

Ecosystem Approaches and Methods Steering Group EGs Resolutions

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Resolutions to be approved in 2024

WKEO4 - Workshop on fourth generation ecosystem overviews

2024/WK/EAMSG01 Workshop on fourth generation ecosystem overviews (WKEO4), chaired by Henn Ojaveer* (Estonia), Nathalie Steins* (Netherlands) and Debbi Pedreschi* (Ireland) will meet in person (with online option) 16–20 June 2025 at ICES HQ, Copenhagen, Denmark to:

- a. Review and update priority topic lists for the Ecosystem Overviews (EOs). Identify and document progress to date, existing gaps and emerging topics, and prioritise based on available knowledge and advice users' needs. Produce updated medium (3-5 years), and long-term (5-10 years) priority lists, taking into account the ICES Framework for Ecosystem-informed Science and Advice (FEISA).
- b. Considering FEISA, advance specific sections in the EOs to meet end-user needs and by developing/proposing:
 - i. A common template structure for the climate change section (flexible to regional needs and available data), to be piloted in the Central Arctic Ocean and Oceanic Northeast Atlantic ecoregions.
 - ii. A common template structure for the social and economic context section, flexible to regional needs and available data, and flagging future needs/directions
 - iii. A general schematic summary for communicating the main key signals of the EO.
- c. Develop recommendations on how to improve the utility of EOs to meet advisory and decision-making needs, improve communication and accessibility, and address capacity challenges by:
 - i. Reviewing Integrated Ecosystem Assessment (IEA) and EO production processes to identify opportunities for streamlining and improving information flow and integration across groups and products, including data and evidence management.
 - ii. Investigate how to improve alignment and integrate indicators, data, and information from other state of the environment reporting (e.g. OSPAR, HELCOM, Norway, EU MSFD, NAFO) into the EOs to reduce redundancy and address capacity challenges.
 - iii. Critically review current EO format to assess how to improve accessibility, such as via interactive outputs from IEA and EOs (e.g. Shiny apps, ArcGIS Story maps, Web Services, etc.).

WKEO4 will report within two months after the workshop for the attention of the ACOM and SCICOM.

Supporting information

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| Priority | High; the EOs are part of the recurrent advice in the Administrative Agreement (AA) signed between the EU and ICES, included MoUs with other requesters and are a key mechanism for ICES to deliver its advice on ecosystem-based management EBM with incorporation of climate change impacts. This WK is strategic for the development of ICES EAM and HUDI Steering Groups, advancing the implementation of the ICES Framework for Ecosystem-Informed Science and Advice (FEISA) and following up on the work of WKEO3, WKCONSERVE and WKCLIMAD. The outcomes of the workshop will be relevant to any future iterations and formats of the ICES overviews taking account of ACOMs discussion on improving integration. |
| Resource requirements | Assistance of the Secretariat in maintaining and exchanging information and requirements data to potential participants. ICES Data Centre participation required. Assistance from ACOM leadership in obtaining input from stakeholders for ToR A (e.g.) through the MIRIA and MIACO meetings. |

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| Participants | Chairs and members of SICCME and EPDSG, EAMSG, HUDISG, HAPISG, ACOM leadership and DSTSG related expert groups and the ICES Data Centre. |
| Secretariat facilities | ICES Headquarters meeting room; SharePoint site, secretariat support with rooms and for reporting |
| Financial | No financial implications. |
| Linkages to ACOM and groups under ACOM | EPDSG/EAMSG/HUDISG/HAPISG/DSTSG are ACOM/SCICOM groups, the WK is relevant for the next generation of Ecosystem Overviews. |
| Linkages to other committees or groups | EPDSG, EAMSG, HUDISG, HAPISG, DSTSG related expert groups, SIICME, MIRIA and MIACO – but of relevance to whole community. |
| Linkages to other organizations | Links to EC, OSPAR, HELCOM, NEAFC, PICES, etc. |

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

2024/MT/EAMSG02 A Working Group on Integrative, Physical-biological and Ecosystem Modelling (WGIPEM), chaired by Ute Daewel, Germany, Sonja van Leeuwen, Netherlands, Sevrine Sailley*, UK and Déborah Benkort*, Canada will work on ToRs and generate deliverables as listed in the Table below.

| | MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|-----------|--------------------|---------------------|---|--------------------------------------|
| Year 2025 | 31 March - 4 April | Norrköping, Sweden | Interim report and E-eval by 19 May | Incoming chair: Sevrine Sailley (UK) |
| Year 2026 | March/April | Scotland or Germany | Interim report and E-eval by Date Month May to July | Outgoing chair: Sonja van Leeuwen |
| Year 2027 | March/April | ICES HQ or Canada | Final report and E-eval by Date Month May to July | |

ToR descriptors¹

| ToR | Description | Background | Science Plan Codes | Duration | Expected Deliverables |
|-----|---|---|------------------------------------|-----------------|--|
| | This should capture the objectives of the ToR | Provide very brief justification, e.g. advisory need, links to Science Plan and other WGs | Use codes (max 3 per ToR) | 1, 2 or 3 years | Specify what is to be provided, when and to whom |

¹ Avoid generic terms such as “Discuss” or “Consider”. Aim at drafting specific and clear ToR, the delivery of which can be assessed

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| a | <p>Enhance/improve the use of coupled marine ecosystem models in the context of human activities with particular focus on:</p> <ul style="list-style-type: none"> - Offshore renewable energy (ORE) - Marine Spatial Planning - Social-Economical coupling | <p>Hydrodynamic models and ecosystem models are excellent tools for scenario studies, e.g. to gauge the impact of hard offshore structure placement or different levels of area closure.</p> <p>Modelled results from WGIPEM members can inform and support the ORE roadmap and can contribute to ICES advice requests on ORE. Links with the spatial planning community built during the previous period will be continued to improve uptake of model results in marine management and to allow for inclusion of social and economic factors.</p> <p>Links with WGOORE, WGOWDF, WGMPCZM, WGECON.</p> | 1.3, 2.2, 2.4 | Annual | Review paper on offshore renewable energy modelling |
| b | <p>Improving lower trophic level models by investigating:</p> <ul style="list-style-type: none"> - Parameterization of functional diversity (community structure, traits) and adaptations - Patterns and drivers of plankton phenology and productivity across models and ecosystems - Benthic-pelagic coupling in models | <p>More research is needed to improve model descriptions of diversity, adaptation and traits in lower trophic level models.</p> <p>The benthic-pelagic coupling is important for nutrient and energy fluxes and carbon storage and should be better described in the models.</p> <p>Links with EAMSG, WGZE and BEWG.</p> | 1.3, 1.9 | Annual | Zooplankton Discussion Paper |
| c | <p>Improve higher trophic level models by investigating:</p> <ul style="list-style-type: none"> -models and formulations for trophic coupling -potential applications in support management decisions and operational products -Effects of connectivity, climate and habitat on emerging species and biomass distribution -Key process formulation (mortality, physiological rates, migration etc.) | <p>Supports the increasing requests for operational models for HTL (fish) relevant to management.</p> <p>Fundamental research is needed to improve the description of key physiological processes in models.</p> <p>Important for IEA EG's, spatial planning EG's, BWEG, WGBIOP and for ecosystem and fisheries advice.</p> | 1.3, 1.4, 2.2, 2.5 | Annual | Review paper on IBM physiological rates |

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| d | <p>Assessment of model skill evaluation methods and integration of models and observations by:</p> <ul style="list-style-type: none"> -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, scenarios) including model ensembles. -Exploring representativeness and use of observations for ecosystem model validation. -Validate observations and assess their representativity and uncertainty using models. | <p>The lack of systematic evaluation of ecosystem model performance and sensitivity currently limits their use in an operational and management context.</p> <p>Evaluation is challenged by the complexity of the models themselves, as well as model vs sparse dataset comparisons, where characterizing different types of variability (mean or trend; interannual or seasonal; rare or extreme events etc.) are needed.</p> <p>Links to all EGs using multispecies and ecosystem modelling (e.g. WGSAMS, WGIMM, working groups on integrated assessments), and for ecosystem and fisheries advice.</p> | 1; 3, 5.3 | Annual | Meeting with assessment groups |
| e | <p>Improving communication of models to a broader audience including communicating uncertainty and expert confidence as risk, and investigating what data/information (model outputs) are available and relevant to supplementing and/or supporting stakeholder and management needs, monitoring plans and ICES advice</p> | <p>Communication of model outputs is often made difficult by the use of jargon but also with communicating the usefulness of the outputs especially when it comes to model uncertainty. This ToR will improve communication and take-up of model data in ICES work and is relevant to the FEISA framework and advancing ecosystem-informed science and advice</p> | | Annual | <p>Meeting with assessment groups</p> <p>Paper/Best practice guide</p> |

Summary of the Work Plan

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| Year 1 | Annual meeting to report on the state-of-the-art of the topics in ToRs a-E, 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 ToRs a-e 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 ToRs a-e, and joint meeting with other expert groups. |

Supporting information

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| Priority | This group's activities will support the ecosystem approach to marine 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 marine ecosystem models and fisheries models in the context of increasing human activities. A specific focus is given to the developments of "end-to-end" modelling tools. The activities of the group will foster international collaboration and networking among established and young scientists in a rapidly evolving science field, which should be given high priority. The work of the group is cognisant of ICES developing and emerging science and advisory needs, and the planned work program explicitly supports and advances the development of ecosystem-informed science and advice |
| Resource requirements | The research programs 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 | Members of the groups are involved in the EU's Directorate-General for Maritime Affairs and Fisheries (DG-MARE) advice requests on ORE. We would generally highlight the need to include ecosystem information in EBM (Ecosystem Based Management), and that ecosystem models are important data providers in that context. The group actively engages in ongoing discussions and/or workshops with other groups on the application ecosystem modelling to support and inform ICES advice, and improve uptake of products and outputs in management and advisory processes. |
| Linkages to other committees or groups | There is a close working relationship with all the groups of EAMSG. It is also very relevant to WGSAM, WGBE, WGS2D, WGINOSE and WGSPPF. Initiated collaborations to WGOORE, WGOOWDF, HUDISG, WGMSPCZM and WEGECON. |
| 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. Several members are involved with OSPAR (ICG-EMO, WG COCOA) and with the Nansen Legacy and the European Marine Board. Member presentations at annual meetings ensure the group knows of developments within these organisations. Several members are also part of OceanPredict : https://oceanpredict.org/ (the global community for operational oceanography) for which model improvements and model communication are very relevant. |

WKFISHCARBON2 - Workshop on Assessing the Impact of Fishing on Oceanic Carbon

2024/WK/EAMSG03 The Workshop on Assessing the Impact of Fishing on Oceanic Carbon (WKFISHCARBON2), chaired by Dave Reid, Denmark, and Emma Cavan, UK, will meet in person at ICES Secretariat, Copenhagen, and be open to online participation, from 8-10th April 2025 to:

- a) The Ocean Carbon pump: Identify the main sources of uncertainty about the roles of fish and fishing in the biological carbon pump and develop strategies to reduce these uncertainties ([Science Plan codes](#): 1.1, 2.1, 6.1);
- b) Seabed Carbon: Review information and data on carbon stocks, liability, and likely fishing impacts dependent on substrate and hydrography. Evaluate vulnerable carbon storage areas and non-fisheries factors e.g. climate change and other human activities ([Science Plan codes](#): 1.1, 2.1, 6.1);

- c) Carbon Emissions: Evaluate fuel consumption and emissions by fishing fleets and identify knowledge gaps, assumptions and minimum data/monitoring requirements ([Science Plan codes: 2.5, 4.1](#));
- d) Crosscutting issues: Identify where and how the biological carbon pump, seabed process, and emissions interact. Explore ways to work with stakeholders on these issues ([Science Plan codes: 1.3, 2.7, 6.3, 6.4](#));

WKFISHCARBON2 will report by June 2025 for the attention of the SCICOM.

