</td>
<td>Year 1</td>
<td>Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e</td>
</tr>
<tr>
<td>e</td>
<td>When ecosystem reference points already exist, identify if they could change (or have already changed) under different climatic or ecological regimes</td>
<td></td>
<td>1.3, 2.2, 6.2</td>
<td>Year 1</td>
<td>Report of the review in ICES or as peer reviewed publication. Combined review based on ToRs a-e</td>
</tr>
<tr>
<td>f</td>
<td>Develop conceptual models to examine ecosystem drivers (climate forcing, fishing) and responses using selected ecosystem reference points.</td>
<td>Ecosystem indicators are attached to mental (conceptual) models of ecosystems. The conceptual models need to be explicitly presented together with the reference points.</td>
<td>1.3, 2.2, 6.2</td>
<td>Year 2</td>
<td>Contribution to ICES ecosystem overviews through the provision of conceptual models of ecosystem functioning.</td>
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<td>g</td>
<td>Establish a framework to test the performance of the selected indicators and of the calculation of the associated reference points, using simulated data.</td>
<td>Similar to what is done in MSE (management strategy evaluation), ecosystem reference points need to be evaluated through simulation studies…</td>
<td>4.1</td>
<td>Year 2</td>
<td>Report within ICES and as peer reviewed publication. Combined with ToR h.</td>
</tr>
<tr>
<td>h</td>
<td>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.</td>
<td>…and these simulation studies should be performed on a set of representative case studies.</td>
<td>4.1, 5.1, 5.3</td>
<td>Year 3</td>
<td>Report within ICES and as peer reviewed publication. Combined with ToR g.</td>
</tr>
<tr>
<td>i</td>
<td>Identify ecosystem components that respond rapidly to changes in biophysical drivers and could potentially serve as indicators of loss of resilience and ecosystem change.</td>
<td></td>
<td>1.3</td>
<td>Year 3</td>
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<td>j</td>
<td>Provide a set of recommendations for integrated assessment working groups and Ecosystem overviews for the definition of ecosystem indicators and their limit reference points.</td>
<td>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.</td>
<td>6.1, 6.3, 6.6</td>
<td>Year 3</td>
<td>Recommendations to ICES IEA groups and for the further development of Ecosystem Overviews. Peer review publication.</td>
</tr>
</tbody>
</table>

**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 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 WGECO, 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.

<table>
<thead>
<tr>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in Chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2019</td>
<td>8-10 May Sapporo, Japan</td>
<td>Interim report by 1 September 2019 to IEASG</td>
<td></td>
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<tr>
<td>Year 2020</td>
<td>To be decided</td>
<td>To be decided</td>
<td>Interim report by 1 September 2020 to IEASG</td>
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<tr>
<td>Year 2021</td>
<td>To be decided</td>
<td>To be decided</td>
<td>Final report by 31 December 2021 to IEASG</td>
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**ToR descriptors**

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</tr>
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</table>
### 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.  

1.1, 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 ¾ 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.
### 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
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. 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).

#### Scientific justification
ICES IEA EGs provide science based assessments of ecosystem status, trends and vulnerabilities to support implementation of the ecosystem approach to management.

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.

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.

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.

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.

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

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

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

<table>
<thead>
<tr>
<th>Priority</th>
<th>WKKEMSSP is essential to WGINOSE to be able to deliver on its ToRs and subregional analysis of the North Sea ecosystem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific justification</td>
<td>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.</td>
</tr>
<tr>
<td>Resource requirements</td>
<td>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.</td>
</tr>
<tr>
<td>Participants</td>
<td>10 – 20 participants will be expected.</td>
</tr>
<tr>
<td>Secretariat facilities</td>
<td>None.</td>
</tr>
<tr>
<td>Financial</td>
<td>No financial implications.</td>
</tr>
<tr>
<td>Linkages to advisory committees</td>
<td>There are no obvious direct linkages with the advisory committees.</td>
</tr>
<tr>
<td><strong>Linkages to other committees</strong></td>
<td>WGINOSE, WGIBAR, WGINOR, WGIAB or groups</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td><strong>Linkages to other organizations</strong></td>
<td>NOAA IEAs</td>
</tr>
</tbody>
</table>
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 (intersessionaly) 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

<table>
<thead>
<tr>
<th>Priority</th>
</tr>
</thead>
</table>
| 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 Ecorregions.

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.

<table>
<thead>
<tr>
<th>Scientific justification</th>
</tr>
</thead>
</table>
| 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.

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.

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.

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.

The process will be iterative with a number of phases which will increase the relevance, impact and quality of the ecosystem overviews.

