

ATLANTIC OCEAN RESEARCH ALLIANCE COORDINATION AND SUPPORT ACTION WP4

ECOSYSTEM APPROACH TO OCEAN HEALTH AND STRESSORS

WORKSHOP SUPPORTED BY: DFO, EU, FAO, ICES, AND NOAA
THROUGH THE ATLANTIC OCEAN RESEARCH ALLIANCE (AORA)



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AORAC-SA workshop: Making the ecosystem approach operational

21–22 January 2016

Copenhagen, Denmark



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the Exploration of the Sea

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Conseil International pour
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Atlantic Ocean Research Alliance Coordination and Support Action

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Executive Summary

The Atlantic Ocean Research Alliance Coordination and Support Action (AORAC-SA) and Food And Agriculture Organization of the United Nations (FAO) workshop: Making the ecosystem approach operational took place 20-22 January 2016 at the Headquarters of the European Environment Agency (EEA), Copenhagen, Denmark. The workshop was supported by: Fisheries and Oceans Canada (DFO), European Union, International Council for the Exploration of the Sea, European Environment Agency, and National Oceanic and Atmospheric Administration through the Atlantic Ocean Research Alliance (AORA) and by Food and Agriculture Organization of the United Nations (FAO).

As part of a process to determine the science needs for investigating ocean stressors and the ecosystem approach, the workshop was organized to scope what is seen as the "ecosystem approach" priorities and strategies of policy developers and stakeholders. The workshop feeds into the Galway process and was centred on science for blue growth/blue economy.

The three-day workshop addressed issues that are currently challenging the implementation of the ecosystem approach to management as it moves from single to multi-sector.

- Perceptions of the Ecosystem Approach (what does the phrase mean?)
- Challenges for implementing the ecosystem approach
- Reconciling sectoral objectives within an ecosystem approach
- How do we construct a fully functional ecosystem approach?

The workshop created an opportunity for researchers, managers, policy developers and stakeholders to review concepts and address scientific, institutional, legal, and socio-economic challenges related to operationalizing the ecosystem approach. It also allowed for exchange of experiences, discussion of encountered constraints, and the identification of approaches and strategies to make this approach operational.

Questionnaires, case examples, and breakout groups were used to explore the questions and engage with participants. The online survey and workshop exercises illustrated a high degree of agreement, and shared understanding, about the concepts around the ecosystem approach.

The key take home message is that whilst the provision of knowledge is important, and examples exist where ambitious higher order objectives challenge the knowledge base, it is not the central challenge. Understanding the **impediments to implementation is imperative**. Implementation of EBM is a process, and has institutional and legal implications. The actors engaged need to consider that process and their role, as much as trying to estimate the consequences of managing human activities in an ecosystem context.

When making the ecosystem approach operational, the workshop illustrated that:

1. There is broad agreement of concepts and best practices
2. Successes were associated with mechanisms for setting objectives and priorities, achieving effective integration, getting buy-in by stakeholders while understanding respective roles and responsibilities, realistic ambitions and a tangible knowledge base.
3. Failures tend to be associated with misunderstanding incentives, poor stakeholder buy-in, and institutional, legislative, and governance issues.



4. Greater attention should be given to developing appropriate governance frameworks, on the one hand, and to development of tools and knowledge to support the EBM process, such as tools for integrated trade-off analyses.

1 Introduction

The Atlantic Ocean Research Alliance Coordination and Support Action (AORAC-SA) and Food And Agriculture Organization of the United Nations (FAO) workshop 'Making the ecosystem approach operational' took place 20-22 January 2016 at the Headquarters of the European Environment Agency (EEA), Copenhagen, Denmark. The workshop was supported by: Fisheries and Oceans Canada (DFO), European Union, International Council for the Exploration of the Sea, European Environment Agency, and National Oceanic and Atmospheric Administration through the Atlantic Ocean Research Alliance (AORA) and by Food and Agriculture Organization of the United Nations.

As part of a process to determine the science needs for investigating ocean stressors and the ecosystem approach, the workshop was organized to scope what is seen as the "ecosystem approach" priorities and strategies of policy developers and stakeholders. The workshop was a deliverable for the Atlantic Ocean Research Alliance coordination and support action (AORAC-SA) project (D4.2) which is designed to support the Galway statement implementation process¹ and was centred on science for blue growth.

The three-day workshop addressed questions that are currently challenging the implementation of the ecosystem approach to management as it moves from single to multi-sector.

The workshop created an opportunity for researchers, policy developers, managers and stakeholders to review concepts and address scientific, institutional, legal, and socio-economic challenges related to operationalizing the ecosystem approach. It also allowed for exchange of experiences, discussion of encountered constraints, and the identification of approaches and strategies to make this approach operational.

The workshop was structured in five sessions where case studies were presented, and break-out groups were given questions for further discussion and reported back in plenary in a variety of formats. Break-out group leaders were selected in advance, break-out group participation was assigned randomly and changed at every session.

1.1 Introductory Session

Participants were welcomed to the workshop by:

- Constança Belchior – European Environment Agency
- Gabriella Bianchi – FAO
- Terry Schaefer – NOAA – Atlantic Ocean Research Alliance
- Ana-Teresa Caetano – European Commission
- Margaret Rae, Marine Institute, Atlantic Ocean Research Alliance Coordination and Support Action
- Mark Dickey-Collas, ICES, Atlantic Ocean Research Alliance Coordination and Support Action

The Ecosystem Approach (EA) is not a new concept, however implementation continues to be a struggle. Mandated by the ministerial declaration in 2001 in connection with the Conference on Sustainable Fisheries in the Marine Ecosystem (Reykjavik, 2001), FAO has made a major effort to streamline the ecosystem approach into fisheries management. Based on the outcomes of the work by international expert groups, FAO has

¹ https://ec.europa.eu/research/iscp/pdf/galway_statement_atlantic_ocean_cooperation.pdf



developed guidance covering both science and management and supports countries in the developing world with practical application of EAF. In addition to further developing sectoral management, FAO sees the need for multi-sectoral governance frameworks to be developed to ensure coordination/harmonization across sectors.

The case study approach was adopted to provide an overview of ongoing efforts to implement EA. The workshop format aimed to follow the important stakeholder engagement spirit of the ecosystem approach.

All presentations can be found online at <http://www.ices.dk/explore-us/projects/Pages/Making-the-ecosystem-approach-operational.aspx>.

1.2 The Galway Statement, the Atlantic Ocean Research Alliance and AORAC-SA

The Galway Statement on Atlantic Ocean Research Cooperation is a tripartite agreement between the European Union, Canada, and the United States that aims to:

- Improve ocean health and stewardship
- Promote sustainable management of resources
- Improve ecosystem assessments and forecasts and deeper understanding of vulnerabilities and risks, including climate change
- Generate new tools to increase resilience, conserve rich biodiversity, manage risk and determine social, environmental, and economic priorities

The European Union has provided Horizon 2020 financial support to Galway Statement Implementation through the Atlantic Ocean Research Alliance Coordination and Support Action. The Coordination and Support action is made-up of 11 work packages, including the Ecosystem Approach to Ocean Health and Stressors Work Package responsible for the development of this workshop (Work Package 4).

The overall objectives of the Ecosystem Approach to Ocean Health and Stressors Work Package is to provide the Atlantic Ocean Research Alliance with relevant and responsive information on the status of “Ecosystem Approach” and ocean health and stressors research in Europe relevant to scientific and industry needs in the North Atlantic.

This will be provided through the provision of:

- a) a preliminary mapping, connectivity, synthesis and analysis of relevant ongoing “Ecosystem Approach” and ocean health and stressors research activities and programmes in Europe relevant to the North Atlantic
- b) such detailed/sectoral assessments as are deemed necessary by the Alliance to contribute to aligning the planning and programming of trans-Atlantic research activities with a view to launching joint Research & Innovation initiatives, while building on existing ones.

A number of workshops and documents will follow on from this work package.

The final product will be a collation of the findings of all workshops to create a synthesis of a “Shared Vision” document on research directions, priorities and synergies for the ecosystem approach and ocean health and stressors.

To set the context for the workshop, participants were reminded of the development of the Ecosystem Approach concept through the past, present, and needs for the future.

The development of the Ecosystem Approach concept is embedded within international agreements such as the Convention on Biological Diversity (UN, 1992 CBD) which calls for conservation of biological diversity through an ecosystem approach and

the Johannesburg Declaration of the World Summit on Sustainable Development (UN, 2002) which also calls for an ecosystem approach.

Presently, there is a recognition that integrated management of human activities in the seas and oceans requires an operational ecosystem approach, tangible and workable methods are being developed for considering trade-offs between uses of the marine environment.

In future, the Ecosystem Approach will focus on reconciling conservation and stewardship of the marine ecosystem with blue growth/blue economy and will be needed to support, for example, “coordinated and coherent decision-making to maximise the sustainable development, economic growth, and social cohesion of EU Member States” (EU DGMARE).

1.3 Format of the workshop

The workshop was designed around key issues.

Stock taking

- Perceptions of the Ecosystem Approach

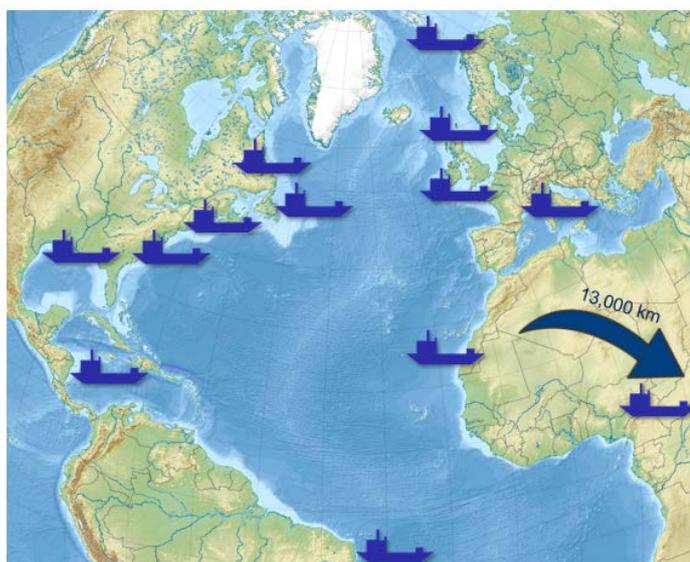
Gaps

- Challenges for implementing the ecosystem approach
- Reconciling sectoral objectives within an ecosystem approach

Options for progress

- How do we construct a fully functional ecosystem approach?

Examples of application of the ecosystem approach were provided as case studies throughout the workshop. These case studies were chosen by the organisers to show a breadth of approaches being used and from a wide range of locations around the Atlantic Ocean and beyond. Each session began with a number of presentations (usually 4) in plenary and then the workshop spilt into 4 subgroups to discuss each issue. The presentations were not always specific to the issue being discussed but were included across the programme to stimulate ideas and discussions. The membership of subgroups varied for each session.