Supporting information

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| Priority | <p>The workshop focuses on the role of fisheries in blue carbon sequestration, listed as an emerging issue in the Working Group on Ecosystem Effects of Fishing Activities (WGECO) 2021 report (http://doi.org/10.17895/ices.pub.8279). This workshop also responds to recommendations from the first Workshop on Assessing the Impact of Fishing on Oceanic Carbon (WKFISHCARBON; https://doi.org/10.17895/ices.pub.24949122).</p> <p>The impact of climate change on marine ecosystems is a key issue for marine ecosystem-based science and advice. The activities of this workshop will contribute knowledge related to the carbon impacts of fisheries, as well as the climate implications of fish extraction, thus contributing to EBM development. Since ocean carbon sequestration is important for climate change mitigation and adaptation, these activities are considered to have a very high priority. There is also a high interest in this subject from ICES and wider science and advice communities as illustrated by the attendance of over 180 people from research institutes, academic organisations, eNGOs, local, national, and international (EU) government, industry, and civil society at informal perpatory online workshops held in Spring 2024.</p> |
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Scientific justification

The first WKFISHCARBON (ICES 2023) scoped the issues surrounding oceanic carbon and fishing. This scoping focused on three key issues; The biological carbon pump (BCP) and its relationship with fishing; seabed carbon sequestration and the impacts of fishing; and the carbon emissions from commercial fishing. Since then these issues have risen higher on the agendas of national governments and the EC. Despite continued research efforts, to date no consensus has been reached about the impact of fishing on carbon sequestration, with no conclusive evidence of whether it is positive, negative or neutral. Equally, understanding the emissions associated with fishing is incomplete, as such, there is a need to critically review the research and identify a pathway towards advice. Improving understanding of ocean carbon and its interactions with fisheries is consistent with the ICES approach to expand the evidence base for EBM.

Term of Reference a)

The Biological Carbon Pump (BCP) represents one of the key processes in oceanic carbon sequestration, but it is not fully understood how fishing might impact on the operation and effectiveness of the BCP. This is particularly the case for the BCP in shelf seas. This is where the bulk of commercial fishing occurs, and where the understanding of the BCP and carbon sequestration is weakest. WKFISHCARBON 2 will:

- Develop an approach to uncertainty assessment for the BCP that draws on information on quantification from observations, model sensitivity analysis, and expert opinion.
- Advise on best practice for scaling observations to other geographic and time scales.
- Advise on critical monitoring requirements: Parameters, locations, and timescales. Including monitoring and modelling in the shelf seas.

Term of Reference b)

The role of fishing in releasing, and the consequent remineralization, of carbon from the seabed is relatively poorly understood. There have been a number of specific studies, and also a number of modelling studies on this issue, however no consistent understanding has emerged. Some studies show a negative impact, others a positive, and others show no evidence either way. In this ToR, WKFISHCARBON 2 will:

- Develop a risk and confidence assessment of environmental factors governing seabed carbon remineralization and storage for managers and stakeholders to identify potentially vulnerable areas.
- Review spatial and temporal data assessing carbon stocks and lability in the north Atlantic. With consideration to:
 - Is this data appropriate for fishery areas at a scale useful for management?
 - Is it possible to overlay spatial and temporal data of carbon stocks, risk factors and fishing intensity?
 - Where are the gaps in the data?
- Review of methods to assess the sediment carbon stocks and lability, considering cost and suitable precision.
- Review the effects of fisheries on benthic biological communities (infauna and biogenic habitats) and how this interacts with carbon storage and remineralisation.
- Put the effects of fisheries on sediment carbon in the context of shifting base lines due to climate change and other industries (e.g. offshore energy and aquaculture).

Term of Reference c)

Understanding the direct GHG emissions from fishing may superficially seem to be a less complex issue. But in general, this is often indirectly derived, e.g. by fuel use, and may often be expressed in different e.g. in absolute terms (total fuel used), or in relative terms (fuel use per Kg fish). It may or may not include auxiliary fuel use (generators), and it would rarely represent actual GHG emissions. There is also likely no standard approach to making these calculations. Under this ToR WKFISHCARBON 2 will:

- Document current approaches used by countries in Europe to monitor fuel consumption and emissions by their fishing fleets, and identify knowledge gaps.
- Advise on minimum data requirements (parameters and resolution), for producing robust baselines estimates of GHG emissions.
- Identify the current methodological assumptions made in estimating GHG emissions from fisheries, assess the associated risks, and identify strategies to reduce those risks.

Terms of Reference d)

None of the above elements happen in isolation. The same fishing activity may affect the BCP as well as the seabed carbon storage, and simultaneously produce GHG emissions. Additionally, fishing is affected by many external factors including social and economic drivers. It may vary due to market forces, but also ecosystem effects, e.g. climate change affecting fish distributions or migrations. Under this ToR WKFISHCARBON 2 will:

- Establish an approach to dealing with confounding factors, including potential consequences of effort displacement.
- Identify the best practice for the use of uncertain prognostic models.
- Develop a way to build a cooperative relationship with stakeholders, especially the fishing industry.
- Explore how metrics of direct emissions best be combined with other measures of fisheries impacts on oceanic carbon (e.g. on the biological carbon pump, on the seabed, etc.), i.e. an integrated approach to the GHG budgets.

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| Resource requirements | ICES Secretariat support and meeting facilities. Participants will be expected to prepare input in advance of the meeting, and participate during the meeting dates. |
| Participants | Based on participation in WKFISHCARBON 1, and the informal workshops in 2024, this workshop is expected to attract at least 80 participants. Many of these will join online, but we expect at least 30 in person participants. These will include members of WGECO, IEASG, WGFBIT, WGBIODIV, and others. It is also expected that there will be participants from NGOs, offshore industry, academic organisations and civil society. It will also likely include representatives from local and national governments, and from European Commission staff including from DG MARE research unit and DG ENV marine unit. |
| Secretariat facilities | ICES Secretariat support and meeting facilities |
| Financial | No financial implications. |
| Linkages to advisory committees | Workshop outputs are expected to be of interest to ACOM |
| Linkages to other committees or groups | WGECO, WGFBIT, WGBIODIV, IEASG |
| Linkages to other organizations | OSPAR, HELCOM |

WGINOR - Working Group on the Integrated Assessments of the Norwegian Sea

To be submitted - They are meeting 4–8 November 2024

WGIEANBS-CS – ICES/PICES Working Group on Integrated Ecosystem Assessment of the Northern Bering Sea-Chukchi Sea

This group will probably close at the end of this year (2024) when the report is submitted to PICES

WGIAB - Joint ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea

2024/MT/EAMSG06 ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea (WGIAB), chaired by Carolyn Faithfull, Sweden and Riikka Punttila-Dodd, Finland will work on ToRs and generate deliverables as listed in the Table below.

| MEETING DATES | VENUE | REPORTING DETAILS |
|---------------|-------|-------------------|
| Year 2025 | | |
| Year 2026 | | |
| Year 2027 | | |

ToR descriptors

| TOR | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | YEAR | EXPECTED DELIVERABLES |
|-----|--|--|--|-----------|--|
| a | Analyse and evaluate Baltic Sea food web properties to identify drivers of change. | ToR a will evaluate food webs in different sub-basins of the Baltic Sea, aiming to examine their structure and function in relation to pressures over time. The work will include assessing trait-based diversity of food web components and temporal changes in food web functionality from a novelty perspective. Additionally, a spatio-temporal, dynamic Bayesian network model with latent variables will be developed to help analyse the different temporal regimes and how they have cascaded across Baltic sub-basins. The analyses will build a strong knowledge base of food web dynamics for future ecosystem-based management initiatives and contribute to model and indicator development in ToR b. | 1.1, 1.3, 1.6, 2.2, 5.2, 6.1 | 2025-2027 | -Research article(s) - Intermediate results reported in interim reports as well as the final report. -Contributions to Ecosystem overviews and WGECCOBAL - Contribution to development of food web indicators for HELCOM HOLAS 4 through EG Foodwebs. |

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| b | Analyse and quantify the state of the Baltic Sea ecosystem, using a variety of food web indicators to support ongoing assessment work in ICES and HELCOM | ToR b will assess the status of food webs in different sub-basins of the Baltic Sea, aiming to calculate and test indicators that can support EBFM. We will also quantify ecosystem health and Good Environmental Status (GES) as requested by the EU MSFD. The work will benefit from existing EwE (and network) models to support food web assessments by focusing on indicators derived from information theory to assess the diversity of carbon/energy circulation in the ecosystems. The work will build on previous studies conducted in ICES and HELCOM. Results will be complementary to indicator assessments performed in WGECOBAL where the focus is on the functional groups while here the analyses will be centered on ecosystem fluxes. | 1.7, 2.1, 2.2, 2.5, 5.1, 6.1, 6.5 | e.g. 2025-2027 | <ul style="list-style-type: none"> -Research article(s) - Intermediate results reported in interim reports as well as the final report. -Contributions to Ecosystem overviews and collaboration with WGECOBAL - Contribution to development of food web indicators for HELCOM HOLAS 4 through EG Foodwebs and other groups. |
| c | Implement ecosystem knowledge to support the progression of ecosystem-based fisheries advice | ToR c will investigate potential ecosystem indicators for advancing ecosystem-based fisheries advice in the Baltic Sea. The ToR is inspired by, and aims to contribute to, recent initiatives within e.g. WKEBFAB, i.e. Feco and building on the work of other ICES EGs e.g. WKECOBAL as relevant. | 5.1, 5.2, 5.3, 5.4 | 2025-2027 | <ul style="list-style-type: none"> -Research article(s) - Intermediate results reported in the final report. -Contribution, as applicable to ICES fisheries advice carried out within WGBFAS - Contribution as applicable to HELCOM environmental status or pressure indicators as relevant to ecosystem-based fisheries management. |

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| d | Develop and use ecosystem-based risk assessment tools for deriving advice on ecosystem and habitat management. | This ToR will use risk assessment and cumulative impact assessment tools (e.g. Bayesian Networks, SCAIRM) for ecosystem-based management in the Baltic Sea by combining information from the ecosystem as well as expert and stakeholder knowledge, ecosystem services and socioeconomic data. This enables investigations of impacts of management scenarios (e.g., future scenarios) and multiple pressures, cumulative risk assessment and identifying management trade-offs. | 1.6, 2.4, 5.3, 7.4 | 2025-2027 | <ul style="list-style-type: none"> -Research article(s) - Intermediate results reported in interim reports as well as the final report. - Results are applicable to the next Ecosystem Overview - Results are relevant for HELCOM HOLAS 4 |
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Supporting information

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| 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 FEISA framework in the Baltic Sea. |
| Resource requirements | Assistance of the Secretariat in maintaining and exchanging information and requirements data to potential participants. The assistance of especially the ICES Data Centre to collect and store relevant data series. |
| Linkages to ICES committees or groups | WGBFAS, WGSOCIAL, WGECOBAL, WGECON and groups in EAMSG. |
| Linkages to other organizations | OSPAR, JRC and HELCOM. The period of the current ToR (2025-2027) will see a deepening interaction between WGIAB and HELCOM subsidiary bodies, with the aim of establishing the group as fully joint with a workplan/ToR developed in coordination between HELCOM and ICES for the following 3-year period. |

Resolutions approved in 2023

WGINOSE - Working Group on North Sea Integrated Ecosystem Assessment

2023/MT/IEASG01 The Working Group on North Sea Integrated Ecosystem Assessment (WGINOSE), chaired by Andrea Belgrano, Sweden and Gayantonia Franze*, Norway, will work on ToRs and generate deliverables as listed in the Table below.

| | MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|-----------|------------------|---------|--|---|
| Year 2024 | 13–17 May | ICES HQ | E-evaluation by 31 May | Outgoing chair: Morten D. Skogen (Norway) |
| Year 2025 | 5–9 May | ICES HQ | E-evaluation by 23 May | Incoming chair: Gayantonia Franze (Norway). Joint meeting with WGEAWESS |
| Year 2026 | 18–22 May | ICES HQ | Final ICES Scientific Report and E-eval by 30 June | |

