



Background Document:

Guide preparation and discussion at the workshop

PAME (Joint EA-EG)/ICES Workshop on Ecosystem Approach Guidelines and Integrated Ecosystem Assessment (6th EA workshop)



The Ecosystem Approach Expert Group (EA-EG)

The Protection of the Arctic Marine Environment (PAME) working group under the Arctic Council (AC) established in 2007 an expert group on the Ecosystem Approach to management in the marine Arctic. The EA-EG was broadened in 2011 as a joint expert group with participation of other AC working groups (AMAP, CAFF, SDWG).

The EA-EG convened 5 workshops on various aspects of the EA from 2011 to 2015, and a first conference on EA implementation in the Arctic in 2016 (in August in Fairbanks, Alaska). The current workshop is the sixth EA workshop organized by the EA-EG, in this case jointly with the International Council of Exploration of the SEA (ICES), and with contribution and support also from the Integrated Ecosystem Assessment program of NOAA in the USA.

The report '*Status of implementation of the Ecosystem Approach to Management in the Arctic*'

The EA-EG produced a report on the status of implementation of the EA in the Arctic in early 2017. This report provides:

- a brief summary of the history of work on the EA within the AC
- a framework for implementation of the EA to management,
- potential roles the AC could play in promoting the development and use of the EA in the Arctic.

The report is a main background document for this workshop ([available here](#)). Table 1 in the report provides links to the various reports and products on EA produced by the EA-EG and other projects or groups in the AC.

Request from the Arctic Council ministers

The EA status report was submitted via PAME and the Senior Arctic Officials (SAOs) to the ministerial meeting (11 May 2017) of the Arctic Council in Fairbanks, Alaska, marking the end of the US chairmanship of the AC. In the Iqaluit Declaration from the AC ministerial meeting two years earlier (2015), the AC ministers requested development of practical guidelines for an ecosystem-based approach to the work of the AC. This request was repeated in the Fairbanks Declaration:

“32. Reaffirm the need for an ecosystem approach to management in the Arctic, welcome the Status of Implementation of the Ecosystem Approach to Management in the Arctic Report, and encourage future efforts to develop practical guidelines for implementing an ecosystem approach,”

Indigenous perspectives

Six organizations representing Arctic Indigenous Peoples are Permanent Participants of the Arctic Council. Representatives from the Indigenous Peoples have taken active part in the work of the EA-EG at previous workshops and at the 1st EA conference in Fairbanks last year where they presented on topics including ‘the Alaskan Inuit food security lens’ and aspects of co-management. The perspectives and contributions of Indigenous Peoples on the concept and implementation of EA is important and welcomed. Use of local and traditional knowledge is a valuable source of information along with traditional scientific knowledge when it comes to perform IEA of Arctic marine ecosystems. In the work

to develop EA guidelines, it will be important to include and engage with Indigenous knowledge holders and Indigenous organizations.

Two topics – EA guidelines and IEA

The workshop will consider two separate although related topics. One is to start the work on developing practical guidelines for EA implementation in the Arctic. The other is to consider where we stand with regard to Integrated Ecosystem Assessment (IEA). This is reflected in the two objectives for the workshop.

Workshop objectives:

1. Scope and start work on development of guidelines for Ecosystem Approach to management (EA) in the Arctic.
2. Review status of work on developing and doing Integrated Ecosystem Assessment (IEA) to develop best practices for Arctic IEA.

The first topic – Developing practical guidelines for EA implementation

At what level of detail and for whom?

At the workshop we will discuss how we should proceed to develop practical guidelines for EA implementation and then start the process to develop them. The ministers have requested (or encouraged) the development of practical guidelines. Discussion topics will include: For whom are we developing the guidelines? The EA is about management (see definition below), so at what hierarchical level of the management system should they be tailored for, and at what level of detail and specificity should they be developed? Do we see the guidelines as overarching and general for how an EA management system needs to be set up, or do we see them as more detailed prescriptions for how various tasks under an EA framework need to be carried out?

Definition of Ecosystem Approach to Management (EA)

The Ecosystem Approach to Management (EA) is known by several names, such as Ecosystem Management, Ecosystem-based Management (EBM), or Integrated Ocean Management. In the work of the EA-EG, EA and EBM are regarded as synonymous terms with the same meaning.