Locations of case study presentations



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 652677.

Participants were asked to complete an online survey (see chapter 6). The results of the survey will be worked up through a parallel initiative throughout early 2016.

There are no existing collections of information (or databases) on the implementation of the ecosystem approach to marine management. Thus quantitative analysis is difficult. Attempts were made prior to the workshop to ensure consistency in survey replies and workshop presentations. This was done to aid analysis, and was partially adhered to by participants. However, the resulting diversity of submissions resulted in the analysis being qualitative in nature.

1.4 Structure of the report

After the introduction (chapter 1), this report will explore the results of each session (chapters 2, 3 and 4). The subgroup contributions will be followed by a synthesis by the convener of each session. The case study presentations are broadly summarised in chapter 5 and the initial response analysis to the online survey is given in chapter 6. Annex 1 provides the list of participants and annex 2 gives the guidance that case study presenters received.

Group 1

The group engaged in an iterative process, starting with a collection of single buzzwords in relation to the term ecosystem based management (EBM) to get an idea of what people relate to the concept of EBM. In a second step, the buzzwords were used to structure the discussion along the 'Why', 'How' and 'What' to synthesize it in the end into single sentences and a commonly agreed upon graphical sketch and one sentence **'balancing human activities and environmental stewardship in a multiple use context.'**

It was interesting that the 'why' ranged from 'we have to do it, because it is a legal requirement' to 'we need to take a holistic approach to survive'. It became clear that the ecosystem approach, although explicitly including humans and their needs, emphasizes the need to understand and take into account the limits of the natural system to provide the provisioning, regulating, and cultural services that we as humans rely on.

Buzz-words: duties and responsibilities, comprehensive, loss of autonomy, climate, integrated, solutions, compromise, adaptive, biomes, species, valuation, interrelationships, area-based, definitions, cause and effect, co-creation, resilience, regulatory, cumulative, stakeholders, efficiency, interdisciplinary, sectors, allocation, trade-offs, conflict resolution, priorities, functions and services, well-being, governance, distrust, food security, human dimension, complexity, long-term, communities, drivers, recognize connections, multiple objectives.

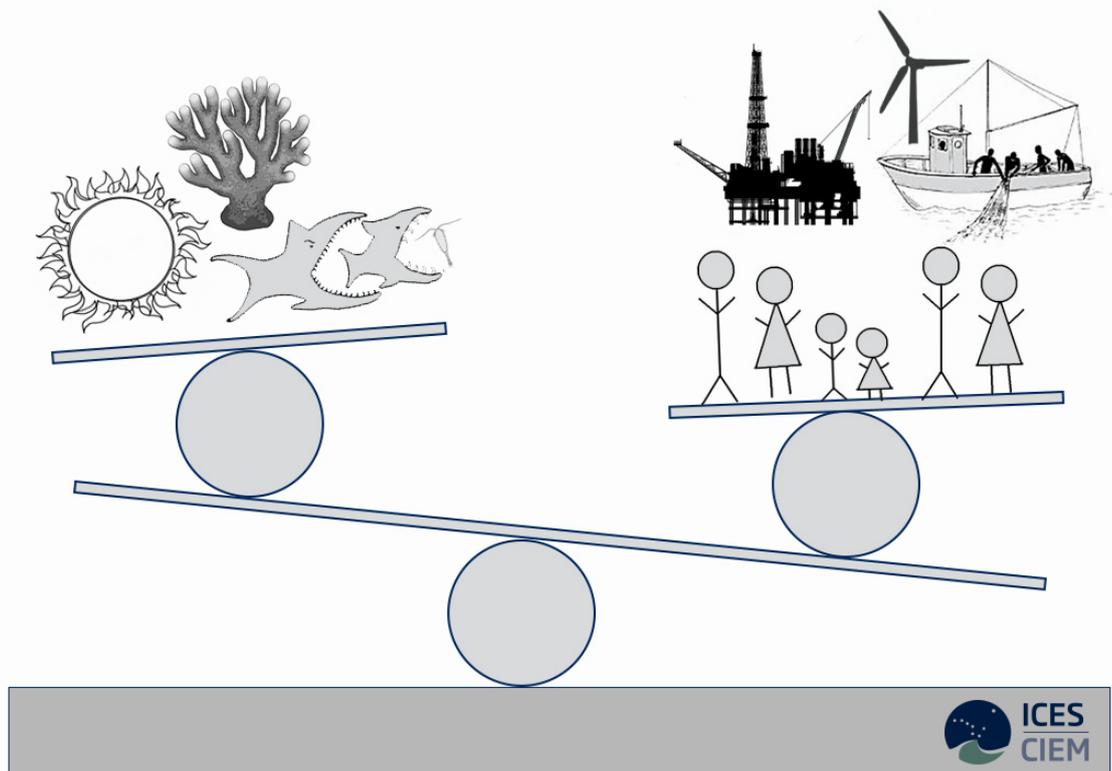


Figure 2.1 balancing human activities and environmental stewardship in a multiple use context.

Group 2

The break-out session was split in two phases. The first allowed for a free flow brainstorming around what the ecosystem approach (EA) meant for participants. The main ideas and concepts that were being shared were captured by simple words on a white board, with no particular structure. In the second phase, the group structured the concepts on the white board through a mind map. The ecosystem approach was at the core of the mind map and then the concepts were organized around why, what, and how (figure 2.2).



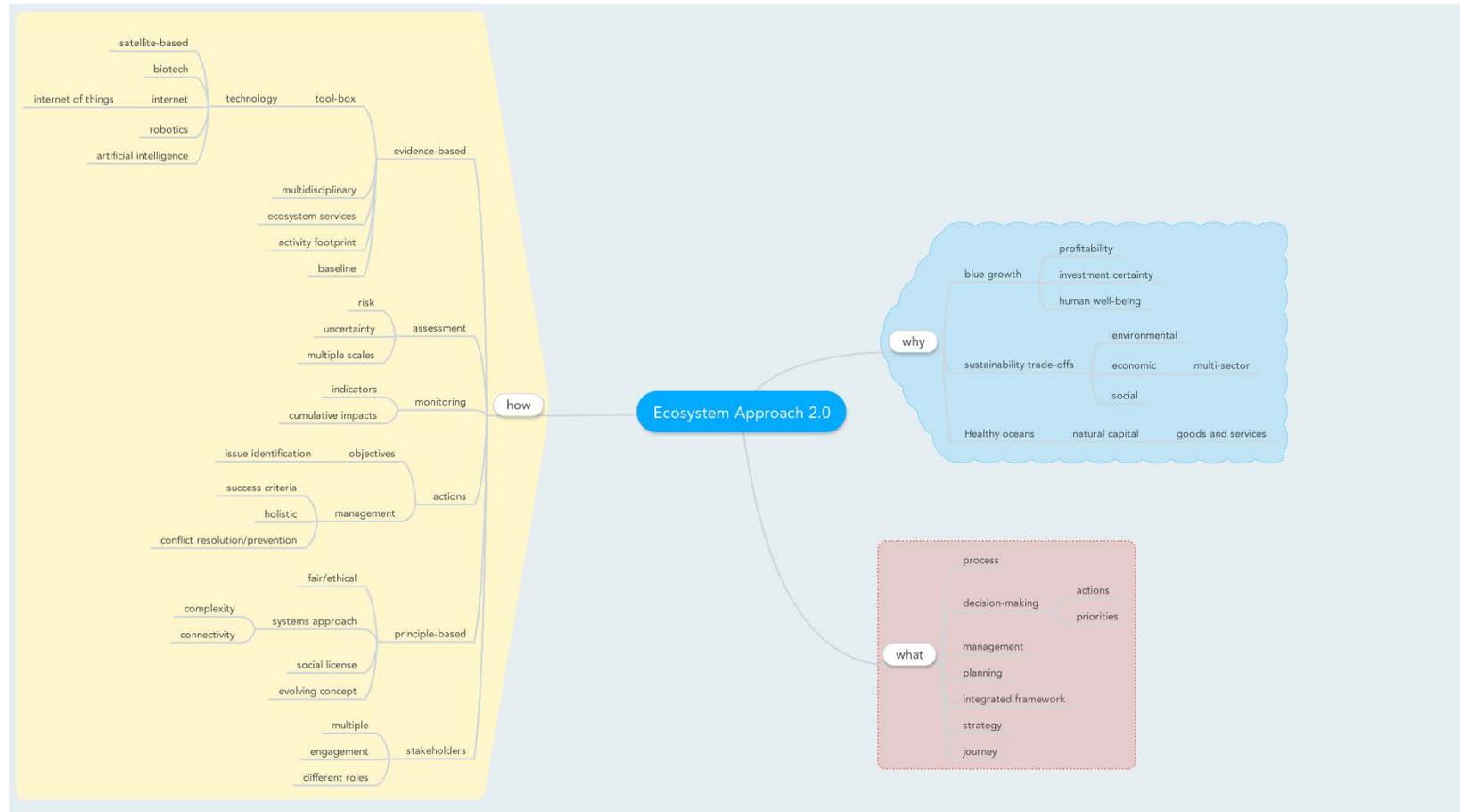


Figure 2.2. Ecosystem Approach 2.0.



Group 3

The group listed and discussed concepts that they thought were necessarily part of the definition. Second, they outlined a diagram representation starting with a square comprising two circles: one representing the natural system and the other the human dimension (Figure 2.3). The square represented a particular context of several dimensions. Finally, the concepts were placed on the diagram, and were further discussed/modified, and then connecting arrows were added.

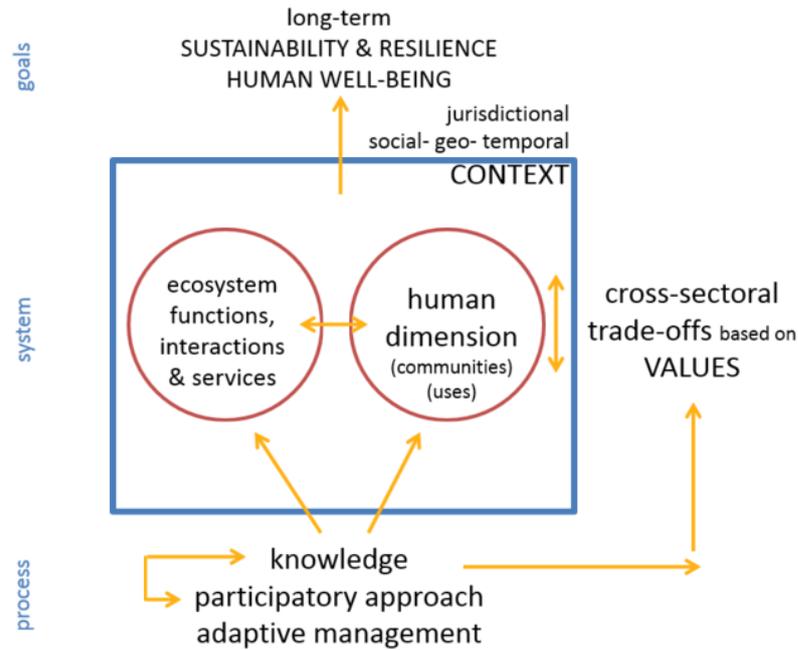


Figure 2.3 Group 3 diagram.