ToR descriptors

| TOR | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | DURATION | EXPECTED DELIVERABLES |
|-----|--|---|---|-------------------------------|---|
| a | Update and operationalise strata specific ecosystem trends analysis including the application and possible development and integration of indicators of ecosystem state and function by working closely with WGECO, WGSFD, WGBIODIV, WGCERP. Investigate methods (e.g including ecosystem model outputs) for communicating trends and significant changes in ecosystem state, using ecosystem summary sheet or report card style approaches. | <p>a) Science Requirements</p> <p>The strata specific ecosystem trend analysis require an yearly update toward the operationalisation of the information, and for the integration of indicators of ecosystem state and function.</p> <p>b) Support Advisory Requirements</p> <p>The strata specific ecosystem trend analysis provides relevant information for the ICES advice on Ecosystem Overview.</p> <p>c) Requirements from other EGs</p> <p>The strata specific ecosystem trend analysis, benefit from a close collaborations with WGECO, WGSFD, WGBIODIV, WGCERP, in providing relevant information on the integration of indicators of ecosystem state and function.</p> | 1.1, 2.1 | 3 years and on-going annually | Report card/ESS methods in supporting IEA science that supports advice. Scientific publication. |

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| b | <p>Continue to develop and up-date the existing human activities and pressure data layers and mapping tool for the ICES Greater North Sea Ecoregion distinguishing between fixed structures (e.g. pipelines, windfarms) and on-going activities (e.g. dredging, fishing, shipping, underwater noise, litter) by working with relevant EGs where appropriate.</p> | <p>a) Science Requirements Defining and mapping the footprint of human activity and their associated pressures for the ICES Greater North Sea Ecoregion to support the development of robust impact assessments, including the development of cumulative effects assessments and methods.</p> <p>b) Coordinating inputs from relevant EGs for the revision of the North Sea Ecosystem Overview. Ensure the latest knowledge, data and information of human activities and pressures relevant to the Greater North Sea Ecoregion are incorporated into the revision of the EO.</p> <p>c) Support Advisory Requirements, e.g. revision of the EO. The mapping of human activity footprints and pressures provides the required information for the update of the ICES advice on the Ecosystem Overview for the Greater North Sea Ecoregion.</p> | 4.1, 1.1, 2.1 | <p>3 years and on-going every 5 years commensurate with the timing for the revision of the EO –next planned for 2027 expected to be published in spring 2028.</p> | <p>a) Updated dynamic map of assessed human activities, pressures and impacts, and table of activity footprints for WGINOSE webpage.</p> <p>b) Workshop to facilitate the revision of the EO and undertake the ‘impact risk’ assessment.</p> |
|---|--|---|---------------|---|--|

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|---|--|---|---------------|-------------------------------|---|
| c | Utilizing the output from ToR a, b, develop and apply strata specific assessment methods and tools to evaluate trade-offs between different human activities and ecosystem components, and services to support ecosystem management and advice (e.g. through EwE/Ecospace models and network analysis, mental models, bow-tie and etc.). Establishing links with WGSAM, WGBIODIV, WGCEAM, WKOMRE, WGOWDF, WGRMES, WGIAB. | a) Science Requirements The operationalization of EwE/Ecospace models, and other models for strata specific assessment for the Greater North Sea Ecoregion, provides the best-available science for quantifying and evaluate trade-offs between different human activities and ecosystem components, and services. Th output from these models will provide relevant information to support ecosystem management advice, and provide a common methodologies for the ICES IEA. | 2.2, 2.3, 3.2 | 3 years and on-going annually | Scientific Paper on applications/actions in supporting ecosystem assessments and management advice. |
| d | Work in preparation of the next revision post-2026 of the greater North Sea Ecosystem Overview as required, and according to the guidelines. | a) Science Requirements Provide the best-available science for the update of the ICES advice on Ecosystem Overview for the Greater North Sea Ecoregion, b) Advisory Requirements To provide the updated mapping of existing human activities and pressures. c) Requirements from other EGs In collaboration with WGSFD, WGSHP, WGCEAM, for updating the require information for the mapping of existing human activities and pressures. d) Provide an update of the existing human activities and pressure for the ICES advice on Ecosystem Overview for the Greater North Sea Ecoregion; and also provide feedback on the risk assessment methodology | 1.2, 2.1 | As required - ongoing | Draft North Sea ecosystem overview sections. Produce an infographic product. |

Summary of the Work Plan

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|--------|---|
| Year 1 | The first year will continue to update and operationalise strata specific trend analysis and communication, especially in relation to and/or application of indicators of ecosystem state and function; and scoping ecosystem summary sheet/report card reporting at the North Sea scale. Work will also begin on drafting a review paper on trend analysis methods and communication approaches for IEA science that supports advice. Further develop and apply strata specific assessment methods and tools to evaluate trade-offs between different human activities and ecosystem components, and services in support of ecosystem management and advice. |
| Year 2 | Continue to develop and apply strata specific assessment methods and tools to evaluate trade-offs between different human activities and ecosystem components, and services in support of ecosystem management and advice. Update on trend analysis signals for ecosystem state and function, and reporting tools to inform management advice. |
| Year 3 | Update of activities and pressure mapping and analysis for an expected revision of the Greater North Sea Ecoregion EO. Drafting a scientific paper on application/actions to support ecosystem assessment and management advice. Finalizing report card/ESS methods to support IEA science and management advice. |

Supporting information

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| 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 and potentially web-hosting relevant material |
| Participants | The Group is generally attended by 10–20 members and guests. |
| Secretariat facilities | None. |
| Financial | No financial implications. |
| Linkages to ACOM and group 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 EAMSG working groups. It is also very relevant to the following ICES expert groups: WGSFD, WGECO, WGSHP, WGCEAM, WKINTRA, WGBESIO, WGFBIT, WGBIODIV, WGSAM, WGCEAM, WKOMRE, WGOWDF, WGCERP, WGRMES, WGIAB. |
| Linkages to other organizations | OSPAR (ICG-EUT, ICG-EMO), HELCOM, NAFO, JRC, DG-ENV, DG-MARE, EMODnet, Copernicus |

WGECOBAL - Working Group on Ecosystem-Based Fisheries Management of the Western Baltic Sea

2023/MT/IEASG02 A Working Group on Ecosystem-Based Fisheries Management of the Western Baltic Sea (WGECOBAL), chaired by Christian Möllmann, Germany, Stefan Neuenfeldt, Denmark and Heike Schwermer, 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 2024 | 28–31 May | Lyngby, Denmark | E-evaluation due 17 June | |
| Year 2025 | 17-20 June | Kiel, Germany | E-evaluation due 7 July | |

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|-----------|-----|------------------|---|
| Year 2026 | May | Kiel, Germany | Final report 6 weeks after annual meeting |
|-----------|-----|------------------|---|

ToR descriptors

| ToR | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | DURATION | EXPECTED DELIVERABLES |
|-----|--|--|--|------------------|--|
| a | Literature review of recent ecological knowledge on climate change effects on the Western Baltic ecosystem, especially focusing on fish community structure and functioning. | Better understanding of ecosystem functioning under climate change; provide environmental background for fisheries advice | 1.1., 1.3, 1.7 | Years 1 and 2 | Review paper |
| b | Develop a set of environmental and socio-economic indicators to assess changes in the social-ecological system | Better understanding of ecosystem functioning under climate change; provide environmental background for advice. ToR developed in tandem with WGIAB. | 1.1, 6.5, 7.1 | Years 1 and 2 | Peer-reviewed publication; indicator sheets to support single-species stock assessments |
| c | Conduct management strategy evaluations to test environmentally-informed reference points for key fisheries species | Include environmental information into advice; improve MSY approach | 2.5, 5.1, 5.2 | Years 1, 2 and 3 | Peer-reviewed publication; environmentally-informed reference points to support single-species stock assessments |
| d | Conduct ensemble modelling on the future of the the social-ecological system under climate change | Evaluate future socio-economic potential of the Western Baltic fisheries | 2.5, 5.2, 6.6 | Years 2 and 3 | Peer-reviewed publication |
| e | Develop adaptation scenarios for a sustainable future of the Western Baltic social-ecological system | Evaluate future socio-economic potential of the Western Baltic fisheries | 5.4, 7.5, 7.6, | Year 3 | Potential storylines on sustainable development pathways for Western Baltic fisheries |

Summary of the Work Plan

| | |
|--------|--|
| Year 1 | Annual meeting, intersessional work to progress on TORs a, b, c |
| Year 2 | Annual meeting, intersessional work to progress on TORs a, b, c, d |
| Year 3 | Annual meeting, intersessional work to progress on TORs c, d, e |

Supporting information

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|--|---|
| Priority | The activities of this Group aim to better understand environmental (especially climate) effects on the living marine resources of the Western Baltic Sea. The ultimate goal of the Group is to support stock assessments and ecosystem-based advice for Western Baltic fish stocks, especially for cod and herring. Activities of the Group include the evaluation of climate adaptation measures for the related fisheries. 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 will be attended by some 20–25 members and guests. |
| Secretariat facilities | Standard communication, annual meeting, and sharepoint support. |
| Financial | No financial implications. |
| Linkages to ACOM and group under ACOM | WGBFAS, HAWG, WKCLIMAD |
| Linkages to other committees or groups | There is a very close working relationship with all the groups of EAMSG and especially to the Working Group on Integrated Assessments of the Baltic Sea (WGIAB). WGECOBAL, in contrast to WGIAB, focusses specifically on developing an ecosystem-based fisheries management approach for the Western Baltic. Cooperation between the WGECOBAL and WGIAB is especially envisioned for TOR b where there is complementarity in approaches, and limited data availability. WGECOBAL will focus this work on supporting fisheries advice for Western Baltic stocks, while WGIAB will focus on the Integrated Assessments. Limited overlap in participation between the groups is envisioned, but some shared membership and communication between the Chairs and with the EAMSG Chair will ensure complementarity and communication, whilst minimising redundancy. Work may also be of interest to WGSOCIAL and WGECON. |
| Linkages to other organizations | HELCOM |

WGIEAGS - Working Group on Integrated Ecosystem Assessment of the Greenland Sea

2023/MT/IEASG03 Working Group on Integrated Ecosystem Assessment of the Greenland Sea (WGIEAGS), chaired by Søren Post, Greenland, and Thomas Juul-Pedersen*, Greenland, will work on ToRs and generate deliverables as listed in the Table below.

| | MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|-----------|----------------|-----------------|--|--|
| Year 2024 | 26-28 November | Nuuk, Greenland | Interim E-eval due 15 December 2024 | During 2023 Søren Post (Greenland) replaced Jesper Boje (Denmark) as chair. During 2024 Thomas Juul-Pedersen (Greenland) replaced Colin Stedmon (Denmark) as chair. |
| Year 2025 | TBD November | Nuuk, Greenland | Interim E-eval due TBD | |
| Year 2026 | 3-6 November | Nuuk, Greenland | Final ICES Scientific report and E-eval by 18 December | |

ToR descriptors

| ToR | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | DURATION | EXPECTED DELIVERABLES |
|-----|--|---|-----------------------|--|---|
| a | Assemble stakeholder information, such as knowledge about the area's use, current and future user objectives, and ecosystem goals | Stakeholder knowledge is critical to IEAs and will be collected through workshops | 1.1 | Years 1-3 | Report to ICES |
| b | Dialogue with scientists and stakeholders on operational approaches and analytical tools for conducting an integrated ecosystem assessment. | Before starting data analysis, basic discussions on suitable methodological/analytical approaches are required. | 1.1 | Years 1-3 | Report to ICES |
| c | Assemble data for describing spatial and temporal changes in the Greenland Sea ecoregion. | The database will contain physical, chemical and biological (incl. higher trophic levels) oceanographic data. | 1.1 | Years 1-3 | Merged database. Metadata to be reported to ICES. |
| d | Report on the status and trends in the ecoregion, based on integrated analysis of multiple datasets, incl. associated with major hydroclimatic changes and human activities | This ToR will be based on activities and advancements of the above. The aim is to produce scientific manuscripts, inform IEAs and future iterations of the EOs. | 1.1 | Years 2-3 | Report to ICES. Manuscript to be submitted to peer-reviewed science journal |
| e | Revise Ecosystem Overview for the Greenland Sea | This is advisory requirement. | 1.3 | To be initiated year 3 and finalized in the next round of ToR. | Relevant draft sections of the Ecosystem Overview submitted to ICES |
| f | Identify knowledge gaps and priority research needs to improve future integrated ecosystem assessments. Provide recommendations for improvement of data collection and monitoring in the ecoregion | To further advance the IEA for the region, identification of knowledge and data gaps is inevitable, together with considering improvements in data collection. | 1.1, 3.1, 3.2 | Year 3 | Report to ICES |