The Arctic Council at Kiruna in 2013 adopted the following definition of the EA (or EBM):

Ecosystem-based management is the comprehensive, integrated management of human activities based on best available scientific and traditional knowledge about the ecosystem and its dynamics, in order to identify and take action on influences that are critical to the health of ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.

Framework for implementation of the Ecosystem Approach to management

The EA-EG has developed a framework for implementation of the EA (or EBM) to management of Arctic marine and coastal environments which consists of six related elements:

- 1) Identify the geographic extent of the ecosystem;
- 2) Describe the biological and physical components and processes of the ecosystem,
- 3) Set ecological objectives that define sustainability of the ecosystem,

- 4) Assess the current state of the ecosystem (Integrated Ecosystem Assessment),
- 5) Value the cultural, social and economic goods produced by the ecosystem,
- 6) Manage human activities to sustain the ecosystem.

While they are numbered, the elements do not necessarily need to be sequential, although they eventually are linked in an iterative and adaptive operational management cycle.

The first step is to identify the ecosystem using ecological criteria (rather than administrative boundaries). Focusing on the functions, health and integrity requires that the ecosystem be defined in spatial and geographical terms. The identified Arctic Large Marine Ecosystems (LMEs) represent this first step, which can be said to have been taken for the marine and coastal environment (Fig. 1).

The next element is to describe the biological and physical components and processes of the defined ecosystem (e.g. LMEs) including humans and their activities. A key to successful EA (or EBM) management is that the ecosystem is understood, in the sense of how it is constructed and how it works.

The third element is to set ecological objectives that collectively as a suite or ensemble define the line (or envelope) of sustainability that 'runs through' the ecosystem. Finding the holistic suite of ecological objectives which defines sustainability is scientifically very demanding, but is a very important step that provides integration across ecosystem components and the various human activities and pressures that affect the ecosystem.

The fourth element is to carry out an integrated assessment of the current state of the ecosystem, including pressures and impacts from human activities, both individually and combined as cumulative effects. This is now commonly called Integrated Ecosystem Assessment (IEA), and approaches and methodology for doing IEA are being developed and tried in several institutional contexts (see section on IEA).

The fifth element on valuation of ecosystem goods and services is another very demanding task where limited work has been done so far.

The final element is the management decisions to regulate human activities in ways that provide benefits from sustainable use of resources while achieving or maintaining the ecosystem in good 'health' (where its integrity is maintained). What good health (or good environmental status, as it is called in EU legislation) is, is defined in an operational sense by the ecological objectives (element 3), and its achievement is assessed in the IEA in element 4. The management decisions and measures need to be responsive and adaptive to the changing conditions in the ecosystem as well as in the human populations that use and depend on the ecosystem.

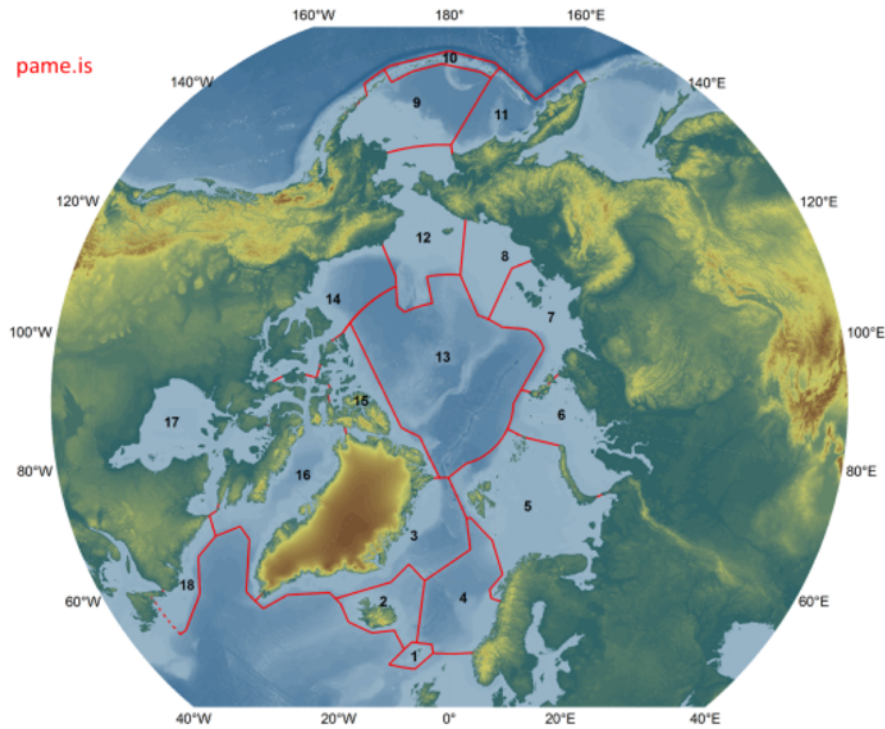


Fig. 1. Map of 18 Large Marine Ecosystems (LMEs) identified as units for management applications in the Arctic.