Group 4

The group engaged in a brainstorming exercise, participants began by talking about their perceptions of the Ecosystem Approach (EA). After a long discussion about the challenges of the implementation of the EA, it was decided to focus on different perceptions. The group started reviewing the words that appeared during our discussions, and tried to see how they could be linked and where commonalities exist. Initially the group split the marine ecosystem and society, but the group did not feel comfortable separating humans from the ecosystem itself, and decided to change the approach.

It was proposed to use 'human and natural capital', but after discussion the group chose 'natural integrity' and 'human well-being' (with economic, social and cultural dimensions represented) as components of the 'ecological well-being'. The concepts of 'regulation and legislation' were introduced, like 'natural and anthropogenic pressures' and 'benefits', and of course 'sustainability' and 'conservation', then the group turned to linkages (Figure 2.4).

Human well-being causes manageable stressors that affect the natural integrity, which are also affected by natural stressors that cannot be managed. At the same time natural integrity provides benefits or goods and services for the human well-being, which could potentially be affected by both the manageable and natural stressors. The group wanted to highlight the existing links between the manageable and the natural stressors. Legislation supports the conservation of the natural integrity and in consequence

the goods and services it provides to societies, whereas regulations are used to ensure the sustainable use of the natural integrity by controlling the manageable pressures (stressors) that societies cause on them. Finally, the group highlighted that under an Ecosystem Approach framework human well-being gives the priorities which guide the governance (and governments) and policies that sure ensure equity and fair management of this system.

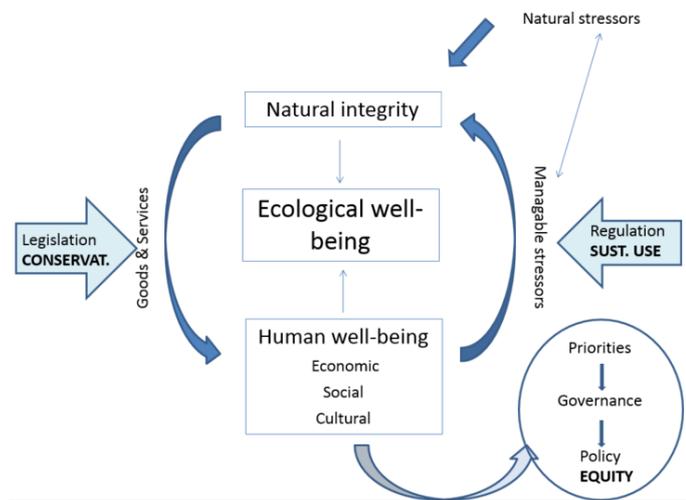


Figure 2.4 Group 4 diagram.

2.2 Synthesis of the session

Each breakout group approached the question of perception of what the Ecosystem Approach is in a different manner, however, commonalities emerged (Tab. 2.1). The Ecosystem Approach is intended to provide a holistic approach to managing human activities and environmental stewardship within relevant geopolitical systems. Humans are beginning to understand that the ecosystems upon which we depend are not infinite and that an Ecosystem Approach helps identify the limits and boundaries of goods and services. Practitioners and researchers feel strongly that it should be participatory, inclusive, fair, and knowledge based. Because the Ecosystem Approach recognizes humans as part of the ecosystem and explicitly considers trade-offs between management strategies it can engage the stakeholder community and assist with conflict resolution.

Table 2.1 Commonalities of perceptions of the Ecosystem Approach arising from the four breakout groups and ensuing general discussion.

Goals	<p>Balancing human activities and environmental stewardship in a multiple use system</p> <p>Promoting human wellbeing recognizing limits to resources and services</p> <p>Identifying/setting boundaries for human activities</p> <p>Providing a platform for sectoral and multi-sector management</p>
Context	<p>Jurisdictional</p> <p>Geospatial</p>



	Temporal Social
Attributes	Knowledge based Principal based (ethical, fair) Objectives are operational Adaptive Iterative Inclusive, participatory Hierarchical Considers complex systems
Advantages	Explicitly considers humans as part of the ecosystem Trade-offs are made explicit Considers complex systems Helps stakeholders take ownership and responsibility Assists in the recognition of common goals Assists with conflict resolution
Challenges	Getting agreement on goals among sectors or political entities Creating symmetry between sectors where impacts occur without spatial overlap or in one direction only

3 Gaps

3.1 Challenges for implementing the ecosystem approach

Convener Gabriella Bianchi, FAO

The second session of the workshop aimed at creating an overview of the challenges for implementation of the Ecosystem Approach (multi-sectoral approaches).

Case studies presented

- A pluralistic approach to EBM implementation in the Caribbean.
Lucia Fanning Dalhousie University
- Canada LOMA- Large Ocean Management Areas.
M. Robin Anderson, DFO
- An uncharted voyage: Ten years of integrated ecosystem-based management in the Barents Sea.
Erik Olsen IMR
- Making EAM operational in Canadian fisheries management.
Stacey Paul, DFO

Break-out groups

Breakout groups discussed “in your experience what are the main challenges to implementing the ecosystems approach in practice?” They were asked to report back to plenary using a “report card”. The report card left room for groups to list their top five challenges and also prompted them to complete the sentence “Could do better by:” The following was presented in plenary.

Group 1

Challenge	Solutions
Trade-offs - Objective cross-sectoral comparisons and agreed currency types (Economic, Ecological, social well-being)	<ul style="list-style-type: none"> ▪ Currency to resonate with range of Stakeholders, ▪ Capacity in the system: need interdisciplinary expertise (new training?) ▪ Methods for qualifying & quantifying trade offs ▪ Needs to link to clear indicators / metrics (? use of MSFD GES)
Gaps and Inertia between Science /knowledge being translated to policy and then to management plan/ actions (and implementation of the management plans/actions)	<ul style="list-style-type: none"> ▪ Ocean Literacy - across stakeholders, policy advisors and managers ▪ Capacity in the system: need interdisciplinary expertise (new training? PhDs- they are the decision support tools?), ▪ Consistent upper level buy in and needs regular policy evaluation cycle (with clear check points) ▪ Needs to link to clear indicators /metrics for evaluation of implementation effects ▪ Focus on Gaps



<p>Lack of transparency /trust /integrity / knowledge in decision making/ giving up of power move to sharing (openness)</p>	<ul style="list-style-type: none"> ▪ Ocean Literacy - how does the system work (ecologically / economically and what are social values (benefits from system that link to ecology and economics and well-being) ▪ Agreement upon overall objectives and what is going to be managed / adaptive approach ▪ Open transparent discussion making process /peer reviewed for economic and social as well as ecological / inspiring examples ▪ Getting info to the correct people with learning/training resources ▪ Use scale of issues to help with hierarchy and level of nesting for coherent approach to objectives
<p>Agreeing on Objectives /Priorities</p>	<ul style="list-style-type: none"> ▪ Use common language ▪ Agree on overall goals first ▪ identify gaps in moving forward - consensus building tools (from social sciences) ▪ Deal with uncertainty/risk by use of confidence levels ('more likely than not')
<p>Not making use of SEA EIA and EEM processes (why re-invent wheels - what most stakeholders use and will help with stakeholder buy in so do not see as another level of burden)</p>	<ul style="list-style-type: none"> ▪ Find way to make use of EIAs for industries (Should fisheries need to create EIAs?) ▪ Bring in Consultancy industry ▪ Put EIA and EEM output in accessible and public data bases (design data bases for needs in trade-offs metrics) ▪ Use for cumulative effects

Group 2

	Challenges	Solutions
1) Articulation of Need	<p><i>Why is it challenging?</i></p> <p>Evidence of benefits rarely articulated</p> <p>Clear objectives often lacking</p> <p>Role of science uneven, poorly communicated</p>	<p><i>Why is it challenging?</i></p> <p>Better language for purpose</p> <p>Identify short-term benefits</p> <p>Science for solutions, not problems</p> <p>Clear and useful foresight</p> <p>Decision support systems</p> <p>Conflict resolution</p>
2) Effective Governance Issues	<p><i>How is it challenging?</i></p> <p>Political will and governance lacking</p> <p>Multiple time scales of needs</p> <p>policy adaptability and flexibility</p> <p>fit for purpose mismatch</p> <p>lack of follow through ownership rarely felt</p> <p>insufficient stakeholder engagement</p>	<p><i>How is it challenging?</i></p> <p>Adaptive management</p> <p>Educate all sectors</p> <p>Transparency</p> <p>Clarity on domains and needs</p> <p>Transparency and accountability</p> <p>Real participatory opportunities</p> <p>Evaluate policy effectiveness, Including indicators</p>
3) Ownership issues	<p><i>How is it challenging?</i></p> <p>Poor awareness and education</p> <p>mental models and fixed point of view</p> <p>lack of trust and equity at table</p> <p>dependence on natural capital</p> <p>maturity of sectors varies</p> <p>science packaging often inappropriate</p>	<p><i>How is it challenging?</i></p> <p>explicit trade-offs</p> <p>effective communication</p> <p>transparency (including science)</p> <p>develop learning strategies</p> <p>address stakeholder needs</p> <p>effective co-management</p>
4) Limits of understanding	<p><i>How is it challenging?</i></p> <p>We get lost in complexity</p> <p>Carrying capacity and limits unknown</p> <p>Poor at dealing with uncertainty</p> <p>Often lack relevant data in natural, Social and economic sciences</p>	<p><i>How is it challenging?</i></p> <p>Understanding stakeholder issues</p> <p>Adaptive management models with assumptions recognized</p> <p>Pragmatism of working with best available information</p> <p>Risk analysis with stakeholders</p> <p>Concrete goals and objectives</p>



Group 3

Challenges	Solutions
Misunderstanding of the benefits of EBM in tangible terms	Examples of EBM proven benefits in sector specific context and terminology Partnership and collaboration to develop an understanding of EBM implementation
Multidisciplinary language, definition and understanding	De-jargonize language and context
Lengthy timeframe of processes and shifting priorities	Short term incremental steps towards overall goals while demonstrating benefits
Mistrust or perceived mistrusts of EBM	Process designed around education and exchange instead of decision
Effective Governance and complexity	Long-term commitment and leadership Natural complexity versus management uncertainty

Group 4

Challenge	Could do better by:
Communications/Presentation of information	Professional communicators Visualization Social media/video story telling
Benefits of engagement – Why! -opportunities to benefit from EBM -Promote technological innovation	Accept long-term process
Governance structure (spectrum ranging from lacking to too complex)	Re-orient structures to address EBM Opportunities within existing legal frameworks
Honour agreements	Follow-up on agreements Adapt to management needs/monitor
Acceptance of recommendations Relationship building--> trust Place management problem “at centre”	Platforms to engage
The group noted science was not a “top 5” challenge The list is provided in order of priority Political will a background factor. EA=EBM	

3.2 Synthesis of the session

The Convention on Biological Diversity² defines the Ecosystem Approach (EA) as:

“...a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.”