Summary of the Work Plan

| | |
|--------|--|
| Year 1 | <p>Assemble stakeholder information, such as knowledge about the area's use, current and potential user objectives, and ecosystem goals.</p> <p>Continue dialogue between scientists and stakeholders on operational approaches and analytical tools for conducting an integrated ecosystem assessment in line with stakeholder objectives.</p> <p>Continue to gather relevant data to describe spatiotemporal changes in the Greenland Sea ecoregion as input to integrated ecosystem assessments.</p> <p>Identify additional scientists/partners and invite them to join the EG.</p> |
| Year 2 | <p>Continue assembling relevant datasets and update the database.</p> <p>Continue discussions on methodological approaches and analytical tools for conducting integrated ecosystem assessment. Prepare the first analysis on the ecosystem status and trends.</p> <p>Continue collecting stakeholder knowledge and objectives.</p> <p>Incorporate stakeholder information to the Science Report.</p> |
| Year 3 | <p>Prepare manuscript on the status and trends of the Greenland Sea ecosystem.</p> <p>Identify knowledge gaps and priority research items that can improve future integrated ecosystem assessments and provide recommendations to improve the monitoring.</p> |

Supporting information

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|---|--|
| Priority | Incorporating stakeholder information, gathered through their local knowledge and objectives, is crucial for a holistic and contextually accurate ecosystem assessment of the Greenland Sea. This input provides vital insights into ecosystem dynamics, fosters community engagement and support, and ensures that advice on ecosystem management is both scientifically robust, socially relevant and consequently useable for the clients. This inclusive approach enhances the assessment's credibility and contributes to informed, sustainable decision-making. |
| Resource requirements | <p>Data acquisition for this initiative will primarily rely on the outcomes of collaborative workshops, where valuable insights and information from scientists, stakeholders, and experts will be gathered. These workshops serve as our key data sources. In addition to these, we will tap into existing research programs, accessing data available through public databases and established research networks.</p> <p>Crucially, external funding from the Nordic Council of Ministers has been secured to underpin starting this effort, facilitating financial stability.</p> |
| Participants | Initiated by DTU and GINR. Participation will be sought from Greenland, Denmark, 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 EAMSG expert groups, several EGs under HAPISG and EPDSG. Human Dimensions steering group HUDISG in ICES |
| Linkages to other organizations | Arctic Council, PAME, IASC, NEAFC |

WGICE - Working Group on the Integrated Ecosystem Assessment of Icelandic Waters

2023/MT/IEASG04 Working Group on the Integrated Ecosystem Assessment of Icelandic Waters (WGICE), chaired by Warsha Singh, Iceland, will work on ToRs and generate deliverables as listed in the Table below.

| | MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|-----------|-------------------|-----------------------|--|-------------------------------------|
| Year 2024 | 20–22 November | Reykjavik, Iceland | Interim E-evaluation by 6 December and science report by 24 January 2025 | |
| Year 2025 | November | Reykjavik, Iceland | Interim E-evaluation and science report by TBC | |
| Year 2026 | November | Reykjavik, Iceland | End of term Science report and E-evaluation by TBC | |

ToR descriptors²

| TO R | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | DURATION | EXPECTED DELIVERABLES |
|------|---|--|--|-----------|---|
| a | Review and compile spatiotemporal data from the various components of the ecosystem including associated human activities and impacts and other pressures, and develop indicators to analyze changes. | This will summarize data from the physical, chemical, biological, economical, and social components to establish an overview of the ecosystem and related impacts and risks. | 1.1, 2.1 | Years 1–2 | WG will create and synthesise the evidence base for the ecosystem overview.. |
| b. | Develop functional food-web connections via the Ecopath with Ecosim model, and broaden the ecosystem scope to integrate economic and social dimensions using Atlantis end-to-end ecosystem model. | This will contribute to ecosystem-informed science and advice | 2.2, 7.3 | Years 1–3 | Scientific Papers focusing on utilization and implementation of ecosystem assessments and management recommendations. Contribution to relevant advice products |
| c. | Use appropriate methodology to identify relevant stakeholders to participate in an integrated ecosystem assesement of Icelandic Waters. | To ensure relevant stakeholders are identified for future involvement in the integrated ecosystem assessment process. | 7.2, 7.7 | Year 3 | WG report |

² Avoid generic terms such as “Discuss” or “Consider”. Aim at drafting specific and clear ToR, the delivery of which can be assessed

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|----|--|------------------------------|-----|--|--|
| d. | Revise and update the Ecosystem Overview for Icelandic Waters. | This is advisory requirement | 6.5 | Revision to be initiated in Year 1 and finalized in 2026 and to be repeated every 5 years. Update graphs annually as per ICES requirements. | Relevant draft sections of the Ecosystem Overview submitted to ICES. |
|----|--|------------------------------|-----|--|--|

Summary of the Work Plan

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|--------|---|
| Year 1 | Intersessional work to progress on ToRs a&b, initiate work on ToR e. Annual Meeting and working group report. |
| Year 2 | Intersessional work to progress on ToRs a & b, ToR a to be delivered, initiate work on ToR c, continue work on ToR e. Annual Meeting and working group report. Initiate the drafting of a review paper on trend analysis across ecosystem components. |
| Year 3 | Intersessional work to progress on ToRs a-c, initiate work on ToR d, finalize work on ToR e. Annual Meeting and working group report. |

Supporting information

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| Priority | The current activities of this group will lead ICES to develop an Integrated Ecosystem Assessment for Icelandic Waters as a step towards implementing ecosystem based management in the region. These activities are considered to have a high priority for this region that is vulnerable to climate change and relies highly on fisheries resources economically and culturally. It also contributes towards advancing ecosystem science which is identified as a priority in the ICES Science Plan. |
| Resource requirements | The monitoring and research programmes which provide data on the physical, chemical and biological components of the ecosystem are already underway, and resources are committed. |
| Participants | Initiated by MFRI. Domestic participation will be sought from other governmental, research and academic institutions. International participation will be sought from Greenland, the Faroe Islands and Norway. A diverse scientific competence is required to comprehend all ecosystem components. |
| Secretariat facilities | Sharepoint site |
| Financial | No financial implications. |
| Linkages to ACOM and group under ACOM | Link to ACOM and SCICOM through development of Ecosystem Overview (ADGEO), NWWG, WGDEEP and WGWIDE. |
| Linkages to other committees or groups | There is a very close working relationship within the EAMSG and HUDISG. It is also very relevant to the WGIEAGS, WGINOR, WGSOCIAL, WGECON, WGENGAGE. |
| Linkages to other organizations | Arctic Council, PAME, IASC, NEAFC, CAFF |

WKCAO - Workshop for the revision of the Ecosystem Overview of the Central Arctic Ocean ecoregion

This will be dissolved at the end of year 2025

2023/WK/IEASG05 The Workshop for the revision of the Ecosystem Overview of the Central Arctic Ocean ecoregion (WKCAO), chaired by Martine van den Heuvel-Greve*, the Netherlands, will hold a (hybrid) workshop on 24 October 2024 in Copenhagen, Denmark, and work intersessionally online to:

- a) Review the draft Ecosystem Overview (EO) of the Central Arctic Ocean ecoregion, as prepared intersessionally by the WKCAO chair;
- b) Discuss and further develop a wire diagram informed by a driver - pressure – ecosystem state approach using a linkage framework and pressure assessment process that examines and scores all direct pressures and human activities for the Central Arctic Ocean ecoregion following the ICES technical guidelines methodology; this will be based on previous expert analysis.
- c) Prepare a draft advice on the Central Arctic Ocean EO;
- d) List gaps in knowledge for the Central Arctic Ocean and identify operational products to potentially improve the scientific basis of the advice for future iterations of the Central Arctic Ocean EO.

In their work, WKCAO shall describe the main environmental drivers for the ecoregion 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 ecosystem components (ice habitat and associated biota, pelagic habitat and associated biota, benthic habitat and associated biota, cephalopods, fish, seabirds and marine mammals). When possible/appropriate temporal trends of each ecosystem component will also be described.

WKCAO will provide a science report 10 days after the workshop and report this to the attention of ACOM and SCICOM together with the revised Ecosystem Overview for the Central Arctic Ocean ecoregion to be delivered as advice in 2025.

Supporting information

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| Priority | <p>The overviews are seen as a progression towards operational implementation of the ecosystem approach and as such are aimed at informing expert working groups and assisting Regional Seas Conventions and policy makers. ACOM aims to develop this product for all ICES ecoregions. The EOs should be prepared according to the ICES Technical Guidelines for Ecosystem Overviews.</p> <p>This workshop is an essential step to underpin a sound scientific basis for the management of the Central Arctic Ocean ecoregion by recording sources of information and discussions on the decisions by the experts. The work of this workshop will feed directly into Advisory process and will allow comparison between different ecoregions. Consequently, these activities are considered to have a very high priority.</p> <p>The ICES EOs are an integral part of ICES strategic plan to implement the Ecosystem Based Management (EBM). The revision of the EO for the Central Arctic Ocean ecoregion will contribute to implementing EBM in the region and will be aimed at informing both the scientific community as well as states and intergovernmental management authorities and organizations.</p> |
| Scientific justification | <p>Environments and ecosystems vary over time, sometimes with a trend and sometimes with a step change. The regional ecosystem overviews are intended to provide advisory groups with information on natural variability, trends and step changes in the dynamics of their respective ecosystems based on the best available evidence that</p> |

are expected to influence the advice.

They will also summarize 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, by-catch, 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. Risk assessment methods will be used to obtain a better understanding of the distribution and scale of anthropogenic pressures across the marine system and to estimate their impacts.

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

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|---|---|
| Resource requirements | ICES Data Centre, Secretariat and Advice process. |
| Participants | The participation should reflect the diverse scientific competence needed to fulfil the objectives of the workshop. Participants join the workshop at national expense. Participation of stakeholders is not committed. |
| Secretariat facilities | Data Centre, Secretariat support. |
| Financial | This work will be done at national cost. |
| Linkages to advisory committees | The EOs are part of the ICES advice and the product 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 (WGSOCIAL, WGECON, SICCME, etc.) as well as ACOM, SCICOM, IEA, FRSG, HUDISG, HAPISG. |
| Linkages to other organizations | The work of this group may be used or is closely aligned with work under WGICA, PAME (Arctic Council) and PICES. |

WKONEA - Workshop for the revision of the Ecosystem Overview of the Oceanic Northeast Atlantic Ecoregion

This will be dissolved at the end of year 2025

2023/WK/IEASG06 A Workshop for the revision of Oceanic Northeast Atlantic Ecoregion (WKONEA), chaired by Ellen Kenchington*, (Canada), Laura Grady* (UK) and Debbi Pedreschi* (ICES), will meet at ICES HQ, Copenhagen, Denmark and online, 10–14 February 2025 to:

- a) Review and update the content of the current Ecosystem Overview (EO) including new scientific evidence and best available science. Prepare a draft-advice for the Oceanic Northeast Atlantic EO.
- b) Develop a risk assessment informed by a sector – pressure – ecosystem component approach that examines and scores all direct human activities and associated pressures for the Oceanic Northeast Atlantic ecoregion following the ICES technical guidelines.
- c) List gaps in knowledge for the Oceanic Northeast Atlantic ecoregion and identify operational products/future directions that could improve and/or expand the scientific basis of the EO in future iterations. Identify opportunities for integration with other ICES ABNJ scientific work.

In their work, WKONEA shall describe the main environmental drivers for the ecoregion 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 ecosystem components, in line with the EO Technical Guidelines. When possible/appropriate temporal trends of each ecosystem component will also be described.

WKONEA will report for the attention of ACOM and SCICOM by 7 March 2025.