The EA framework as a basis for development of guidelines

Development of guidelines for EA implementation in the Arctic could use the EA framework as the basis and starting point. The EA framework provides general guidance to the elements and activities which are required to construct or align a management system with an iterative cycle of assessing the changing state of the ecosystem against agreed ecological objectives that prescribes sustainability of the ecosystem.

General and specific guidelines

It is possible to see development of guidelines for EA implementation as a two-step (or two-level) process, where the first step is to develop general guidelines based on the EA framework, followed by a next step of developing specific guidelines for the various elements (such as IEA).

One advantage of a two-step process is that it may facilitate the separation of common elements and activities at the general level of EA implementation, from the more specific and detailed prescriptions of how to carry out certain activities, e.g. how to set ecological objectives or how to perform an IEA. The EA (as defined above) is integrated management of human activities across economic (and other) sectors, to achieve the dual objectives of sustainable use while maintaining ecosystem integrity. The way the EA is applied can vary, reflecting the specific ecological, cultural and social conditions in marine ecosystems. There is not likely to be 'one-size fits all', but rather the EA should be a flexible, varied, and adaptable framework reflecting regional priorities. Guidelines may therefore have to be general, in agreement with embedded principles, but flexible and optional when it comes to specifics.

Refinement of the EA framework

The 6-element EA framework has two (or more) hidden elements which are implicit. They are Monitoring and Scientific advice (a credible knowledge base for decision making). Monitoring is providing updated information on ecosystem components and human activities. Basically, monitoring

provides the basis for an assessment of the current status of the ecosystem and also provides information on progress towards targets. Scientific advice is the step of translating the outcome of an IEA into requirements and options for management actions. These actions should be adaptive and tailored to the current situation to meet agreed objectives.

A third hidden element is scientific research. Research serves the purposes of providing insight into the structure and dynamics of marine ecosystems, and improving the understanding of the relationship between human activities and marine ecosystems. Research improves our ability to assess the ecosystem, and an IEA will have identified priority research questions as a by-product, which when illuminated, will improve the knowledge base for the next iterative round(s) of IEA for a given ecosystem.

The scale issue – LMEs and integration of scales

Scale is a very important and complex issue with regard to implementing the EA. Often the scale of monitoring and assessment are very different from that of management. Also, the scale of interest by management is often different from that of local communities. In the work of the EA-EG, we have identified 18 Large Marine Ecosystems (LMEs) in the Arctic (Fig. 1). The LMEs are identified based on ecological criteria and are meant to be units of space or geography for applying the EA to management. LMEs represent an appropriate scale for assessing the structural and functional integrity of ecosystems (which is the overall purpose of EA, see definition), including cumulative impacts of human activities. At the same time, we recognize that the boundaries of LMEs are open, with fluxes of water, plankton, and contaminants, and migrations of fish, birds, and mammals, across them. Use of LMEs offers an orderly way of dealing with scales and scale integration, addressing large-scale drivers such as climate change and pollution, and smaller-scale issues related to habitats, protected areas, human settlements, etc.

Guidance to breakout groups

A list of questions has been prepared as guidance for the breakout groups on development of guidelines for EA in sessions 2 and 4. The list is included as Annex 1.

The second topic – Integrated Ecosystem Assessment (IEA)

What do we mean by IEA and how do we define it?

IEA is a core element of the EA and is the step where the basis for management actions is evaluated. Assessment is both a process, whereby the assessment is carried out, and a product, where the outcome of the assessment is documented. An IEA provides an assessment of the current state and trends of the ecosystem, including pressures and impacts from human activities. Integration occurs along two 'axes' or subsystems: across components of the natural ecosystem, and across human sectors and activities.