The aim of EA is to maximize benefits for humans within a sustainable ecological envelope. Specific goals and objectives are needed for the effective management of human activities within the ecosystems they are part of. The challenge of EA is the need to balance across different objectives, sectors, and countries. These trade-offs need to be made explicit, and decisions made must account for knowledge and be evidence-based at all levels. This brings challenges due to the complexity of interactions between human activity and ecosystems. The Ecosystem Approach must account for uncertainty and risk and still engage all stakeholders to find consensus on the way forward. However, achieving consensus and effective management is not straightforward in areas with multiple stakeholders and competing objectives. A precondition for a successful ecosystem approach to management is effective governance through an appropriate institutional and legal framework; EA demands coordination and management that is not always available in all countries/government.

All breakout groups reported challenges related to communication, ability to achieve consensus, effective governance, and complexity. Solutions offered focused on improved means of communication about the science/knowledge, the process, and trade-offs.

Science was not articulated as a main gap or barrier. Instead, the focus was on the gap of uptake of science for application of the ecosystem approach to management. This implies that there is work to be done for science to effectively communicate how existing science methods can be used to help make informed management decisions; for managers to understand the science and knowledge available; and in general how to translate the stated/agreed high-level international goals (e.g. Convention on Biological Diversity (UN, 1992 CBD); the Johannesburg Declaration of the World Summit on Sustainable Development (UN, 2002)) into effective political will at the operational level.

² <https://www.cbd.int/ecosystem/> Secretariat of the Convention on Biological Diversity (2004) The Ecosystem Approach, (CBD Guidelines) Montreal: Secretariat of the Convention on Biological Diversity 50 p.



3.3 Reconciling sectoral objectives within an ecosystem approach

Convener Rebecca (Becky) Shuford, NOAA

The third session of the workshop explored challenges for reconciling sectoral objectives. In other words the relationship between sectoral and multi-sectoral challenges and the impact of governance frameworks.

Case studies presented

- EBM in Australia: National, Regional and Local Approaches
David Smith, CSIRO
- The NAFO Roadmap for an Ecosystem Approach to Fisheries.
Mariano Koen-Alonso, DFO
- Application of Marine Planning to Support Protection of Living Marine Resources in Northeast USA Waters.
Mark Monaco, NOAA
- A scientist's perspective of implementation of the EU marine strategy framework directive.
Mark Dickey-Collas, ICES secretariat

Break-out groups – Elevator pitch “What is best practice for reconciling different sectoral objectives?”

Breakout groups discussed “What is best practice for reconciling different sectoral objectives?” They were asked to nominate one person to report back to plenary on the discussions in a focused three-minute “elevator pitch”. The following sections are summaries of the elevator pitches.

Group 1

The group started by discussing scientists' role in trade-off analysis as one that should aim to provide unbiased information/opinion (recognizing everyone has bias). Science can provide scenarios and options that make trade-offs explicit, and should include a process for dissenting scientific opinion to be expressed. This information should feed into a decision-making forum at which scientists can be involved, including industry sectors and regulators as willing participants.

Use structured decision-making or other social science tools to reach consensus opinion about what trade-offs will be accepted in the system and which options will be selected. To get effective structured decision making forums, getting the right people at the table is important (need positive and negative incentives to encourage participation).

The strategic environmental assessment (SEA) process could help with significant cost savings for companies involved to identify “no-go areas” in advance/up-front. The difficulty is that once decisions are made they must be implemented, enforced, and adaptively managed. The whole process has to be dynamic and iterative. A decision is not the ultimate goal, what that's decisions effects were, and accounting for emerging issues, emerging science and even emerging sectors using the resource needs to be considered. Perhaps an independent arbitration board could be involved to decide on issues and conflicts that weren't considered in the original decision.

Group 2

Focus: Reconciling sectorial objectives within an ecosystem approach

Our Question: *What is best practice for reconciling different sectorial objectives?*

Reconcile: to cause (a person) to accept or be resigned to something not desired

Actions

- Define the Issue: the service/resource of interest e.g. fisheries, oil extraction, energy, ecotourism.
- Develop exploitation consensus: an open cross sectorial discussion to a develop transparent action plan which is agreed upon by the sectors

Needed

- Definition of the other services impacted upon by targeted exploitation and Tradeoffs between services
- Trust across sectors: Requires effective communication and understanding of sectorial needs and constraints. " A safe place"
- Economic and quality of life metrics to allow cross sectorial valuation
- Sensitive to national and international legal constraints

Management plan should have:

- Concrete tangible goals and expectations agreed upon by the sectors
- Management measures to meet the specific objectives in consideration of uncertainty.

Issues to consider

- Who is leading the process?? A good facilitator, the honest broker!! Not an actor from one of the sectors
- Assessment of the status of the system services and the role of "unmanageable" stressors (e.g. climate) on these services
- Risk assessment... focus on the influence of unmanageable stressors on the resource
- Cost benefit analyses...short, medium, long term costs and benefits
- How do we compare commodities across sectors??
 - Decision Support Tools for assessing the tradeoffs. Create an understanding of the consequences for other sectors
- Need Decision makers at the table!!!

Group 3

The group started by identifying a list of possible sectors that might be dealt with, trying to also consider non-traditional sectors (e.g. military, research, and land-based activities of influence on the marine environment), then considered procedures of best practices, and outlined a process.

1. Scoping to identify the area and objectives.
2. Workshops at horizontal level with different sectors and then vertical as well to help sectors identify priorities, also discussed the need for an honest broker. Discussed and recognized the challenge of getting actors to the table who legitimately represent the sector, how to do real stakeholder identification and not miss any, to build trust use Chatham house rules, and the need for explicit terms of reference for this process.
3. A baseline analysis of the current issues to see how they match-up with those objectives that the sectors offered use interaction matrices to identify impacts (some synergistic/some antagonistic/some none/some additive). Recognised



that the options for reconciling objectives could be constrained by existing legal requirements. Wanted to simplify the next step which brings together representatives at a high-level of sectors to start the discussion on trade-offs.

4. The group discussed a number of trade-off analyses processes to use (ensuring it is open and transparent). They also discussed scenario analyses and natural capital approach which is stakeholder driven. Preferred a more quantitative analysis, as scenario analyses only deals with extremes while natural capital provides a broader range of options. Outputs are system dependant and recommendations need to be transferred for implementation, and need to be reviewed and the process is iterative.

Group 4

The group engaged in a role play, and engaged in a game, a Sim version of a marine spatial planning tool to generate ideas. The group imagined an island with some natural resources and some sectors and generated some goals across sectors and discovered that there were some common drivers around minimizing costs and maximizing profits and the public are interested in (e.g.) holidays, recreation, and inexpensive food. We discussed “what do we mean by sectors?” and if all stakeholders are important and should be involved in the beginning, then all stakeholders from the public up to the governance. All sectors were needed, and not mutually exclusive. After generating these ideas, it then discussed how to solve the conflicts using Marine Spatial Planning as a tool and we came up with seven points:

1. Early participation of all sectors is important
2. Geographical scale should be well-defined in the beginning of the process because it is easier to manage at a local scale but at the broader scale there can be more conflicts.
3. Need to define clear ecological boundaries of what we want to manage.
4. Map out sector activities and the opportunities and the benefits.
5. Timescale must also be taken into account. It is possible to create management plans for 50 years and we can make plans that are readily implement right now – building up for longer time scale plans.
6. This tool helps to generate scenarios and choices, we identify the potential points of conflict helping to understand the other sectors and generate social innovation given that there are different scales and different opportunities.
7. Need consensus in decision-making for resolving conflicts.

3.4 Synthesis of the Session

The plenary session presentations provided several interesting, and geographically diverse (i.e. Australia, North Atlantic Fisheries Organization, United States, and European Union) perspectives on the topic. The break-out sessions inspired by these perspectives focused on discussion of best-practices for reconciling sectoral objectives through an ecosystem approach, culminating in a series of 3-minute “elevator” speeches. There were a number of recurring themes and ideas that developed out of the session, for example:

- An “honest broker” is needed to establish trust and lead the process of reconciling objectives and facilitating trade-offs across sector participants; the process also needs to be inclusive and respectful.

- Even if there is conflict during EA processes, conflict can be a source of innovation; conflict does not mean that a solution or consensus can't be found. Dialogue is an important first step towards establishing consensus.
- Dialogue between sectors will be facilitated by well-defined objectives, and best practice in EA should account for existing objectives within sectors.
- An EA which considers competing sectorial objectives should not be considered as negative; much of what comes out of the process is positive and can result in identification of new opportunities in a system, e.g. the case study from the Northeast US demonstrated how dialogue between sectors through a marine spatial planning process resulted in the shipping industry modifying shipping lanes to avoid collisions with whales.
- Trade-offs need to be explicit; by ignoring them they don't go away; the process needs to be open and transparent.
- Through dialogue and analysis of trade-offs, EA can highlight new possibilities in marine ecosystems and improved understanding of ecosystems to support blue growth.
- There needs to be much more engagement in these discussions and processes from management; the forums for EA tend to still be mostly scientists; there need to be more industry partners to help move EA forward; this is not a "them and us" process, it is a collaborative "we".
- A useful catch phrase was shared to concisely and simply summarize the ecosystem approach: The EA is about creating opportunities by finding common ground (and stepping outside of the comfort zone).
- JUST DO IT – we need to stop talking about EA and we need to implement. Take some risk and try it. Don't be afraid to fail. That is the only way we will succeed. And industry MUST be a full partner in implementation (scientists can't "prove" it without partners to test EA).



4 Options for progress

4.1 Suggestions of a fully functional ecosystem approach

Convener Erik Olsen, Institute of Marine Research Norway

The fourth session of the workshop presented a final case study as a basis for further discussion within breakout groups aimed at outlining a shared understanding of the EA and on the way forward to practical implementation creating an understanding of the relationship between sectoral and multi-sectoral objectives/governance frameworks.

Case study presented

- Applying the ecosystem approach in the North-East Atlantic – initial steps and the challenges of reality.

Emily Corcoran, OSPAR.

Break-out groups “What were the strengths and weaknesses of the approaches discussed during the workshop?”

Breakout groups discussed “What were the strengths and weaknesses of the approaches discussed during the workshop?” and were given post it notes to help arrange their thoughts and were asked to present a summary in plenary.