Supporting information

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|---------------------------------|---|
| Priority | <p>The overviews are seen as a progression towards operational implementation of the ecosystem approach and as such are aimed at informing expert working groups, the scientific community Regional Seas Conventions, policy makers, national authorities, intergovernmental management authorities and organization among other stakeholders. ACOM aims to develop this product for all ICES ecoregions. The EOs should be prepared according to the ICES Technical Guidelines for Ecosystem Overviews.</p> <p>This workshop is an essential step to underpin a sound scientific basis for the management of the Oceanic Northeast Atlantic ecoregion by documenting sources of information (i.e. Mission Atlantic) and discussions on the decisions by the experts. The outputs of this workshop will feed directly into Advisory process and will allow comparison between different ecoregions. Consequently, these activities are considered to have a very high priority.</p> <p>The ICES EOs are an integral part of ICES strategic plan to implement Ecosystem Based Management (EBM) through ecosystem-informed science and advice and aims to progress EBM in the Northeast Atlantic ecoregion.</p> |
| Scientific justification | <p>Environments and ecosystems vary over time, sometimes with a trend and sometimes with a step change. The regional ecosystem overviews are intended to provide information on natural variability, trends and step changes in the dynamics of their respective ecosystems based on the best available knowledge and evidence relevant to the advice. This information needs to consider both spatial and temporal variability, with priority given to changes that would lead to the most significant modifications to the advice.</p> |

To support emerging policy developments, those developing advice on the impacts of specific sectors (e.g. fisheries catch options, contaminants, by-catch, 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 provide integrated advice on human impacts affecting marine ecosystems of the ICES area. Risk assessment methods will be used to obtain a better understanding of the distribution and scale of anthropogenic pressures across the marine system and to estimate their impacts.

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

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| Resource requirements | ICES Data Centre, Secretariat support and Advisory process through ACOM. |
| Participants | The participation should reflect the diverse scientific competence needed to fulfil the objectives of the workshop. Participants join the workshop at national expense. |
| Secretariat facilities | Data Centre, Secretariat support. |
| Financial | This work will be done at national cost. |
| Linkages to advisory committees | The EOs are part of the ICES advice and the product 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 (WGBFAS, WGCEPH, WGDEEP, WGHABD, WGHARP, WGOH, WGSCAL-LOP, WGPME, JWGBIRD, WGSOCIAL, WGZE, WGECON, etc.) as well as ACOM, SCICOM, IEA, FRSG, HUDISG, HAPISG. |
| Linkages to other organizations | The work of this group may be used or is closely aligned with work under Mission Atlantic , NAFO, NEAFC and National Programmes. Additional IGOs of interest to this work: NAMMCO, IWC, ICCAT. |

Resolutions approved in 2022

WGNARS - Working Group on the Northwest Atlantic Regional Sea

2022/FT/IEASG01 The **Working Group on the Northwest Atlantic Regional Sea (WGNARS)**, chaired by Jamie C. Tam, Canada, and Kimberly J. W. Hyde, USA, will work on ToRs and generate deliverables as listed in the Table below.

| | MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|-----------|---------------|---------------------|------------------------------------|----------------------------------|
| Year 2023 | 15-19 May | Halifax, Canada | Interim E-eval by 1 July | |
| Year 2024 | 14-17 May | Online meeting | Interim E-eval by 30 May | |
| Year 2025 | 5-9 May | Nova Scotia, Canada | Final report and E-eval by 16 June | New USA Chair will be appointed |

ToR descriptors³

| ToR | ToR Description | Background | Science plan topics addressed | Duration | Expected Deliverables |
|-----|--|--|-------------------------------|-----------|---|
| a | Improve regional capacity to conduct, co-create, co-produce, and communicate science to support marine ecosystem based management. | Enhance capacity to perform transdisciplinary research. Continue to develop bilateral/cross jurisdictional collaborations. | 1.1, 6.5 | 1-2 years | Report on recent activities related to IEAs, US, Canada and Regional Fisheries Management Organizations (e.g. NAFO). Increase joint projects between Newfoundland, Maritimes, NEUS regions. Invitation to Gulf Region members from DFO. Improved membership from management bodies, industry, stakeholder or academics. Annual Seminar or Workshops to invite non-members to present their work and how methodologies might improve IEAs or EBM. |
| b | Explore, develop, and refine indicators (e.g. habitat, social-cultural, climate) across a variety of temporal and spatial scales | Improve understanding of system drivers through review of external initiatives/reports which may be of relevance to WGNARS, e.g. The NOAA State of the Ecosystem reports, U.S. Offshore Wind Development IEA, Joint US and Canada Habitat Seminar, Canada's State of the | 1.1, 1.2, 2.1, 6.6, 7.1, 7.5 | 3 years | Review and develop additional indicators relevant for IEA, and incorporate where relevant. Report on outcomes. |

³ Avoid generic terms such as "Discuss" or "Consider". Aim at drafting specific and clear ToR, the delivery of which can be assessed

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| | | Ecosystem Report, revised Canadian Scientific Advice Secretariat (CSAS) processes and reviewing Canada's EBM Framework. | | | |
| c | Expand examination of trade-offs within and among multiple ocean uses. | Examine risk and/or vulnerability for species, habitats, ecosystems, fisheries, and human communities | 2.7, 6.6, 7.1 | 3 years | <p>Develop and explore decision support tools, report on outcomes.</p> <p>Manuscript on enhancing IEAs through the inclusion of other decision making frameworks.</p> <p>Exploring IEAs for single species or multi-species) decision making.</p> |
| d | Develop transparent tools, resources, and collaborative workflows to improve accessibility and coproduction of knowledge across disciplines, communities, and regions. | Ongoing engagement with Rightsholders, stakeholders, and decision-makers. | 7.1, 7.5 | 3 years | <p>Communication tools, report on outcomes</p> <p>Report on use of participatory modelling or mapping for objective setting in IEAs or EBM.</p> <p>Continue to explore and report on out-of-the-box communication tools.</p> |

Summary of the Work Plan

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| Year 1 | Improve regional capacity through WGNARS focused projects that involve case studies. Continue to collaborate where possible with other groups. Improve and develop indicators for habitat through seminar. Develop a joint, cross-regional IEA project. |
| Year 2 | Continue to collaborate with other groups and gain interest in long-term participation in WGNARS. Explore habitat indicators and how they can be incorporated into conceptual models or other models developed through WGNARS. Explore novel communication tools for IEAs and EBM. Develop a seminar on new communication tools based on outcomes from ICES ASC 2023. |
| Year 3 | Complete cross-regional joint projects on IEAs. Continue to expand on components of the IEA loop to identify gaps in knowledge and where WGNARS can provide support and research. |

Supporting information

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| Priority | The current activities of this group will lead ICES into issues related to IEAs and EB(F)M. With some linkages to ICES EOs. |
| Resource requirements | The research programmes(e.g. in the US: State of the Ecosystem Reporting, Offshore Wind IEA; in Canada: Blue Economy of American lobster, EBM/EBFM/EAM working group) which provide the main input to this group are already underway, but resources and capacity are limited. |

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| Participants | The group meetings are normally attended by some 20–25 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 somewhat close working relationship with all the EAMSG working groups, but will continue to improve relationships between groups. |
| Linkages to other organizations | There is a close working relationship with the NAFO Working Group on Ecosystem Science and Assessment (WG-ESA). There is also a close working relationship between members from NOAA-NEFSC and related New England and Mid-Atlantic Fisheries Management Councils. |

WGEAWESS - Working Group on Ecosystem Assessment of Western European Shelf Seas

2022/FT/IEASG03 A Working Group on Ecosystem Assessment of Western European Shelf Seas (WGEAWESS), chaired by Jacob Bentley, UK, and Sigrid Lehuta, France, will work on ToRs and generate deliverables as listed in the Table below.

| | MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|-----------|---------------|-------------------|--|----------------------------------|
| Year 2023 | 28–31 March | Cascais, Portugal | E-evaluation due 21 April | Outgoing chair: Marcos Llope |
| Year 2024 | 13–17 May | Galway, Ireland | E-evaluation due 3 June | |
| Year 2025 | 6–8 May | Online | End of term ICES Scientific Report and E-eval by 22 June | Joint meeting with WGINOSE |

ToR descriptors⁴

| ToR | Description | Background | Science Plan Codes | Duration | Expected Deliverables |
|----------|--|--|------------------------------------|----------|--------------------------|
| a | Review and update the Bay of Biscay/Iberian Coast (BoB-IC) and Celtic Seas (CS) ecoregion Ecosystem Overviews (EO) as necessary. | Linked to ICES advice, data profiling. The ToR work includes exploring potential additional products from other EGs (e.g. WKASCAPES), processes (e.g., OSPAR, EEA, STECF) and upcoming/ongoing research projects | 4.1, 6.1, 6.5, 6.6 | Ongoing | Ecosystem overviews (EO) |

⁴ Avoid generic terms such as “Discuss” or “Consider”. Aim at drafting specific and clear ToR, the delivery of which can be assessed

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| b | Perform a full cycle of Integrated Ecosystem Assessment (IEA) of the Celtic Sea region from scoping to outputs to inform advice. | The work will build on ongoing research projects related to IEA and EBM (Seawise, Mission Atlantic, EcoScope, etc.). It will provide risk assessment, management strategy evaluation, trade-off evaluation, co-construction of scenarios, and work to identify pathways into the advice via the ICES ecosystem-based management (EBM framework). | 6.1, 6.4, 6.5 | 3 years | Chapter in group final report, potential peer-reviewed publication, and possible ICES Viewpoint |
| c | Improve the inclusion of human dimensions in the integrated ecosystem assessments and Ecosystem Overviews (as appropriate). | The work aims at increasing understanding of relevant objectives, socioeconomic issues, expert knowledge and human behaviour (e.g. improved fisheries fleet modeling). Potential tools include surveys, participatory mapping and mental modelling with stakeholders. | 7.1, 7.2, 7.3 | 3 years | Report on identification of methods and progress made to improve the inclusion of human dimensions in WGEAWESS IEAs and EOs. |
| d | Develop ecosystem knowledge to support the progression of ecosystem-based fisheries management (EBFM) advice and identify options and opportunities to contribute to ICES fisheries advice (catch options) | This ToR will build on the work of WKIrish and investigate potential ecosystem indicators for advancing ecosystem-based fisheries advice in the Celtic Seas and Bay of Biscay and Iberian Coast. This ToR aligns with WGIABs ToR b, with whom we will work closely to develop consistent methodologies for operationalising ecosystem information in ICES advice. | 5.2, 5.3, 6.1, 6.6 | 3 years | Paper on EBFM (likely focused on the development of ecosystem-based fishing mortality reference points (Feco); results reported in the final report; |

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| e | Use ecosystem models to develop food web indicators in support of ongoing assessment work across the Celtic Seas and Bay of Biscay and Iberian Coast ecoregions, and identify options and opportunities to contribute to the Ecosystem Overviews. | This ToR will further develop and use the ensemble of models gathered by WGEAWESS (while also bringing in additional models) to develop food web indicators in relation to requirements for the Marine Strategy Framework Directive (MSFD) and Good Environmental Status (GES) reporting of D4. | 1.9, 6.3, 6.5, 6.6 | 3 years | Paper on food web indicators; intermediate results reported in the final report. |
| f | Finalise sub-regional Integrated Trend Analysis (ITA) applications. Investigate methods to standardise and automate ITA and report on significant trends in the ecosystem. Investigate the impact of spatial scales at which ITA are performed on perceived trends. | Build on previous WGEAWESS progress, and apply methods and recommendations developed by WKINTRA. | 1.4, 1.9, 6.5 | Years 1 & 2 | Paper on ITA application to sub-regions. Proposals for products related to ITA for EOs. |

Summary of the Work Plan

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| Year 1 | <p>The main task will be related to finalising the papers for Tor F. The group will continue to work toward the update of EO focusing on the application of the data profiling tool and improvement of the knowledge stream to EOs through communication with other relevant groups and automated processes (ToR A & C).</p> <p>The work related to new ToRs will be launched in relation with research projects (Tor B), in collaboration with other groups (ToRs D & E with WGIAB) and by reaching to stakeholders and SIHD WGs (Tor C human dimension).</p> |
| Year 2 | Continue with year 1 activities. Annual meeting, intersessional work and meeting to progress on ToRs. |
| Year 3 | Continue with year 2 activities. Annual meeting, intersessional work and meeting to progress on ToRs, finalise papers and other outputs. Begin planning for BoB-IC EO update. |
| All years | <p>Group leaders ToRs:</p> <ul style="list-style-type: none"> a) Sigrid Lehuta b) David Reid c) Debby Pedreschi d) Jacob Bentley and Clive Fox e) Jacob Bentley f) Marcos Llope |