There is a continuum going from narrowly-focused assessments (e.g. of single fish stocks) to fully integrated assessments, including socio-economic information in addition to natural scientific and traditional knowledge. An IEA can be at various points along this gradient, and it is not clear how much integration is required to qualify for being an IEA. A modular build-up is perhaps the best model for an IEA, whereby various sources of information are assessed and documented, and then linked together at increasing levels of integration and complexity. To illustrate this, we may have modular components in the forms of a eutrophication assessment, single species fish stock assessments, assessments of conservation status of species, climate impact assessment, etc. These various assessments (and assessment reports) may be used as building-blocks of information for an IEA.

ICES and IEA

The International Council of Exploration of the SEA (ICES) is an intergovernmental organization established in 1902. It is based on a convention with 20 Member Countries from around the North Atlantic and the Baltic Sea. The 8 Arctic States that form the Arctic Council are also members of ICES. The ICES' mission statement is:

“To advance the scientific understanding of marine ecosystems, and provide information, knowledge, and advice on the sustainable management of human activities affecting, and affected by, marine ecosystems.”

ICES works through a network of more than 4.000 scientists in over 350 marine institutes in member countries and beyond. ICES focuses on the development and the provision of knowledge/science for the management of human activities at sea and on ecosystem functioning. In addition, it operates data and information services, and has a secretariat staff (in Copenhagen) that supports the work of the ICES network. In the ICES Strategic Plan 2014-2018, the two pillars are expressed as:

- Building a foundation of Science
- Producing the information and advice decision-makers need

Integrated Ecosystem Assessment (IEA) is one of five action areas in ICES, and is seen as an important step in the progression of the development of the EA to marine management. ICES has established 8 regional working groups for IEA (Fig. 2), one of them jointly with PICES and PAME (WGICA for the Central Arctic Ocean). The oldest of these groups have now existed for over 10 years (North Sea and Baltic Sea). Three of the groups deal with Arctic LMEs (Barents Sea, Norwegian Sea, and the Central Arctic Ocean).

The ICES concept of EBM

As a point of information, rather than create another definition of EBM, ICES has selected a collection of keywords which highlight what it considers the central tenants of EBM. These are the management of human activities, sustainable use, regional, trade-offs, achievement of good environmental status, stewardship for future generations, optimize benefits among diverse societal goals, consideration of collective pressures.

Representatives from ICES will share their thoughts and experiences from the work on IEA in the various regional groups. The ICES network of experts is collectively 'learning-by-doing' in harnessing knowledge and experience from performing IEA in an EA context, including both scientific and advisory perspectives.



Fig. 2. Geographical areas with regional working groups for doing IEA by ICES.

NOAA IEA program

The National Oceanic and Atmospheric Administration (NOAA) in the USA has a program for IEA which supports Ecosystem-Based Management (EBM, or EA) (<https://www.integratedecosystemassessment.noaa.gov/index.html>). The program is being implemented in 5 regions across the USA: Northeast Shelf, Gulf of Mexico, California Current, Alaska Complex, and Hawaii.

The NOAA IEA program builds on a framework described in the scientific literature by Levin et al. (2009) (Fig. 3). The framework is a blend of steps taken to develop EBM or EA to marine management, and specific steps or elements in carrying out an IEA. Citing from the NOAA website, the IEAs are intended to provide a structure to assess ecosystem status relative to objectives, account for the holistic impact of

management decisions, and guide management evaluations. The NOAA IEAs consist of ecosystem status reports (at the scale of LMEs), supplemented by risk assessments and management strategy evaluations.

Experts from NOAA will share their views and experiences from the work in the NOAA IEA program through presentations and panel discussion.



Fig. 3. The NOAA IEA framework to support the development and implementation of EA to marine and coastal management.

OSPAR and HELCOM

OSPAR and HELCOM are two environmental conventions (and commissions) for the Northeastern Atlantic and the Baltic Sea, respectively. Both conventions are doing environmental assessments and are supporting the implementation of the Marine Strategy Framework Directive (MSFD) of the European Commission. OSPAR and HELCOM have performed recent assessments which are presented at the meeting.

Panel and discussion guidance

A list of questions has been prepared as guidance for the panel and general discussions on IEA in session 3. The list is included as Annex 2.

Expected outcomes from the workshop

Workshop report

We will prepare a workshop report with administrative information (participants, program), and summary of presentations and discussions. Presenters are asked to provide summaries, and rapporteurs will help reflect the discussions following presentations according to the program.