Group 1

The group struggled a bit with the definition of ‘approaches’ and decided to start with collating what group members considered fell under this term. It quickly became clear that the phrases are hierarchically structured (where to start the process, elements of the process, tools and methods). The next step was the identification of strength and weaknesses attached to the phrases and in a final step the phrases and the strength and weaknesses were structured hierarchically.

Approaches	Strength	Weakness
General comments to EBM	Recognizes the need to include the human dimension; Embrace the diversity on different levels and scale in the process: once there is a common understanding, you get more ownership and resilience	Existing public engagement is weak Process too diverse: too many different temporal and spatial scales and too many differences between sectors
Start with a conceptual model	Having a framework, a plan, to start with	Difficult to translate into something that can be operationalized
Governance first approach	Gives the legislative basis to implement the approach	If governance is weak, the process could fail from the beginning; weak/inadequate governance or even active resistance, e.g. in

		developing countries. There is still a split between responsibilities between ministries and not enough communication and coordination between them
Start with a single sector	Easier to implement, less conflict; could be a good starting point for an EBM process; may help to solve intra-sectoral conflicts first	Only half EBM, the trade-offs between sectors get lost
Start with multi sectors		Difficult to keep the power between sectors in balance

Tools	Strength	Weakness
Spatial planning as a process within EBM	Very useful tool for certain sectors, e.g. oil and gas, renewables, mining	Due to focus on space, could miss key trade-offs; Risk of prioritising sectors that fit this approach better than others, thus a range of tools is needed; Does not capture all sectors equally, e.g. non-spatial elements of fishing
Participatory approach	Interdisciplinary approach! Better stakeholder buy-in if everybody feels their interests are being considered; Agreement on the operating procedure from the beginning; All objectives/interest are explicit from the beginning on; Helps in identifying conflicts and trade-offs;	In case of strong diverging views or opposing objectives, what prevents stakeholders to 'leave the table'?; May become a talking shop, promotes inertia; Still too much driven by natural sciences, needs more social science Time consuming; Everyone has to come out of her/his comfort zone;



	Essential for future compliance	Needs a very good communication strategy
Common metric	Comparability between activities; Easier to weigh different objectives	It is impossible to have one common metric for everything, e.g. cultural or social values

One outcome was also that a better question could have been: **'How could we better review and assess the implementation of EBM'**. There are many case studies available, which have to a very different degree applied EBM or at least facets of it, sometimes without referring to EBM directly. A thorough analysis of these case studies could reveal commonalities, good practices, and also differences between the different processes. By also identifying strength and weaknesses of the applied steps, methods, tools, i.e. of what has been done and also flagging gaps, i.e. what should have been done in the opinion of the actors involved in a process, a more practical approach could be taken to inform future EBM processes.

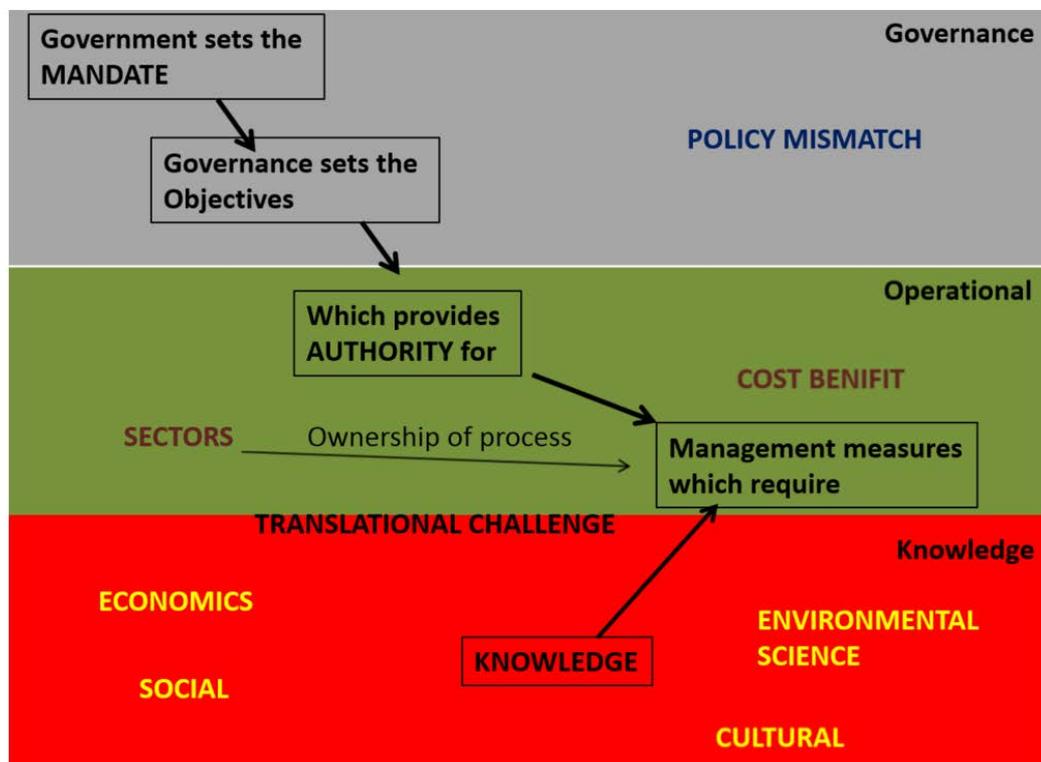
Group 2

The group came up with this prioritized list of strengths and weaknesses/challenges presented in the table below.

Strengths	Weaknesses/Challenges
1 Sustainability -Maintaining sustainable use -Responds to community attitudes/requirements -Opportunity not to repeat land management failures	1 Lack of clarity re need, benefit, definition of implementation -Multiple definitions through different policy instruments -Lack of clear articulation of need and benefit -Need for operational objectives -Not acknowledging success -Danger of reinventing the wheel
2 Simple and transparent -Simple concept -Transparent -Improved communication	2 Stakeholder perceived loss of autonomy -Inadequate Stakeholder buy-in -Loss or perceived loss of ownership or independence of own sector -Danger of becoming dominant paradigm
3 Improved efficiencies -Making trade-offs explicit -Reduced costs of conflict -Informs investment - more certainty for individual sectors -Potential for reduced duplication, including information -Potential for common standards	3 Resources and time to implement -Resources to implement, who pays and how quickly?
4 Building on existing experiences -Growing number of case studies at different scales -Can be applied at multiple scales	4 sufficiency of information, tool kits -Lack of understanding of cumulative impacts Adequacy of current toolkit

-Potential for building blocks

Group 3



Governance	Operational	Knowledge (most developed component)
<p>-ve mismatch between policy and mandate</p> <p>-ve lack of manager and policy at the workshop</p> <p>+ve increasing public awareness of issues (ca-veat: responsibility placed on scientists but should be shared)</p> <p>+ve clear overall policy objectives</p>	<p>Operational</p> <p>-ve lack of common language</p> <p>-ve lack of pull through of knowledge</p> <p>-ve Lack of stepwise operational framework which uses knowledge to support management and governance</p> <p>+ve Pragmatic approaches used</p> <p>+ve clarified education and development needs for managers.</p>	<p>-ve lack of explicit trade off analysis</p> <p>-ve lack of economic, social and cultural analysis at each step of the process</p> <p>+ve Actively addressing gaps in knowledge</p> <p>+ve We have the knowledge based to begin to implement an ecosystem approach.</p> <p>+ve Integrated knowledge being produced</p>

*key outcomes in bold



Group 4



4.2 Synthesis of the session

Achieving sustainability by putting people at the center and taking a holistic approach seems possible. However, it is complex achieving the necessary stakeholder participation and synthesising the knowledge base that is directly useful in evaluating trade-offs or spatial management options.

Even though the case studies were diverse, and the groups approach to answering the question was equally diverse commonalities were clear in the strengths and weaknesses identified. Participation of stakeholders and an open transparent process were seen as a key strength that brings marine management out of the closeted domain of the experts into the open, public arena where options can be discussed and weighted. A weakness in achieving this is currently a lack of stepwise frameworks to guide such a public scrutiny and decision making process. Methods for integrated trade-off analyses of management options across sectors are among the key tools needing development in such a step-wise framework. Without it, the public can easily lose faith in a complex EBM process as it does not meet the high expectations.

Balancing the public expectations and involvement versus what is realistically and pragmatically achievable is one of the key balancing acts of a fully functioning EBM. Still, even if successful in striking a balance, EBM can, because of its complexity and lengthy decision-making processes, still be considered rigid and aloof (e.g. 'big government') that lacks clarity and ambition. EBM can easily degenerate into a 'talking club' with little effective management coming out of it. Starting development around a few core sectors has been one successful approach, although that limits the trade-off analyses between sectors that is an ambition of EBM. The knowledge base (in the cases studies) seem to be adequate, but the lack of involvement of the social sciences knowledge and expertise is worrying as it can lead EBM into becoming a concept monopolized by the natural sciences.

4.3 Additional presentations

Participants who had brought unscheduled presentations were also given an opportunity to present:

- Building our future can and should be done together with Nature
Paris Sansoglou, European Dredging Association (EuDA)
- Co-Creating Ecosystem Based Fisheries Management Solutions
Ólavur Gregersen, MAREFRAME



4.4 Concluding session- the way forward....

Convener Mark Dickey-Collas, AORAC-SA & ICES secretariat

The final session had participants break-out for a final time and were asked to respond to three questions:

1. What's new? New concepts, ideas on table? New ways of thinking of existing ideas?
2. What's next? What will you do as individual? What should we do collectively? How to keep things moving forward (once the workshop is over)? Useful outcomes, outputs (that would help you)?
3. What are your top three takeaways?

Break-out groups representatives reported back in plenary on impressions and outline of next steps needed to progress implementation of the ecosystem approach, followed by an open discussion.