Supporting information

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| Priority | <p>WGEAWESS will focus on the 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).</p> <p>The group will demonstrate and consolidate its advice capacity by strengthening the knowledge stream to EOs and developing a viewpoint on the IEA of the Celtic Sea. It will conduct research toward the development of new knowledge and associated tools to fill identified gaps pertaining to food web functioning and ecosystem-based fisheries management. The group will work toward the wider inclusion of the human dimension within IEAs to improve the understanding of users' stakes and behaviour and reflect trade-offs between objectives.</p> |
| Resource requirements | There is no resource implication for ICES. Working group plan 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 20-30 members and invited guests. |
| Secretariat facilities | None. |
| Financial | No financial implications. |
| Linkages to ACOM and group under ACOM | Direct link to ADGEO when updating the EOs. |
| Linkages to other committees or groups | There is a very close working relationship with the EAMSG and many of its expert groups and workshops. It is also very relevant to WGECON, WGCERP, WGSAM, WKIrish, along with stock assessment groups such as WGHANSA, WGBIE, WGCSE, WGMIXFISH. Collaborations for the new ToRs have been instigated with WGIAB, WGSOCIAL, WGCAMEDA, WGECON 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 feed back to the work of WGEAWESS. |
| Linkages to other organizations | DC- MAP- DG MARE, MSFD DG ENV, OSPAR. |

WGIAZOR - Working Group on Integrated Assessment of the Azores

2022/FT/IEASG04 A Working Group on Integrated Assessment of the Azores (WGIAZOR), chaired by Gui Menezes*, Azores, Portugal, Maria de Fátima Borges, Lisbon, Portugal, will work on ToRs and generate deliverables as listed in the Table below.

| | MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|-----------|---------------|-------------------------|----------------------------|--|
| Year 2023 | 6–10 February | Online | E-eval by 24 February 2023 | Addition of chair Andreia Braga-Henriques |
| Year 2024 | 7–9 February | Horta, Azores, Portugal | E-eval by 23 February 2024 | <p>During 2024 Gui Menezes (Portugal) replaced Andreia Braga Henriques, (Portugal) as chair.</p> <p>In 2024 Régis Santos (Portugal) stepped down as chair.</p> |

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| Year 2025 | 10–14 February | Horta, Azores, Portugal | End of Term E-eval due 28 February Final report due 31 March 2025 |
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ToR descriptors⁵

| TOR | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | DURATION | EXPECTED DELIVERABLES |
|----------|---|---|--|----------|--|
| a | Review and update information on landings, fishing effort and stock status for the Fisheries Overview (FO) | Linked to ICES advice. Maximising efficiency across relevant ICES working groups for FO development, eliminating redundancy. | 5.3, 5.4, 6.6 | 3 years | Annual updates to Fisheries Overview (FO) and underlying data |
| b | Review and update regional knowledge (e.g., MSFD) and products for the Ecosystem Overview (EO) | Linked to ICES advice. Maximising efficiency across relevant groups for EO development, eliminating redundancy. | 6.1, 6.5, 6.6 | 3 years | Inform Ecosystem Overview (EO) and collaborative networking (IEA groups) with improved workflow. |
| C | Define sub-regions features according to oceanographic and ecological units to identify and report on commonalities and divergences among sub-areas, with a focus on climate variability for management advice. | Responding to requests for standardisation of ecosystem advice products and inclusion of climate change information in Ecosystem Overviews. Linked to EAMSG and the commitment to provide advice in the context of ecosystem-based management (EBM). | 1.1, 1.4, 1.9 | 3 years | Inform IEAs/EO. Results in the final report or/and as a collaborative paper. |
| D | Assess the sustainability of the Azorean fisheries in terms of biological, socioeconomic, environmental and climatic performance. | Improving fisheries assessments based on new types of data and analysis to guide science-based policy in addition to traditional biological information and modeling. | 6.6, 7.1, 7.7 | 3 years | Results in the final report or/and as a collaborative paper. |

⁵ 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

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| Year 1 | The main tasks will be related to presenting and drafting the outline for the papers/process for ToR D. Discuss social, ecological and economic scenarios from ToR D work. Begin revision of the Ecosystem Overview. Delivery of updates to the Fisheries Overview. |
| Year 2 | The main tasks will be related to the ToR C. Continue revision of the Ecosystem Overview. Delivery of updates to the Fisheries Overview. Proposal of workshop with stakeholders to discuss the main outputs and connections with invited social scientists. The group will continue to identify data and outputs that may be potentially valuable to IEAs, ecosystem approach to fisheries management (EAFM), ecosystem-based management (EBM), and particularly the Ecosystem Overview (ToR B). The group will work to improve communication with other relevant groups linked to EAMSG. |
| Year 3 | Continue with Year 2 activities while liaising with relevant ICES WGs. Progress agreed upon methodologies for ToRs A,B,C&D. Finalise papers. |

Supporting information

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| Priority | WGIAZOR will focus on integrated ecosystem assessment of the Azorean seas. Pressure on seas (biodiversity loss, climate changes, fisheries), lack of understanding of large marine ecosystem functioning and the context of ecosystem health indicators development (e.g. for the Marine Strategy Framework Directive (MSFD)) require regionally relevant approaches. 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. WGIAZOR will work to address these challenges. |
| Resource requirements | There are 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 10 members plus guests. |
| Secretariat facilities | None apart from Webex and Sharepoint site provision. |
| Financial | No financial implications. |
| Linkages to ACOM and groups under ACOM | Direct link to IEA steering group, ICES advice (Ecosystem Overviews and Fisheries Overviews). |

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| Linkages to other committees or groups | There is a very close working relationship with all the groups of EAMSG. It is also very relevant to establish relationships with ICES WGs such as WGSOCIAL and WGMARS. ToR a may involve collaboration with WGDEEP, WGEF, WGSOCIAL and WGMARS for the fisheries overview development. ToR b may rely upon working with WGDEC and WGML, among other groups that are contributing to the EOs. |
| Linkages to other organizations | DC- MAP- DG MARE, MSFD DG ENV, OSPAR. |

WGIBAR - Working Group on Integrated Assessments of the Barents Sea

2022/FT/IEASG07 A Working Group on the Integrated Assessments of the Barents Sea (WGIBAR), chaired by Bérangère Husson, Norway, will work on ToRs and generate deliverables as listed in the Table below.

| | Meeting dates | Venue | Reporting details | Comments (change in Chair, etc.) |
|-----------|---------------|--|-----------------------------------|--|
| Year 2023 | 20 February | Online Meeting | Interim E-eval by 6 March 2023 | Outgoing chair: Elena Eriksen; Incoming chair: Bérangère Husson. |
| Year 2024 | 10 January | Online Meeting | Interim E-eval by 24 January 2024 | |
| Year 2025 | 24-25 April | Hybrid meetings, Bergen and Tromsø, Norway | Interim E-eval | Incoming chair: Elena Eriksen |
| Year 2026 | TBD | TBD | End of term report and E-eval | |

ToR descriptors

| ToR | Description | Background | Science Plan codes | Duration | Expected Deliverables |
|----------|--|---|------------------------------------|-----------------|---|
| a | Provide support to ongoing stock and ecosystem assessments and evaluations in the Barents Sea | Respond to Science and advisory requirements as needed | 2.1, 2.2; 2.7; 6.1 | Year 1, 2, 3, 4 | Annual report |
| b | Improve the methodological framework of the ecosystem assessment, including regarding the reproducibility and transparency of the assessment process | Move towards FAIR principles, aiming to engage with ICES transparency and reproducibility work (e.g. Data Profiling Tool) of science and advice in order to reduce work | 4.1, 4.2, 4.3, 6.1 | Year 1, 2, 3 | Propose reproducibility and transparency frameworks for IEA |

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| | | load by producing and sharing analyses scripts and workflows | | | |
| c | Publish integrative studies from the assessment databases | Synthesise knowledge gained during 19 years of ecosystem survey in the Barents Sea. This survey constitute the basis of most results reported by WGIBAR. | 2.2, 2.7, 4.3 | Year 1, 2 | Peer review paper (e.g., spatial-temporal trends to describe the last two decades of changes in the Barents Sea), ICES data base |

Summary of the Work Plan

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| Year 1 | <p>Provide support to ongoing stock and ecosystem assessments and evaluations in the Barents Sea</p> <p>Improve the methodological framework of the ecosystem assessment, particularly regarding the reproducibility and transparency of the assessment process.</p> <p>Publish integrative studies from the assessment databases.</p> <p>Due to the continuing uncertainty associated with the temporary suspension of experts from the Russian Federation, it is challenging to provide specifics in the work plan. WGIBAR will remain agile to the opportunities presented.</p> |
| Year 2 | <p>Provide support to ongoing stock and ecosystem assessments and evaluations in the Barents Sea</p> <p>Improve the methodological framework of the ecosystem assessment, particularly regarding the reproducibility and transparency of the assessment process.</p> <p>Publish integrative studies from the assessment databases.</p> <p>Due to the continuing uncertainty associated with the temporary suspension of experts from the Russian Federation, it is challenging to provide specifics in the work plan. WGIBAR will remain agile to the opportunities presented.</p> |
| Year 3 | <p>Provide support to ongoing stock and ecosystem assessments and evaluations in the Barents Sea</p> <p>Improve the methodological framework of the ecosystem assessment, particularly regarding the reproducibility and transparency of the assessment process.</p> <p>Due to the continuing uncertainty associated with the temporary suspension of experts from the Russian Federation, it is challenging to provide specifics in the work plan. WGIBAR will remain agile to the opportunities presented.</p> |
| Year 4 | <p>Provide support to ongoing stock and ecosystem assessments and evaluations in the Barents Sea.</p> <p>Due to the continuing uncertainty associated with the temporary suspension of experts from the Russian Federation, it is challenging to provide specifics in the work plan. WGIBAR will remain agile to the opportunities presented.</p> |

Supporting information

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| 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 a, b and c) is needed. |

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| Participants | The Group is normally attended by some 20–25 members and guests. The group, as of 2023, is at reduced capacity, and will only include Norwegian participants. |
| 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 committee 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, WGEKO. Will engage with EAMSG and other EAM groups on transparent framework for IEA. |
| Linkages to other organizations | <p>The Joint Russian-Norwegian Fisheries Commission, in charge of joint fisheries management in the Barents Sea.</p> <p>The Joint Russian-Norwegian Environmental Commission, in charge of joint environmental management in the Barents Sea.</p> <p>The Norwegian Ministry of Climate and Environment, in charge of Norwegian holistic ecosystem-based management plan for the Norwegian part of the Barents Sea.</p> <p>Relevant groups within the Arctic Council. PAME/ICES workshop, PICES/ICES workshops.</p> <p>Norwegian monitoring group under the Norwegian Management Plan</p> |

WGCOMEDA - Working Group on Comparative Ecosystem-based Analyses of Atlantic and Mediterranean marine systems

2022/FT/IEASG08 A Working Group on Comparative Ecosystem-based Analyses of Atlantic and Mediterranean marine systems (WGCOMEDA), chaired by Sofia Henriques, Portugal, Giovanni Romagnoni, Germany, Camilla Sguotti*, Italy and Maria Cristina Mangano, Italy will work on ToRs and generate deliverables as listed in the Table below.

| | MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|-----------|---------------|------------------|---|--|
| Year 2023 | 25–28 Sep | Ispira, Italy | Interim E-eval | Giovanni Romagnoni replaced Romain Frelat as chair in 2022. |
| Year 2024 | 21–24 May | Patras, Greece | Interim E-eval by 6 June | |
| Year 2025 | 20-23 May | Hamburg, Germany | End of term E-eval by 9 June and final 3-year cycle report by December 2025 | Camilla Sguotti (Italy) replaced Paris Vasilakopoulos (EU) as chair. |