<table>
<thead>
<tr>
<th>Resource requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICES data centre, secretariat and advice process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secretariat facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Centre, Secretariat support and meeting room</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial</th>
</tr>
</thead>
<tbody>
<tr>
<td>No financial implications.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Linkages to advisory committees</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Linkages to other committees or groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Several ICES working groups may contribute with text and data to the content of this EO (WGDEEP, WGWIDE, WGMME, WGBIRDS, WGZEM, BEWG, WGITMO, WKEO3, WKOFOFFORE etc) as well as ACOM and SCICOM.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Linkages to other organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>The work of this group may be used or is closely aligned with work under OSPAR, the EEA, NEAFC and National Programmes.</td>
</tr>
</tbody>
</table>
Workshop for the production of the Oceanic North East Atlantic Ecoregion Ecosystem Overview (WKABNJ)

2018/2/IEASG 10 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 | 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. This workshop is an essential step to underpin a sound scientific basis for EBM management of the ABNJ by recording sources of information and discussions of 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. |
Scientific justification

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.

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.

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.

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.

The process will be iterative with a number of phases which will increase the relevance, impact and quality of the ecosystem overviews.

Resource requirements

ICES data centre, secretariat and advice process.

Participants

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 their relevant qualifications. Participants join the workshop at national expense. 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, WGDEC, WGWIDE, WGMME, WGBIRDS, WGZE, BEW, WGITMO, WKEO3, WKAZOREco etc) as well as ACOM and SCICOM.

Linkages to other organizations

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, IM, some of them with management mandates in the ABNJ.
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

<table>
<thead>
<tr>
<th>Priority</th>
<th>High, in response to a special request from the Joint Norwegian-Russian Commission on Environmental Protection, Norwegian-Russian Working Group on Marine Environment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific justification</td>
<td>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:</td>
</tr>
</tbody>
</table>

**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:

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.

**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 an structured operational mechanism for integration of these multiple data sources, and allows for regular updating. The framework should:

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:

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

<table>
<thead>
<tr>
<th>Resource requirements</th>
<th>ICES Data Centre and ICES Secretariat.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>Workshop with researchers</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Secretariat facilities</td>
<td>Data Centre, Secretariat support and meeting room</td>
</tr>
<tr>
<td>Financial</td>
<td>None</td>
</tr>
<tr>
<td>Linkages to advisory committees</td>
<td>Direct link to ACOM and SCICOM.</td>
</tr>
<tr>
<td>Linkages to other committees or groups</td>
<td>Links to WGIBAR</td>
</tr>
<tr>
<td>Linkages to other organizations</td>
<td>none</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Priority</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource requirements</td>
<td>Assistance of the Secretariat in maintaining and exchanging information and requirements data to potential participants.</td>
</tr>
</tbody>
</table>
Working Group on Integrated Assessments 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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in Chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019 November 25-29</td>
<td>Bergen, Norway</td>
<td>Interim report by 15 January 2020 to IEASG</td>
<td>New incoming Co-Chair, Anna . Ólafsdóttir, Iceland</td>
<td></td>
</tr>
<tr>
<td>2020 November 23-27</td>
<td>Tórshavn, Faroe Island</td>
<td>Interim report by 15 January 2021 to IEASG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021 November 22-26</td>
<td>Reykjavik, Iceland</td>
<td>Final report by 15 January 2022 to IEASG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Terms of Reference a) – f):

<table>
<thead>
<tr>
<th>ToR</th>
<th>Description</th>
<th>Background</th>
<th>Science Plan Codes</th>
<th>Duration</th>
<th>Expected Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Perform integrated assessment of the pelagic ecosystem in the Norwegian Sea and develop a framework for identifying warning signals for management.</td>
<td>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.</td>
<td>6.5</td>
<td>years 1-3</td>
<td>WG report to SCICOM and ACOM January following each year</td>
</tr>
</tbody>
</table>
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

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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
Terminology 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 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.
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.

<table>
<thead>
<tr>
<th>Meeting dates</th>
<th>Venue</th>
<th>Reporting details</th>
<th>Comments (change in chair, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2018</td>
<td>25-29 June</td>
<td>ICES HQ, Copenhagen, Denmark</td>
<td>Interim report by 15 August to IEASG</td>
</tr>
<tr>
<td>Year 2019</td>
<td>11–15 March</td>
<td>FAO, Rome, Italy</td>
<td>Interim report by 26 April</td>
</tr>
<tr>
<td>Year 2020</td>
<td>TBD</td>
<td>TBD</td>
<td>Final report by Date</td>
</tr>
</tbody>
</table>

ToR descriptors

<table>
<thead>
<tr>
<th>ToR</th>
<th>Description</th>
<th>Background</th>
<th>Science Plan codes</th>
<th>Duration</th>
<th>Expected Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>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.</td>
<td>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).</td>
<td>5.4, 6.6</td>
<td>Years 1, 2</td>
<td>Annual reporting</td>
</tr>
<tr>
<td>b</td>
<td>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.</td>
<td>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.</td>
<td>4.2, 5.4, 6.6, 7.1, 7.2, 7.7</td>
<td>Years 1, 2</td>
<td>Annual reporting</td>
</tr>
<tr>
<td>c</td>
<td>To define and report on the information flow needed to provide trade-off analysis of fishing impacts on communities and stakeholder groups.</td>
<td>To develop a system to support potential future advice requests and development of ecosystem overviews and integrated ecosystem assessments.</td>
<td>5.4, 5.8, 6.5, 7.3, 7.5, 7.6</td>
<td>Years 2, 3</td>
<td>Annual reporting</td>
</tr>
</tbody>
</table>
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.