What's New? New concepts, ideas on table? New ways of thinking of existing ideas?			
Becky Shuford	Robin Anderson	Beth Scott	Gabriella Bianchi
<p>Perspective in terms of where my work fits into bigger (global) EBM picture; who is doing what and helps position where I am going and help me sell to own people.</p> <p>Better overview of the process from top down to bottom up and vice versa</p> <p>Disconnect between EA as academic exercise and those that have to do it for "real" – seems to be parallel processes without a lot of overlap</p> <p>When thought of EBFM thought of models and targets; stakeholder engagement important but hadn't thought of it as primary; but now see that governance component is a lot more important to work on and build than to build more targets</p> <p>Surprised as sense of governance as the problem by the natural scientists;</p>	<p>Convergence</p> <p>All the examples - Seeing commonalities between approaches</p> <p>We are not alone – lots of people doing EBM even without calling it that</p> <p>Common definitions</p> <p>No longer primarily natural science driven - more ecosystem and with human included centred</p> <p>Pragmatism – "let's do it approach"</p> <p>Arrival of applied science as a respectable undertaking</p> <p>Recognition that we need to interact with other sectors – most presentations = single sector</p>	<p>Applying management at different scales</p> <p>Differences between mandates and authorities</p> <p>Translation of knowledge from science into practical guidelines</p> <p>Focus on implementation being the challenge. It is still difficult to see effective implementation of EEA (few examples)</p> <p>EBM is made up of aims/process/outputs, so need to be clear which part we are talking about.</p> <p>Explicit recognition of trade-offs between sectors</p> <p>Commonality between approaches</p>	<p>The notion that it is not only about science, it is about managing people, institutional frameworks. Not the science alone will get it done.</p> <p>Government/governance, respective mandates are important and need to be recognized</p> <p>Successful case studies on which to build</p> <p>Acknowledging that there is a need for ocean literacy for the public and governments/sectors</p> <p>Science-policy gap (despite efforts). Policy makers to better articulate what is needed from science</p>



<p>Never been to meeting where natural scientists are acknowledging governance as a real issue; reassuring but not sure it will change what they do</p> <p>Not so much what new, but what is not new; Policy will be implemented – Policy has move forward, but natural science for EBM is falling behind in keeping up in with the need (though counter that wasn't sure agree with this – natural science has been developing a lot in terms of tools – what I see it that what we lack is governance structure that facilitates implementation; re-counter – putting the blame on governance not playing catch up rather than natural scientists not being able to apply the science to the policy;</p> <p>There are people out there that don't see a need to change</p> <p>Knew had to implement EBFM; now see it as a tool (counter – need to implement your policy objectives –mandate is given to you on high – it not an academic exercise)</p>			
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What's next? What will you do as individual? What should we do collectively? How to keep things moving forward (once we leave)? Useful outcomes, outputs (that would help you)?			
Becky Shuford	Robin Anderson	Beth Scott	Gabriella Bianchi
<p>Making a roadmap – useful outcome</p> <p>Develop a marketing strategy</p> <p>Go back and talk to other projects to create partnerships to create a more holistic analysis and more comprehensive program</p> <p>Looking at cases where we can actually demonstrate the approach (fisheries, aquaculture, offshore oil – conflict management. A real case – not an academic case. NAFO is a useful example; need to the complete process (even if the tools are not fully-baked – let's use what we have).</p> <p>Can't advance without it being in practice and without implementing it</p> <p>Translating between languages; we need to force ourselves to invest our time in how to put this into practice/</p>	<p>Focused workshop with leaders from AORA WPs from all sectors (Needs; How to interact)</p> <p>Focused workshop for managers and policy makers</p> <p>Education for scientists in delivering science to management and policy</p> <p>Understanding of institutional impediments to implementing EA (Trans/ interdisciplinary centres; Recognition of this as a pressing need)</p> <p>Need to compile lessons learned (successes and failures) from case studies</p> <p>More analysis of the presentations to this workshop</p>	<p>Review existing environmental management and how to extend towards EBM using the concept/literature and consider what needs changing.</p> <p>Start working with social scientists and economists and highlight the benefits.</p> <p>Take consideration of appropriate scales when designing projects.</p> <p>Develop a method for EBM that quantifies the likelihood that is will be successful.</p> <p>Feed workshop outcomes into Pelagic AC.</p> <p>Feed into Swedish strategy for EBM.</p> <p>Review of what the strategy can add, what is the advantage?</p>	<p>Set-up/identify a peer group/ virtual centre of excellence for EBM/ best practices, taking in to consideration the necessary diversity of disciplines</p> <p>Better policy harmonization at different scales. A research project?</p> <p>Suite of papers on implementing EA/EBM, also based on the case studies presented</p> <p>Implementation guidelines (FAO, UNEP, EU, ICES, Regional organizations)</p>



<p>apply; and what you can learn from the translation – not just the translation; also make language of hope rather than despair</p> <p>Language also has to describe the solutions in terms of dealing with conflicts</p> <p>How to sell someone what they really want – you need to listen</p> <p>Science sometimes describes how we arrived at a point; what they want to; project forward</p> <p>We need some other disciplines involved on how to communicate the natural science in to practical governance</p> <p>Putting emphasis on bringing information to the managers and figuring out how to put the science in place for management</p> <p>This workshop is reinforcing what we are doing in our various efforts and is on track with current thinking and practice</p>	<p>Get over ourselves- Science is essential for the process but not sufficient</p>	<p>Concern about balance between top-down governance and bottom-up approach.</p> <p>Developing indicators to measure success of on-going projects.</p> <p><i>What should this group do?</i></p> <p>Review of best case examples with tangible results (include integrated coastal zone management etc.)</p> <p>Development of indicators of success</p> <p>Bring in land-based examples</p> <p>Good examples of process. Science, results, separately</p> <p>Follow-up with a workshop in other industries/fora</p>	
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Having a workshop on a more regional level and have discussion on how to better appreciate EBFM – again not just about new targets and objectives, but the implementation			
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Top 3 Take Away			
Becky Shuford	Robin Anderson	Beth Scott	Gabriella Bianchi
<p>1. Others are dealing with the same issues, there are partners to work with, learn from each other.</p> <p>2. Trade-offs have to be ok. Need to do it better for achieving a common goal/vision.</p> <p>3. Need to understand where we fit in the process and cooperate with each other.</p>	<p>1. EBM is a journey</p> <p>A lot of the successes have come from successful management of failures or major problems/issues</p> <p>EA is not a single sector process</p> <ul style="list-style-type: none"> -Multi-purpose and multi-stressor abatement are important -Need for education among sectors -Metrics that each sector can communicate and relate to <p>2. Pragmatism “just do it” and adapt...</p> <p>3. It’s not about us</p>	<p>1. Good overview of how EBM is being implemented in existing frameworks.</p> <p>2. Create forums, or use existing forums.</p> <p>3. Engage with industry more and show them the benefits.</p>	<p>EBM is about managing people</p> <p>Science not the problem, integration</p> <p>Reaching out/improving communication by using all kind of media, including social media</p>



4.5 Synthesis of the concluding session

The workshop illustrated a remarkable convergence of understanding around the concept of ecosystem based management and the challenges for implementation. The online survey, presentations and break out groups confirmed that the ecosystem approach to marine management is moving from more academic angles to addressing tangible and operational issues. Implementation is now the main challenge. There are many activities across the spectrum of marine management that could be considered ecosystem based management, although not being called EBM specifically.

The governance component of EBM is now seen as key. EBM is no longer seen as primarily natural science driven. The human aspect is still central. The process of EBM implementation is iterative and adaptive. There is a lack of frameworks for practical implementation. With policy makers, researchers, and other stakeholders exploring the questions to be asked and the tools to be applied. Scientists seem to struggle to translate science into practical guidelines and making knowledge products that can be applied to policy. Science essential for the process for EBM but not sufficient in its own right. Efforts to improve ocean literacy should be increased. Operators in EBM should share experiences from both successes and failures.

Looking forward, and with consequences for AORA and the work of AORAC-SA, the workshop emphasised that scientists need to increase the efforts to work across disciplines, (either individually or through collaboration) and show the delivered benefits. Researchers also should consider why many tools and products are not taken up in practical implementation. It was felt that scientists need to greater explore the institutional impediments of implementing EBM and improve their skills at delivering science for management. Successful implementation of EBM will be pragmatic, people focused and cross disciplinary. Specifically how scale (tools, assessment, monitoring, implementation of management actin) influences was mentioned as a knowledge area that needs more focus.

On a practical note the workshop felt that next steps were:

- Create implementation guidelines (FAO, UNEP, EU, ICES, and Regional organizations)
- Closer analysis of the workshop online survey and workshop presentation
- Set-up a peer group/ virtual centre of excellence for EBM
- Increase efforts to scope EBM issues with industrial sectors

The importance of inter-disciplinarily in developing and implementing the EA should not be underestimated. Not only is cooperation among disciplines needed, but natural scientists must also be mindful of the importance of framing research questions in an ecosystem context (identifying, measuring, and reporting on the relevant metrics and building useful tools to determine, explore scenarios, and evaluate the consequences of multiple human activities in the context of a changing ecosystem).

The key take home message is that whilst the provision of knowledge is important, and examples exist where ambitious higher order objectives challenge the knowledge base (Australia, the MSFD in Europe), it is not the central challenge. Understanding the **impediments to implementation is imperative**. Implementation of EBM is a process, and the actors engaged need to consider that process and their role, as much as trying to estimate the consequences of managing human activities for the ecosystem.

When making the ecosystem approach operational, the workshop illustrated that:

1. There is broad agreement of concepts and best practices

2. Successes were associated with mechanisms for setting objectives and priorities, achieving effective integration, getting buy-in by stakeholders while understanding respective roles and responsibilities, realistic ambitions and a tangible knowledge base.
3. Failures tend to be associated with misunderstanding incentives, poor stakeholder buy-in, and institutional, legislative, and governance issues.
4. Greater attention should be given to developing appropriate governance frameworks, on the one hand, and to development of tools and knowledge to support the EBM process, such as tools for integrated trade-off analyses.

4.6 Post-workshop reflections

Following the workshop, and reflecting over the main messages, it was noted that the workshop participants were primarily natural scientists. The perception from participants was that the challenges for implementing EAM were not based on a lack of knowledge or science, but were more in the realm of governance and policy. Given the lack of social science expertise present at the meeting, this message requires further scrutiny during follow-up work. The observation that EA implementation requires more than just knowledge, but interdisciplinary coordination, communication, and research is important. However, any follow-up workshops should consider the expertise of participants, and where necessary they should strive to include experts in governance, policy, economics, social sciences, and natural sciences.

An additional concern is that in identifying governance/policy as the main challenge there is a risk of underestimating potentially unforeseen or remaining science challenges. There is still a need to continue to develop a holistic understanding of natural systems. Current methods for examining scenarios on the effects of multiple stressors and drivers are still very limited particularly when those effects are nonlinear. There are still only a few tools available to determine cumulative effects of human activities even within a single sector. Existing global ocean models have very tenuous links to human activities beyond changes in atmospheric carbon and although there have been a few attempts, they do not relate well to sustainable human use of marine ecosystems. The current "jigsaw puzzle approach" of ocean monitoring efforts makes it difficult to integrate among sectors and to assess ecosystem level effects. Ocean monitoring systems are still mostly geared to ocean "weather forecasting", not to ecosystem management. In some areas, where it is possible to link anthropogenic pressures to environmental effects, further science developments are needed for improved quantification. Although science still has room for improved integrated understanding of marine ecosystems, this should not prevent moving forward with the existing tools.



5 Case Studies

A short summary of case studies is presented below. A more in-depth analysis of case studies and survey results will be developed in the coming months.

All presentations given at the workshop are available on ICES website:

<http://ices.dk/explore-us/projects/Pages/Making-the-ecosystem-approach-operational.aspx>

The ecosystem approach in South America: where are we and where are we going?