ToR descriptors

| TOR | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | DURATION | EXPECTED DELIVERABLES |
|-----|---|--|------------------------------------|----------|---|
| a | Improve the knowledge on key patterns and drivers of functional biodiversity across different marine habitats to support eco- | A) The topic is a follow up from the work in the previous cycles aiming to define the best representation of the functional structure across different | 1.4; 1.9; 2.2 | 3 years | 1. Contribute to standardize the use of functional traits across different taxonomic groups and marine habitats (demersal-pelagic links; from |

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| | system-based assessments. | <p>assess- marine habitats to support ecosystem-based assessments towards an integrated approach: pelagic-demersal-benthic links. This will include some marine habitats poorly assessed in previous cycles (such as pelagic habitats and rocky reefs).</p> <p>B) Integrating the outcomes and findings of the topic A) with the other ToRs of COMEDA. For instance: using the best functional representation on network analysis (ToR B) and on the assessment of functional resilience (ToR C), discuss the best approaches to integrate the functional and socio-economic dimensions (ToR D).</p> <p>C) Advancing the findings and outcomes of previous COMEDA cycles by comparing habitats and integrating biodiversity patterns between coastal and deep-sea areas, in collaboration with other working groups.</p> | | | <p>coastal to deep sea areas).</p> <p>2. Identify the best set of single or combined traits to represent ecological structure of different assemblages and/or habitats (from coastal to deep sea habitats) in order to integrate them in different contexts of functional assessments (e.g. food-webs, ecological-socio-economic links, marine resilience).</p> |
| b | Investigating multi-trophic interactions towards a coordinated application across regions | <p>A) The topic is a follow up from the work in the previous COMEDA cycles. It aims to advance and integrate methods, approaches and tools for characterising multi-trophic interactions and ecosystem functioning.</p> <p>B) Multiple approaches have been applied to investigate multi-trophic dynamics.</p> | 1.4; 1.9; 5.2 | 3 years | <p>1. Review existing food web models applications across Mediterranean and Atlantic systems.</p> <p>2. Identify and address key geographical and methodological gaps that prevent multi-trophic interaction network application across regions.</p> |

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| | | <p>However, there is a lack of a structural understanding of the diverse potential and the complementarity of the various approaches. A systematic mapping of the application in terms of geographical location and scope of investigation is lacking.</p> <p>C) The capability of the various methods to explore the link between structure and stability, and to investigate past and future changes in the system in light of disturbances, remains a key aspect to be further explored.</p> | | | |
| c | Investigate shifts and resilience dynamics of marine systems in the Mediterranean and the Atlantic. | <p>A) The topic is a follow up from the work in the previous COMEDA cycles, where we studied different types of marine systems (e.g. populations, communities, ecosystems, trait configurations, trophic webs) undergoing change in the NE Atlantic and the Mediterranean.</p> <p>B) Analysis of the multivariate temporal trends of systems and their stressors have been used to elucidate resilience dynamics and mechanisms of change. Resilience has been also inferred by the structural properties of marine systems and indicator-based approaches.</p> | 1.3; 1.9; 6.5 | 3 years | <p>1. Further develop existing methods to track/interpret shifts and quantify resilience in real-life systems, and explore new approaches to assess resilience, such as structure-based or indicator-based approaches.</p> <p>2. Compare the system dynamics and temporal occurrence of shifts, and identify common drivers of change in the NE Atlantic and the Mediterranean.</p> <p>3. Explore approaches to improve our prediction capability of future shifts.</p> |
| d | Explore options to integrate | A) The topic is a follow up from the work in | 6.6; 7.1; 7.2; | 3 years | 1. Scoping/screening exercise focused across the Atlantic |

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| grate ecological and socio-economic dimensions to support integrated marine management | <p>the previous COMEDA cycle and aims to collate the existing knowledge on incorporation of social, economic and cultural aspects to support the implementation of an Ecosystem Approach in regional ecosystems.</p> <p>B) There is a need to collate existing knowledge generated by regional case studies and promote comparative analysis of case studies to produce toolkits of best practices for both Mediterranean and Atlantic systems.</p> | <p>and Mediterranean marine systems to collate existing literature, best practices, protocols and case studies for the identification of future needs and gaps for socio-ecological-economic and cultural integration across the marine systems.</p> <p>2. Develop a framework for collective reporting (database) to support future potential data collection, data analysis and advice development.</p> |
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Summary of the Work Plan

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| Year 1 | <p>1.1 Standardize the use of functional traits across different taxonomic groups and marine habitats. This will start with a revision of the current available traits to standardise the trait nomenclature and with the discussion of the main trait properties that should be used to support the selection of core traits. This work will be towards Deliverables A1 and A2, in collaboration with other working groups.</p> <p>1.2 Review and update databases of (i) existing food webs models and (ii) socio ecological systems approaches across Mediterranean and Atlantic systems (Deliverables B1 and D1). Both ToRs B 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.</p> <p>1.3 The scoping/screening exercise of socio-economic-ecological systems followed by an evidence mapping (Deliverable D1) will depict the current work and identify future needs and gaps for social science when dealing with ecosystem-based approach and support the future potential data collection (Deliverable D2) fostering synergies with other ICES WGs.</p> <p>1.4 Further development of the methodological tools used for shift analysis and resilience assessment of complex natural systems (Deliverable C1). Continuation of the work on the comparison of traits-based and species-based integrated assessments in the Atlantic and the Mediterranean Sea (Deliverable C2, linking to ToRs A & B).</p> <p>1.5 Networking activities to ensure coordination with other international bodies and existing WGs within and outside ICES.</p> |
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| Year 2 | <p>2.1 Identification of the best combination of traits (single or groups of traits) to represent the ecological structure of the functional biodiversity, in order to integrate them in different contexts of assessments (e.g. food web networks - ToR B, ecological resilience - ToR C, ecological-socio-economic links - ToR D). This activity will be developed in order to integrate the current approaches among trophic levels and habitats (i.e. what traits should we use to understand linkages between plankton, fish and benthic invertebrates; what traits better represent the ecological structure of the different habitats), linking to deliverable A2.</p> <p>2.2. Identification of key multitrophic network patterns and methodological applications across geographical regions (Deliverable B1). This, in combination with outcomes of ToR A and Deliverable B2, will contribute to outline key research priority areas for the application of Ecosystem Approach at European level.</p> <p>2.3 Exploration of quantitative approaches to anticipate upcoming shifts in real-world systems (Deliverable C3). We will also explore the effect of such shifts to ecosystem services (linking to ToR D).</p> <p>2.4. Case studies assessing and selecting relevant indicators dealing with socio-economic-ecological systems - Deliverable D1; e.g. the social and cultural significance of human activities related to fishing (coastal regions in both the Mediterranean and the Atlantic).</p> |
| Year 3 | <p>3.1 Spatio-temporal analysis of functional diversity dynamics and analysis of the relationship between structure and stability in food webs - Deliverables A2 and B2 – in order to understand past dynamics and identify drivers of change across ecosystems in the NE Atlantic and the Mediterranean Sea.</p> <p>3.2 Identification of gaps that prevent multitrophic network applications across regions (Deliverable B2), based also on outcomes of Deliverable B1 to refine an assessment of key research priority areas for the application of Ecosystem Approach at European level.</p> <p>3.3 Assessment of past and future vulnerability and stability of Mediterranean and Atlantic ecosystems to different pressures, focusing on functional changes and food web structure to identify the ecosystem resilience to disturbances. This will allow us to explore resilience indicators using ecosystem models, as part of all ToRs.</p> <p>3.4 Collective reporting (database) to assess the ecological, socio-cultural and economic significance of human activities exerted on marine coastal systems and support future potential data collection, data analysis, and advice development in a context of Ecosystem Approach to fisheries management - Deliverable D2.</p> <p>3.5 Bringing together what has been developed over the previous years, finishing relevant papers and setting the scene for the next cycle (all ToRs).</p> |

Supporting information

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| Priority | <p>The aim of this working group (WG) is to investigate both system-specific and cross-systems 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 from regional systems of the Atlantic Ocean and the Mediterranean Sea. A comparative approach of marine ecosystems is essential to understand how Mediterranean and Atlantic ecosystems are structured, how they function, and also to identify which are the most sensitive species and most critical ecological processes to be managed within the ecosystem dynamics. Therefore, this WG aims at strengthening the scientific basis for the regional Ecosystem Approach for coastal and marine living resources through a comparative platform of research. This could also contribute to European marine policies such as the Common Fisheries Policy and some Descriptors of the Marine Strategy Framework Directive (MSFD), e.g. Descriptors 1 (Biodiversity), 4 (Food webs), and 6 (Seafloor integrity).</p> <p>During the previous three cycles, WG COMEDA established a strong network of collaborations that will continue contributing to the comparative knowledge of Atlantic and Mediterranean systems. The new ToRs build up on the past research of the group and propose to test 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, the new resolution will follow up and build on the previous effort to integrate the socio-economic dimension with advanced ecological knowledge, introduced with the last term of reference (ToR D; 2020-2022), to better understand the effects of both anthropogenic changes and management options on the ecosystems.</p> <p>Close collaboration with other WGs of the SCICOM/ACOM Steering Group on Integrated Ecosystem Assessments (SSGIEA) such as WGIAB, WGEAWESS, WGSOCIAL, WGBESEO 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 group aims to develop applied research to support integrated fisheries advice and marine management.</p> |
| Resource requirements | Information from ICES, GFCM, JRC and STECF 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. |
| Secretariat facilities | None. |
| Financial | To facilitate the participation of early-career scientists, WG chairs may apply to marine research consortiums to find financial support for early-career researchers who need travel funding |
| Linkages to ACOM and group under ACOM | There are no obvious direct linkages. |

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| Linkages to other committees or groups | There is a close working relationship with all the groups of EAMSG, 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) and WGBESEO on Balancing Economic, Social and Ecological Objectives; 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. |

WKFoodWeb – Workshop on the operational use of Food Web indicators and information

This will be dissolved at the end of 2024

2022/WK/IEASG09 The **Workshop on the operational use of Food Web indicators and information (WKFoodWeb)**, chaired by Maciej T. Tomczak (Sweden), Eider Andonegi (Spain), Marian Torres (Spain), and Jacob Bentley (UK) will be established and will meet in Copenhagen, Denmark, 19–23 February 2024 to work on the following Terms of Reference (ToRs):

- a) Streamline existing examples, knowledge, experience, and recommendations on food web, trophic level and other ecological indicators from across the ICES network (e.g., from IEA groups, WGECO, WKFOOWI, WKASCAPES) and beyond (e.g. MSFD, OSPAR, HELCOM, UKMS, etc.); ([Science Plan codes](#): 1.3, 1.4, 1.7, 6.3);
- b) Identify priority areas where food web information/indicators could enhance existing advice and align with the ICES EBM framework (including advancing the Feco approach).; ([Science Plan codes](#): 2.2, 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4);
- c) Prepare a roadmap, including risks and opportunities, for the systematic and transparent use of food web models to support ICES advice with information on trade-offs.; ([Science Plan codes](#): 2.5, 4.3, 6.6);
- d) Develop a pipeline proposal to strengthen the ‘food web’ component of ICES ecosystem advice (ICES Ecosystem Overviews) that can be applied in a consistent way across ICES ecoregions and preferentially on the short-term timescale.; ([Science Plan codes](#): 1.3, 1.4, 1.7, 1.9, 6.5).

WKFoodWeb will report by June 2024 for the attention of the SCICOM.