The workshop report will be presented to PAME at the PAME I-2018 meeting in Quebec City in February 2018. The report will also be forwarded to ICES for inclusion in their series of reports from ICES-sponsored meetings.

Topic 1 – Guidelines for EA implementation in the Arctic

It is foreseen that the development of EA guidelines will require more work, dependent on the outcome of the workshop. We hope to have a first draft outline of guidelines produced during the third day of the workshop. This outcome will be reflected in the workshop report, and draft guidelines may be included as an annex.

A second international EA conference (as a follow-on to the first conference in Fairbanks in August 2016) is planned for late 2018, although details have not yet been agreed. We aim to work intersessionally on the further development and drafting of the guidelines, based on the outcome from this workshop, and to have EA guidelines as a topic on the program for the 2nd EA conference. Dependent on progress, we aim to present a draft set of guidelines for implementation of EA to Arctic marine management through PAME (I-2019) and the Senior Arctic Officials (SAOs) to the ministerial meeting at the end of the Finnish chairmanship of the AC in spring 2019.

Topic 2 – Integrated Ecosystem Assessment

The workshop objective is to review status of work on developing and doing IEA, with the aim to develop best practices for Arctic IEAs. The views and experiences from ICES and the US NOAA IEA program, along with other input at the workshop, will be summarized and included in the workshop report. We hope to be able to provide a state-of-the-art summary of where we stand with regard to our ability to carry out an IEA to support the further effective implementation of the EA to management.

The outcome should include consideration and suggestions of next steps regarding development of IEAs for Arctic LMEs. Can we formulate best practices for doing IEA, and can we start to develop guidelines, or is the time not yet ripe for that? Do we need still to collect more experience from learning-by-doing before we can formulate specific guidelines? We have 3 working groups for doing IEA of Arctic LMEs. Should we think of mechanisms for setting up groups to do IEA for more LMEs? These are some questions we should discuss and reflect in the outcome of the IEA session in the workshop report.

Annex 1: Breakout Group Guidance

Session 2 – Guidelines for EA implementation in the Arctic (1.5)

3 breakout groups will each discuss the following:

- What is meant by “guidelines”?
- Who is the target audience (users of the guidelines)?
- How do we see the guidelines – at what level of detail and specificity?
- How should we proceed to develop the guidelines?
 - Can the EA framework be a basis for development of guidelines?
 - Should we refine the EA framework to include monitoring, scientific advice and scientific research?
 - Should we develop guidelines in two steps: general guidelines first, followed by more detailed guidelines subsequently?

Session 4 – Developing an outline/sketch of EA guidelines (3.0 h)

3 breakout groups

- Based on conclusions of Session 2 breakout groups, draft an outline of EA guidelines
- Take into consideration:
 - target audience
 - level of detail and specificity of guidelines
 - flexibility and adaptability of guidelines
 - relationship to EA framework
 - LMEs and integration of scales

Annex 2: Panel and Discussion Guidance for Session 3 “Practical experience with IEA”

Goal of Session 3 - Develop best practices for Arctic IEA

Over-arching questions:

- Where do we stand with regard to our ability to carry out an IEA to support implementation of EA?
- Can we formulate best practices for IEA or do we need to collect more experience from learning-by-doing?
- Should there be new groups to do IEA for more LMEs, and what are the mechanisms for setting up such groups?

Specific, detailed questions:

- Is there a common understanding of IEA in relation to implementing the ecosystem approach?
- Do we need a common definition of IEA?
- How do existing IEAs compare? What are common components? What are unique components?
- At what scale are IEAs conducted? Are elements scalable?

- How much integration of components is necessary for an IEA? Where on the continuum from narrowly-focused assessments to fully-integrated assessments (including socio-economic information in addition to natural scientific and traditional knowledge) should we aim at minimum?
- Is a modular build-up a good model for building an IEA?
- How can existing IEAs be integrated? Are there particular opportunities to build international cooperation and understanding? Are there particular opportunities to develop transboundary EA/IEA pilot projects (as suggested by the Kiruna declaration)?
- How can the level of integration, cooperation and communication among the different programs doing monitoring and assessment in the Arctic be improved?
- To what extent are Arctic Council Working Groups involved in existing IEAs? Could/should there be more involvement?
- What are the interactions between Traditional and Local Knowledge (LTK) and science in conducting IEA?
- What is the interoperability of data and tools from the various IEAs?