Ignacio Gianelli, UNDECIMAR

Using case studies of small scale fisheries in Brazil, Chile, Ecuador, and Uruguay illustrated examples of successes and failure of management. Highlighting cases where more institutional support is needed to reach objectives; where effective management of one resource brought positive changes in other parts of the ecosystem; and where government failed to translate high-level policy goals into fisher incentives for effective management.

1) Barriers for effective EA implementation:

- Legal frameworks on paper but not necessarily in practice
- High-level policy goals are not a sufficient condition for success
- Uncertainty: environmental, economic and institutional
- Lack of economic and human resources

2) Stakeholders participation is crucial:

- Co-management as formal governance mode
- Community-based data collection

3) No magic recipes, no single paths

- Combination of adaptable management tools
- Adaptable and dynamic management schemes

Protection of the Canary Current Large Marine Ecosystem in North West Africa.

Birane Sambe, FAO

The CCLME Project aims to enable the countries of the Canary Current Large Marine Ecosystem to address priority transboundary concerns on declining fisheries, associated biodiversity and water quality through governance reforms, investments and management programs.

Expected outcomes

- Multi-country agreement on priority transboundary issues and on governance reforms and investments to address these;
- A sustainable legal/institutional framework for the CCLME;
- Strong stakeholders' involvement in transboundary water body priority setting and strategic planning;
- Improved knowledge and capacity to address concerns on marine living resources and biodiversity, habitat and water quality;
- Demonstrated management actions and related costs/benefits valuations

Ecosystem-Based Management: A US Perspective.

Rebecca (Becky) Shuford, NOAA

Presented Ecosystem Based Management (EBM) as a Continuum from no EBM in practice, to incremental EBM (sectoral management with some EBM decision-making), to comprehensive multi-sectoral EBM. A self-assessment of the Status of marine and coastal ecosystem-based management among the network of U.S. federal programs shows strong focus on ecosystem science, and low scores on human dimensions.

NOAA's Integrated Ecosystem Assessment Program is a decision-support process that synthesizes and analyses diverse data and ecosystem model outputs; is modular, iterative, scalable, and adaptable; shares a common national framework, yet with regional variation in implementation; provides assessments of the ecosystem across and within multiple ocean-use sectors.

The Bureau of Ocean Energy Management (BOEM)'s is conducting ecosystem studies in the Atlantic on all three BOEM-regulated activities (Marine Minerals; Renewable Energy; and Conventional Energy) and is using the information for planning and conflict avoidance.

Celtic Seas Partnership: demonstrating effective stakeholder engagement as part of the ecosystem approach

Jenny Oates, Celtic Seas Partnership

The Celtic Seas Partnership is a four year EC Life + funded project (2013-2016), lead by WWF-UK with University of Liverpool, SeaWeb Europe, NERC-BODC and Eastern and Midland Regional Assembly. The project aims to Increase stakeholder understanding of marine policy; Build and develop relationships between sectors and countries; Increase stakeholder involvement in marine policy and decision-making and influence management practices; improve the availability of information at Celtic Seas scale. The project has run stakeholder workshops (250 stakeholders) and developed various initiatives to engage with stakeholders, including a Marine Strategy Framework Directive (MSFD) tutorial in order to help build capacity for stakeholders to participate, and influence MSFD.

Possible future trends considered to highlight the need for integrated management. Best practice guidelines are being developed for the Celtic seas related to transboundary marine governance; colocation of marine renewables; conflict resolution; and terrestrial planning and MSFD. The main challenges for environmental management in the Celtic Seas are a growing number of activities and uses as well as a crowded policy landscape.

The way forward is to work to further integration to improve likelihood of success and potentially a Celtic seas forum.

A pluralistic approach to EBM implementation in the Caribbean.

Lucia Fanning Dalhousie University

The Caribbean is the most geographically and politically diverse and complex region in the world. However, the issues in the LME are similar to others such as unsustainable fisheries, pollution, and habitat degradation. With continued degradation of the well-studied region, a driving research question was "if an institutional perspective



could add value to address the issues?" There is a high-degree of organizational complexity in the Caribbean. Stakeholders came together to define a common vision for the region through a 2008 symposium. The CLME+ project (2006-2019) aims to:

1. Identify, analyse and agree upon major issues, root causes and actions required to achieve sustainable management of the shared living marine resource
2. Improve the shared knowledge base
3. Implement legal, policy and institutional reforms
4. Develop an institutional and procedural approach to LME level monitoring, evaluation and reporting
5. Facilitate EBM/EAF in the CLME+ area for the sustainable and climate resilient provision of goods and services for the shared living marine resources in the region

The project has developed a multi-level policy cycle based governance framework. All countries in the Caribbean have endorsed their framework and it is now being tested. The framework allows interventions to be specifically targeted. A Caribbean wide body is needed to build a science-policy interface for ocean governance. It is still not agreed what are the appropriate governance arrangements for ecosystem approach implementation in the region. Aiming for the "Policy direction and review" model.

The way ahead for EBM in the Caribbean is an incremental and adaptive approach. Given the emerging institutional complex within the region, a networked approach that makes best use of and improves upon existing arrangements appears to be the most feasible.

Canada LOMA- Large Ocean Management Areas.

Robin Anderson, DFO

The Canada Oceans act (1997) sets the legislative framework for enabling integrated management of Canada's oceans. The Act is based on the understanding of oceans, ocean processes, marine resources and marine ecosystems to foster the sustainable development of the oceans and their resources; the ecosystem approach; and the precautionary approach. Large Ocean Management Areas (LOMAs) are marine regions established under the Canada Oceans Act for planning purposes. Five LOMAs were developed in areas where there was a need for a management framework.

The five existing LOMAs are characterized by:

- –important living and non-living marine resources
- –high biological diversity and productivity
- –many stakeholders competing for ocean space and resources

Managing LOMAs is a four-step process, comprised of:

- –Initiating the planning process which delineates the eco-region and defines the planning area and team
- –Informing and reporting which begins with the conduct of an ecosystem overview and an assessment report
- –Setting management objectives which sets economic, social, cultural and conservation objectives
- –Developing and implementing an integrated-management plan, which includes management measures, monitoring and reporting

The Placentia Bay and Grand Banks (PBGB LOMA) are ocean areas that include coastal regions and offshore areas. Critical conservation priorities were identified in these areas in consultation with experts. A risk assessment framework was developed for the process. A regional oversight committee was the main governance structure and included an implementation committee, an intergovernmental forum, stakeholder advisory committee and technical working group. The technical working group set LOMA objectives, and put together a management plan.

Then political changes resulted in a change in objectives. Participatory and consensus based planning is clearly doable and desirable, but challenged by established ways of managing (sectoral, jurisdictional) and agencies and industries are reluctant to embrace an alternative that may require significant compromise.

An uncharted voyage: Ten years of integrated ecosystem-based management in the Barents Sea.

Erik Olsen IMR

In Norway, integrated management plans started developing in 2002, first in the Barents Sea with the aim to defuse conflicts between ministries supporting fisheries, oil, and conservation sectors and objectives. The aim was to balance sustainable use and conservation. A ministerial steering group was created to achieve consensus on decisions and public hearings and consultations were held. Integration between levels of sectors is needed. Norway has not created new legislation on EBM, instead the government tries to use existing legislation with specifications through white papers. In practical terms mapping of sectors.

The main Success factors were identified as:

- Political leadership at top-level needed to get broad buy-in- to overcome resistance (opponents), to overcome unwillingness to leave “status quo”, and to get sectors to participate at the round tables.
- Resources and knowledge base.
- Effective vertical and horizontal integration.

It is possible to implement EBM with MSP in large marine ecosystems. But:

- Costly and long development period (3-4 years)
- Requires willingness for power-sharing between sectors
- Society must be open to complex management
- Should focus more on clearly communicating the ecological, societal, and economic trade-offs of possible futures.

Trade-off analyses using a natural capital approach. Possible futures explored using the Atlantic ecosystem models.

Making EAM operational in Canadian fisheries management.

Stacey Paul, DFO

Canadian Fisheries Research Network (CFRN) brings together industry, academia, and government to answer strategic questions through collaborative research. They are working towards a sustainable fishing industry in an evolving management system.



The ‘Sustainable Fisheries Framework’ has developed guidelines for treatment of ecological aspects of ‘Integrated Fisheries Management Plans’ (IFMP). Four aspects of sustainability are considered: Ecological, economic, social, institutional objectives.

IFMP (management plans) were reviewed to see what objectives are being used. A gradient of information available with descending information among objectives from Ecological (high amounts of information), economic, social, institutional objectives (low amounts).

Scenario comparison can help examine trade-offs. The IFMP review showed that DFO – has intent but no recipe. A governance/institutional gap is that there is no “body” requesting social and economic aspects for sustainability. An institutional process that will allow and promote such a framework is necessary.

EBM in Australia: National, Regional and Local Approaches

David Smith, CSIRO

The Australian Oceans policy was developed in 1998, with a shift of focus from integrated oceans management to conservation and marine protected areas in 2005.

Australia’s ocean policy fell short of expectations for a variety of reasons:

- Too ambitious
- No legislative basis initially but then EPBC Act 1999 (primarily conservation and environment)
- Lack of clear ownership of policy process
- States effectively excluded
- Need and form of integrated management
- Need for clear objectives, priorities and standards
- Sectors at various stages of operational implementation of ESD
- Policy in front of science
- Policy was ahead of the available science.

Regional and local management examples were presented.

Needed for effective ecosystem based management:

- Clarity around form of EBM
- Legislative basis or strong governance framework
- Stakeholder ownership
- Operational objectives
- It is about identifying trade-offs not optimisation

The NAFO Roadmap for an Ecosystem Approach to Fisheries.

Mariano Koen-Alonso, DFO

The Northwest Atlantic Fisheries Organization (NAFO) is a regional fisheries management organization (RFMO) with 12 contracting countries (including the EU). NAFO manages fisheries on NRA stocks and straddling stocks within the NAFO convention area. The annual NAFO management cycles between requests for science advice and management decisions. The advice is changing from single stock management to broader ecosystem issues (e.g. closure of areas to conserve VMEs).

A NAFO roadmap (conceptual structure) to the ecosystem approach to fisheries has been constructed. NAFO is still using classic stock assessments, but using them in a new way.

The way forward:

- Continue working towards a full implementation of the Roadmap within NAFO for identified shelf ecosystem units (shifting science emphasis towards multispecies interactions).
- Promote development and implementation of compatible and coordinated approaches within Canada and other coastal states.
- Identify and delineate functional ecosystems in Areas Beyond National Jurisdiction (ABNJs) (e.g. oceanic realm within the NAFO Convention Area).
- Create/expand legal frameworks to coordinate the work of sector-oriented international bodies (e.g. International Seabed Authority, RFMOs) to allow effective integrated management for identified ecosystems in ABNJs.
- Generate a platform for building a broader EBM approach for Functional Ecosystem Units in ABNJs

Application of Marine Planning to Support Protection of Living Marine Resources in Northeast USA Waters.