Supporting information

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| Priority | <p>WKFoodWeb will address the growing requests from previous workshops (WKEO3, WKCONSERVE, WKFOOWI, WKEWIEA, WKASCAPES, WKIRISH, WKEBFAB) and working groups (WGECO, WGIAB, WGEAWESS) for the operational use of food web indicators and information in ICES advice. It will be the priority of this workshop to (i) review existing and developing evidence products, (ii) identify methods for evidence production that can be systematically applied across ICES ecoregions, and (iii) develop and demonstrate the use of a pipeline to operationalise food web products within ICES advice.</p> |
| Scientific justification | <p>Term of Reference a)</p> <p>Advances in food web indicator creation and assessment are ongoing within ICES, across research programs, and within governing bodies to measure progress against national and international biodiversity commitments. ToR a aims to provide a review of the current state of play to help identify opportunities and avoid duplicating efforts.</p> <p>Term of Reference b)</p> <p>Marine ecosystem services are impacted by environmental and ecosystem variation. It is likely that there are opportunities where accounting for these impacts in our advice could enhance existing management. However, making ecosystem information operational often requires a developed understanding of the existing regulatory and advice frameworks to deliver pragmatic solutions. ToR b will identify priority areas where food web information could enhance advice and explore/advance routes for its integration.</p> <p>Term of Reference c)</p> <p>Food web models (e.g. Ecopath with Ecosim (EwE) and Atlantis) are being increasingly used across ICES and by decision makers to guide the delivery of EBM, EBFM, and EAFM. Often models (even those built using the same simulator, e.g. EwE) operate under different assumptions, at different resolutions, and with different policy origins. Their utility to provide food web information is clear and progress should be made to use them in an operational management context (see recent paper by Craig and Link (2023) in Fish and Fisheries). Their current application within ICES is unsystematic relative to the use of less complex models. ToR C will explore options to enhance how food web models are used across ICES to support the delivery of ecosystem-based advice.</p> <p>Term of Reference d)</p> <p>The ICES EOs include food web sections but they remain largely disparate between EOs and often lack information or indicators of status. Food web indicators were identified as a priority for EOs by WKEO3. ToR d will explore options and development needs (building on ToRs a-c) for the development of an evidence pipeline to systematically improve the food web information included in EOs.</p> |

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| Resource requirements | Hybrid meeting (online component only mornings or afternoons: TBD) |
| Participants | <p>This will be of interest to participants who are involved in food web and ecosystem research and the integration of ecosystem information into ICES advice. Members from the following groups may be particularly interested: WKFOOWI, WKEWIEA, WGECO, WGIAB, WGEAWESS, WGINOSE, WKASCAPES, WKIRISH, WKEBFAB, WKEO3, WKCONSERVE, WGIPEM, WGSAM. Chairs intend to reach out to a list of participants who are heavily involved in this work area (also open to nominations from SCICOM), with wider attendance being driven by advertising of the WK on the ICES website and social media.</p> <p>If the workshop is oversubscribed, ICES reserves the right, in consultation with the workshop Chairs, to select the final workshop participants based on their expertise and geographical distribution.</p> |
| Secretariat facilities | Meeting facilities (in person and online), registration support. |
| Financial | No financial implications. |
| Linkages to advisory committees | ACOM, SCICOM |
| Linkages to other committees or groups | EAMSG and IEA working groups. Builds on work and requests of WKFOOWI, WKEWIEA, WGECO, WGIAB, WGEAWESS, WGINOSE, WKASCAPES, WKIRISH, WKEBFAB, WKEO3, WKCONSERVE, WGIPEM, WGSAM |
| Linkages to other organizations | OSPAR, HELCOM, JRC, Ecopath International Initiative (EII) |

Resolutions approved in 2021

WGINOR - Working Group on Integrated Assessments of the Norwegian Sea

2021/MA2/IEASG00 The Working Group on Integrated Assessment of the Norwegian Sea (WGINOR), chaired by Anna H. Ólafsdóttir, Iceland and Benjamin Planque, Norway, will work on ToRs and generate deliverables as listed in the Table below.

| | Meeting dates | Venue | Reporting details | Comments (change in Chair, etc.) |
|-----------|----------------|-------------------------|-----------------------------------|---|
| Year 2022 | 14-18 November | Tromsø, Norway | Interim report by 15 January 2023 | New incoming Co-Chair, Benjamin Planque, Norway |
| Year 2023 | 20–23 November | Tórshavn, Faroe Islands | Interim report by 15 January 2024 | |
| Year 2024 | 4–7 November | Reykjavík Iceland | Final report by 15 January 2025 | |

Terms of Reference a) – g):

| TOR | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | DURATION | EXPECTED DELIVERABLES |
|-----|--|---|------------------------------------|-----------|--|
| A | Perform integrated assessment of the pelagic ecosystem in the Norwegian Sea and develop a framework for identifying important signals for management. | Addresses needs in the Science Plan for developing understanding of the ecosystem and its responses to human impact and other pressures. In addition, start developing reporting formats to meet the needs of ecosystem-based advice. | 6.5 | years 1-3 | WG report to SCICOM and ACOM January following each year |
| B | Utilize multi-species and ecosystem models to evaluate effects of single and multi-species 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 1-3 | WG report to SCICOM and ACOM January following each year |

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| C | Continue development of forecast products (1–5 years) for ocean climate and initiate development of forecast products for other ecosystem components 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 | Continue improvement of workflow, transparency, and replicability. | Develop data sharing plans towards FAIR data principles. | 3.2 | years 1-3 | WG report to SCICOM and ACOM January following each year |
| E | Develop a two-way dialogue between WGINOR and relevant stakeholders and managers in Norway, Faroe Island, and Iceland. | Guiding 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 | Compile information for future ecosystem overview revisions based on the ICES technical guidelines. | Summarize key achievements in developing an understanding of the ecosystem and its responses to human impact and other challenges. | 6.5 | year 1-3 | WG report to SCICOM and ACOM January following each year |
| G | Annually review and revise the ecosystem status summary to report trends and recent changes | These summaries will provide information on annual trends will also provide the foundational material for the ecosystem overview revision. | 6.5 | year 1-3 | Norwegian Sea ecosystem status summary |

Summary of the Work Plan:

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| Year 1 | Work on ToRs a-g |
| Year 2 | Work on ToRs a-g |
| Year 3 | Work on ToRs a-g |

Supporting information

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| Priority | WGINOR aims to conduct and further develop Integrated Ecosystem Assessment for the |
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| | Norwegian Sea, as a step towards implementing the ecosystem approach, addressing core priorities in the ICES strategic plan. |
| Resource requirements | <p>Term of Reference a)</p> <p>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 has been developed with input from relevant projects at the involved institutions and provides the platform for doing this part of the ToR.</p> <p>Term of Reference b)</p> <p>This will be supported by work conducted in the IMR-project “Sustainable multi-species harvest from the Norwegian Sea and adjacent ecosystems” (SIS harvesting project), which represents a continuation of the work done in WGINOR during the last three-year term.</p> <p>Term of Reference c)</p> <p>This will be supported by work conducted in the SIS harvesting project and by oceanographic information collected during cruises in the Norwegian Sea and surrounding waters and supplied by satellite-based monitoring. The SIS harvesting project provides resources needed to complete development of a forecast system.</p> <p>Term of Reference d)</p> <p>This will be based on experiences made during implementation of this ToR. Some support from ICES secretariat may be required to implement FAIR, TAF, data profiling, and related approaches.</p> <p>Term of Reference e)</p> <p>This will be conducted on a national basis, at the time/place of the WGINOR annual meetings. No additional support required.</p> <p>Term of Reference f)</p> <p>Update of the elements of the ecosystem overview 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.</p> <p>ToR f’s expected deliverables was updated to be clearer on the group’s plans to support the ecosystem overview revisions.</p> <p>Term of Reference g)</p> <p>Was added as the result of discussions following a recommendation from WGINOR to ACOM about their plans to produce the Norwegian Sea ecosystem status summary annually.</p> |
| 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 | WGWIDE |
| Linkages to other committees or groups | EAMSG |

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

Extension to year 4 approved by ACOM/SCICOM 2022

2021/FT/IEASG01 A joint ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment (IEA) for the Central Arctic Ocean (WGICA), chaired by Sei-Ichi Saitoh (Japan), Lis Lindal Jørgensen (Norway) and Martine van den Heuvel-Greve (Netherlands) will work on ToRs and generate deliverables as listed in the Table below.

| MEETING DATES | VENUE | REPORTING DETAILS | COMMENTS (CHANGE IN CHAIR, ETC.) |
|---------------|-------|--|---|
| Year 2022 | | | |
| Year 2023 | | | |
| Year 2024 | | | |
| Year 2025 | | Final ICES Scientific Report by DATE to SCICOM | To plan for the 2026 publication of the Cooperative Research Report (CRR) |

ToR descriptors

| TOR | DESCRIPTION | BACKGROUND | SCIENCE PLAN CODES | DURATION | EXPECTED DELIVERABLES |
|-----|--|--|------------------------------------|----------|---|
| a | Identify and prioritize the relevant social, economic, and ecological (SEE) questions to be asked for the CAO in collaboration with the PAME CAO project. Identify relevant audience/stakeholders to the CAO-integrated ecosystem assessment (IEA). | To be used in identifying which key questions are relevant to stakeholders in the CAO | 1.1 1.2 | Year 1-3 | Relevant stakeholders and SEE questions for the present and future summer-ice free CAO. |
| b | Identify priority semi-quantitative and quantitative methods for doing <i>relevant</i> IEA for the CAO based on existing information already compiled in the WG's reports, EOs and CRR. | To link the social, economical, physical, chemical and biological CAO ecosystem to the human activities, pressures and impacts | 2.1 2.2 | Year 2-4 | Overview of available datasets, methods and tools (qualitative, quantitative & semi-quantitative as appropriate), assessment methods, and initiation of analyses. Identification of key knowledge gaps. |

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| c | Integrate and prioritize scientific SEE questions into the IEA for the CAO, this will include collaboration and development of methods with relevant EAMSG and HAPISG groups. | To provide tentative figures showing qualitative and semiquantitative/quantitative linkages between identified components of the IEA, including risk and confidence based on existing socio, economic and ecologic information. | 3.1 | Year 2-4 | One or more output(s) (e.g. risk assessment, ITA, conceptual and ecosystem models) of the CAO IEA to be published in the open source ICES reports series. Begin drafting the Cooperative Research Report (CRRs) on Human Activities and existing Management Bodies and Integrated Ecosystem Assessment methods and processes. |
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Summary of the Work Plan

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| Year 1 | Writing of Report 2 on Human Activities, Pressures and Ecosystem vulnerability |
| Year 2 | Identify the stakeholders and key scientific questions for an IEA of the CAO |
| Year 3 | Identify and initiate IEA method(s) to address the key scientific questions |
| Year 4 | Begin drafting the CRR section on IEA methods and processes to be included as part of the final report for this term |

Supporting information

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| Priority | The current activities of this Group will lead ICES-PICES-PAME into issues related to the development of an Integrated Ecosystem Assessments for the Central Arctic Ocean as a step towards implementing an ecosystem approach in the region. These activities are considered to have a very high priority in this rapidly changing ecosystem and will also contribute towards advancing ecosystem science as identified as a priority of the ICES Science Plan. |
| Resource requirements | Assistance of ICES 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 and potentially webhosting relevant material. Assistance in the steps of the IEA process. Reporting support. |
| Participants | 20-50 ICES-PICES-PAME members and guests |
| Secretariat facilities | Meeting support (both in person and online) |
| Financial | No financial implications identified |
| Linkages to ACOM and groups under ACOM | ACOM (CRR will advance sections of the CAO Ecosystem Overview) |
| Linkages to other committees or groups | EAMSG and its working groups, especially WGINOR (Norwegian Sea), WGIBAR (Barents Sea), and WGIEAGS (Greenland Sea), and WGIEANBS-CS (Bering and Chukchi Seas) as these regions encircle the CAO and the Atlantic and Pacific gateways. Other relevant ICES groups conducting work on SEE-related topics include WGBESEO, WGECON, and WGSOCIAL. |
| Linkages to other organizations | PICES, Arctic Council working groups, and the Provisional Scientific Coordinating Group (PSCG) of the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean |

EGs dissolved in 2024

| Res. Code | EG name | Chairs |
|-----------------|---|---|
| 2022/WK/IEASG10 | WKBALEO - Workshop for the revision of Ecosystem Overview of the Baltic Sea Ecoregion | Carolyn Faithfull, Sweden, and Punttila Riikka, Finland. |
| 2022/WK/IEASG09 | WKFoodWeb – Workshop on the operational use of Food Web indicators and information | Maciej T. Tomczak, Sweden, Eider Andonegi, Spain, Marian Torres Spain, and Jacob Bentley, UK. |