Years 2, 3

Annual reporting, potentially also scientific manuscript

2.7, 5.8, 6.6, 7.1, 7.2, 7.7

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.

Years 1-3

Annual reporting

2.7, 4.3, 5.6, 6.6, 7.1, 7.2, 7.7

**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.
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.

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).

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.

The group will rely on ongoing international and national research projects to support involvement of WGSOCIAL members.

This is a new Group, expected to be attended by some 15–20 participants.

None.

No financial implications.

In the longer term the EG will be ready to support ACOM in addressing advisory requests from ICES clients if these are forthcoming.

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.

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.

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 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.

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

ToR descriptors

<table>
<thead>
<tr>
<th>ToR</th>
<th>Description</th>
<th>Background</th>
<th>Science Plan codes</th>
<th>Duration</th>
<th>Expected Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>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.</td>
<td>a) Science Requirements, b) Advisory Requirements, c) Requirements from other EGs</td>
<td>1.3, 1.9, 6.5</td>
<td>Years 1, 2 &amp; 3</td>
<td>Regional sea state trend analysis for inclusion in eco-region overviews annually</td>
</tr>
<tr>
<td>b</td>
<td>Identify and develop additional strata and associated monitoring programmes for the inshore/coastal areas of the North Sea and the Norwegian Trench.</td>
<td>a) Science Requirements, b) Advisory Requirements, c) Requirements from other EGs</td>
<td>6.5</td>
<td>Years 1, 2 &amp; 3</td>
<td>Regional sea state trend analysis for inclusion in eco-region overviews annually</td>
</tr>
<tr>
<td>c</td>
<td>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).</td>
<td>a) Science Requirements</td>
<td>6.5, 6.6</td>
<td>Years 1, 2 &amp; 3</td>
<td>Recommendations and actions giving rise to the on-going improvement to flow of data between EWG, the ICES Data Centre and WGINOSE</td>
</tr>
<tr>
<td>d</td>
<td>Develop strata specific decision support tools to support ecosystem management and advice (e.g. BBNs and expert systems, ecosystem models, ecosystem goods and</td>
<td>a) Science Requirements</td>
<td>6.1, 6.4, 6.6</td>
<td>Years 1, 2 &amp; 3</td>
<td>Results which explore the balance and trade-offs between ecosystem protection and</td>
</tr>
</tbody>
</table>
services modelling) in collaboration with end users (OSPAR, DG-ENV, DG-MARE) 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
### IEASG Expert Groups dissolved in 2019

<table>
<thead>
<tr>
<th>Year</th>
<th>Code</th>
<th>Description</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018/2</td>
<td>IEASG07</td>
<td>WKintra2 - The second Workshop on integrated trend analyses in support to integrated ecosystem assessment</td>
<td>Saskia Otto, Germany, and Benjamin Planque, Norway</td>
</tr>
<tr>
<td>2018/2</td>
<td>IEASG08</td>
<td>WKKEMSSP - Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholder Participation</td>
<td>Andrea Belgrano, Sweden, Andrew Kenny, UK, and Erik Olsen, Norway</td>
</tr>
<tr>
<td>2018/2</td>
<td>IEASG09</td>
<td>WKAzOREco - Workshop for the production of the Azorean ecoregion Ecosystem Overview</td>
<td>Mário Rui Pinho, Portugal and Maria de Fatima Borges, Portugal</td>
</tr>
<tr>
<td>2018/2</td>
<td>IEASG10</td>
<td>WKABNJ - A Workshop for the production of the Oceanic North East Atlantic ecoregion Ecosystem Overview</td>
<td>Francis Neat, UK and Odd Aksel Bergstad, Norway</td>
</tr>
<tr>
<td>2018/2</td>
<td>IEASG11</td>
<td>WKBAR - Workshop on ecological valuing of areas of the Barents Sea</td>
<td>Adriaan Rijnsdorp, Netherlands, Markku Viitasalo, Finland, and Mariano Koen-Alonso Canada</td>
</tr>
<tr>
<td>2018/2</td>
<td>IEASG12</td>
<td>WKCONSERVE - Workshop on Challenges, Opportunities, Needs and Successes in including human dimensions in IEAs</td>
<td>Alan Haynie, USA, Jörn Schmidt, Germany, Mette Skern-Mauritzen, Norway, and Eva-Lotta Sundblad, Sweden</td>
</tr>
<tr>
<td>2018/2</td>
<td>IEASG02</td>
<td>WKSABI - Workshop on methods to develop a swept-area based effort index</td>
<td>Kai Ulrich Wieland, Denmark</td>
</tr>
</tbody>
</table>