Mark Monaco, NOAA

Biogeographic assessments a framework for information synthesis in MSP to support EBM.

Presented a case where ecosystem based management aimed to reduce ship collisions with whales, balancing marine transportation and conservation objectives. Vessel traffic patterns were analysed and recognized that by changing the shipping lane to avoid the habitat of the preferred prey, there was a potential for 81% reduction in collision risk. It took six months to develop options for different changes, and 4 years for implementation through MMO. Also calculated were time and costs involved in the change, however industry didn't need this kind of convincing, they were convinced it was the right thing to do. A "whale alert" app has been developed to help ships avoid collisions with whales.

A scientist's perspective of implementation of the EU marine strategy framework directive.

Mark Dickey-Collas, ICES secretariat

The European Union's Marine Strategy Framework Directive is an umbrella for ecosystem-based management. Science review of MSFD. There is a comprehensive set of EU legislation for protecting and managing aspects of the marine environment including: Maritime Spatial planning directive, the Common Fisheries Policy (CFP), MSFD, Habitat & Birds Directive, and Water Framework Directive.

The MSFD provides higher order objectives for Good Environmental Status but requires regional solutions to assess and implement action.

MSFD requires a strong knowledge base for assessing 'Good Environmental Status', based on eleven descriptors over a six-year cycle. It assumes clear pressure-state relationships, and requires measure to be implemented.

MSFD is regionally focused, not sectoral. EU member states are responsible for assessments and implementation, responsibility is devolved. Challenges for the MSFD are the interplay between marine policies, dynamics of regional cooperation, balancing ecological, social, and economic concerns, and effective stakeholder involvement.



Applying the ecosystem approach in the North-East Atlantic – initial steps and the challenges of reality.

Emily Corcoran, OSPAR.

OSPAR is an intergovernmental organization working to conserve and manage the North East Atlantic. The main objectives of the OSPAR convention are to

- Prevent and eliminate pollution
- protect the maritime area against the adverse effects of human activities
- safeguard human health and conserve marine ecosystems
- when practicable, restore marine areas

There are many human activities taking place within the OSPAR convention area and coordination between contracting parties is required to implement the MSFD. In preparation for the OSPAR Assessment in 2017 there is a lot of work ongoing on indicators and how to bring indicators together. The ECAPRHA project is developing an ecosystem approach to regional habitat assessments.

Cumulative effects are also being considered through pilot cases and looking at different methods being used in different regions. Understanding causality between pressure and state. A challenge has been access to data, although North-East Atlantic is data rich, there are still challenges in obtaining data, compatibility, etc. In June an online tool will be launched to make data more accessible. Communication and cooperation between sectors is needed for effective management. NEAFC and OSPAR cooperation was aided by defining their own roles and each other's a process of developing trust and understanding mandates.

Additional presentations

Building our future can and should be done together with Nature

Paris Sansoglou, European Dredging Association (EuDA)

Dredging is not a problem, but can be considered a solution, for instance providing support to coastal cities by supporting offshore resources. Building with Nature is a partnership with Nature, integrating both physical and biological aspects of Nature into a project's design, EcoDynamic Design or Geo-Engineering, and its implementation so that the project integrates more harmoniously and more harmlessly into Nature and when possible to Nature's benefits.

Co-Creating Ecosystem Based Fisheries Management Solutions

Ólavur Gregersen, MAREFRAME

MAREFRAME is a project with 28 partners that aims to:

- Utilise new tools and technologies for novel data
- Develop and extend ecosystem models and assessment methods
- Develop practical Decision Support Framework (DSF) that can highlight alternatives and consequences
- adapted to the needs of decision makers, managers, operators, and other stakeholders
- support the implementation of the new Common Fisheries Policy (CFP), Marine Strategy Framework Directive (MSFD) and Habitats Directive (HD)
- Integration, co-creation and training of stakeholders

6 Questionnaire/survey

In advance of the workshop a list of questions was developed in order to aid case study presenters in structuring their presentations in a comparable way that would be useful for the aims of the workshop.

Based on this set of questions an online (Sharepoint application) survey was created and a link sent not only to case study presenters, but all registered workshop participants. The survey was designed with one “branch” at the fourth question “Do you work within a specific ecosystem approach project and/or are you presenting a case study at the workshop?” allowing case study presenters to respond with more detailed information on a specific case study, while other respondents jumped to a set of questions focused on a more generic understanding of the ecosystem approach.

Unfortunately, a technical issue with the survey meant some responses were not saved, and as the survey was designed as “anonymous” it wasn’t possible to trace all partially completed responses. Participants were alerted to the issue, and many resubmitted responses.

Overview of respondents

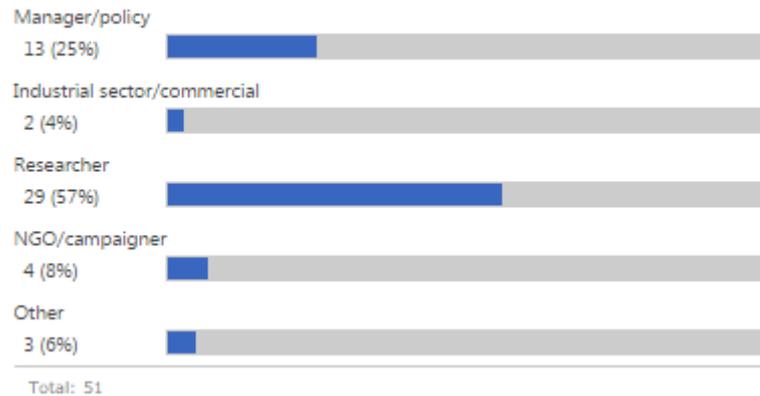
1. Organization/s represented.

- NSERC Canadian Healthy Oceans Network
- CEFAS
- University of Aberdeen
- Future Earth Coasts (formerly LOICZ)
- European Environment Agency
- Baltic Sea Centre at Stockholm University
- Fisheries and Oceans Canada
- Food and Agriculture Organization of the United Nations
- NUI Galway and the H2020 BG1 2015 project 'ATLAS'
- Innovative Fisheries Management - an Aalborg University Research Centre
- Swedish Agency for Marine and Water Management
- DTU Aqua
- Kiel Marine Science
- Dalhousie University
- The Fisheries Secretariat
- Institute of Marine Research
- OSPAR
- AZTI
- WWF/PelAC
- University of Bergen
- Instituto Español de Oceanografía
- NOAA National Ocean Service
- Celtic Seas Partnership, WWF-UK
- Jan De Nul
- European Commission DG ENV
- Bureau of Ocean Energy Management in the Department of Interior
- ClientEarth
- Fisheries and Oceans Canada (DFO) and the Northwest Atlantic Fisheries Organization (NAFO)
- Marine Science Unit, Faculty of Science, Uruguay
- Coastal research at Helmholtz-Zentrum-Geesthacht, Germany

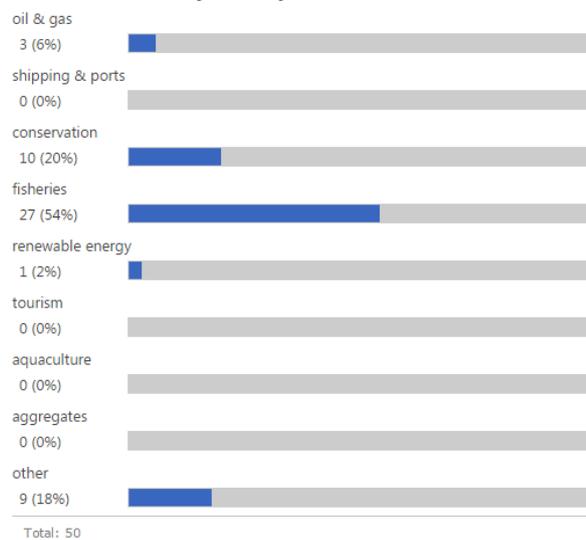


- CSIRO
- HELCOM Holistic Assessment of the Ecosystem Health of the Baltic Sea (HOLAS II)
- IMR
- Plymouth Marine Laboratory
- Pelagic Advisory Council
- University of Cape Town

2. What is your role?

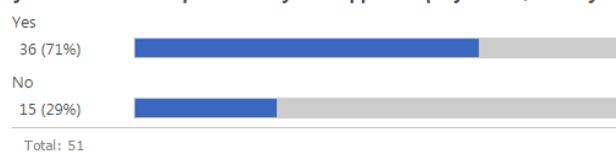


3. What marine sector do you mostly work in?



4. The next set of questions relate to case studies.

Do you work within a specific ecosystem approach project and/or are you presenting a case study at the workshop?



Annex 1 Participants list

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Annex 2 Case Study Presentation format

Case studies presenters were requested to report in a structured format to allow for ease of comparison. This presentation template was also the basis for a survey that was distributed to all participants.

DESCRIPTION OF THE CASE STUDY Case study name and geographic scope (can be at different scales, i.e. from locally managed areas to ecosystems that include more than one EEZ or ABNJs). Presenter's role in relation to the case study

Background and description of the institutional arrangements in place for EBM.

- i. Process that has led to the setting up the given multi-sectoral institutional arrangement (this can be a committee, a commission, etc.)
- ii. Sectors involved (fisheries, mining, tourism etc.)

Description of relevant processes/arrangements in place, such as

- i. Generation of integrated knowledge/science on the impacts of various activities on marine ecosystems;
- ii. Generation of knowledge on ecological, social and economic trade-offs of alternative ecosystem use/strategies;
- iii. Existence of a decision-making process at multi-sectoral level that can take up data and information, formulate advice, implement decisions and review all aspects of the process.
- ii. Level of uptake of knowledge generated in (i.) and (ii.) for decision-making
- iii. Role of sector-level management within a multi-sectoral, EBM framework (strong role, medium, or low)
- iv. Evaluation of the level of capacity in science, policy and management for EBM

MAIN CHALLENGES FOR THE MARINE SECTOR (FOR THE GIVEN CASE STUDY)

- i. Main outputs/products/services coming from the sector/s operating in the region covered by the case study.
- ii. Top 3 objectives you have for your marine sector/s?
- iii. Main (2-3) impediments/challenges for the achievement of the objectives
- iv. Realized or potential conflicts between different marine sectors.

Based on your experience, describe the main value in integrating management across marine sectors and what you see as the way forward in your region

Additional input required on the way forward and addressed in the online questionnaire and break out groups.

How can these conflicts be addressed/resolved, e.g. improved planning of marine areas use, improved science/knowledge to inform decisions, improved stakeholder consultation, improved legal frameworks, other?

