



Working Group on the Ecosystem Approach to  
Ocean Health and Stressors:  
Mandates for Ecosystem-based Ocean Governance  
across Canada, the EU, and the US

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## Executive Summary

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The Atlantic Ocean Research Alliance Working Group on Ecosystem Approach to Ocean Health and Stressors formed a task group to explore the mandate/s for ecosystem based management (EBM) in the North Atlantic. The task group met 13-16 March 2018 in London and was comprised of an interdisciplinary mix of legal, political, administrative, and natural scientists/scholars from the three jurisdictions that signed the Galway Statement on Atlantic Ocean Cooperation (US, Canada, and EU). The task group workshop identified the major mandates that govern marine activities and the stressors that impact ocean health and condition. The overarching goal was to characterize, compare, and synthesize the mandates that govern marine activities and ocean stressors relative to facilitating EBM in the North Atlantic (national and international waters). The group also identified impediments to the incorporation of science into the management process, largely based on a cross-comparison of jurisdictional applications of mandates and highlighted benefits of improved implementation of existing mandates for EBM.

The task group found that there are adequate, extant mandates to execute EBM. In all jurisdictions, nearly all of the ocean uses, goods and services, pressures, and stressors have some mandate coverage. In all jurisdictions, even those ocean uses or pressures without direct mandate coverage have some form of overarching legislation or policy to address facets of cumulative impacts, coordinated planning, and comprehensive, systematic consideration. There is no legal basis hindering EBM, and the potential benefits emphasize the urgency and need for greater implementation.

The observed limited extent of EBM in practice is not primarily due to lack of clear mandates, rather limited implementation of those mandates in every jurisdiction. Lack of implementation seems to be the major challenge across the three jurisdictions. Key challenges to implementing EBM were identified.

- Conflicting interpretations of laws and mandates
- Administrative practices and routines including organization and power dynamics across government departments
- Imbalance across sectors
- Challenges of stakeholder involvement
- Crises swamp longer-term priorities
- Operating across maritime boundaries
- Conceptualizing EBM is context-specific
- Absence of good practices showcasing the merits of EBM.

Mitigating these challenges requires greater recognition of the benefits of EBM and building a stronger business case for EBM, the blue economy, and ultimately more holistic ocean governance.

- There are private benefits and societal benefits from EBM across ecosystem services which account for diverse social values.
- There are likely reduced transaction costs of governance from EBM compared to business as usual and EBM provides information in a more systematic and integrated fashion, thus permitting other regulatory mandates to operate with greater efficiency and lower costs.
- EBM will result in increased predictability in management and governance.

- EBM allows for the prioritization of objectives of maritime uses and alignment with societal objectives.

The report also provides a list of outstanding research questions and recommends that to facilitate institutionalization of EBM, there is a need for realignment of research funding from project based to base budget and for research calls to be multi/inter-disciplinary. EBM should be reframed to emphasise benefits for the blue economy and consideration be given to innovative regulatory and non-regulatory tools to advance implementation of EBM. Ongoing promotion of awareness among relevant government institutions with respect to EBM should be encouraged.

## 1 Introduction

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The vision of the Atlantic Ocean Research Alliance Working Group on the Ecosystem Approach to Ocean Health and Stressors (EA2OHS) is to promote research to understand the North Atlantic Ocean in support of ecosystem-based management (EBM; see Annex 5). EBM is recognized as the best means to advance knowledge to manage marine ecosystems and their associated resources, across multiple ocean-use sectors, and across multiple stressors. AORA with FAO led a [workshop](#) in 2016 to scope what is seen as the EBM priorities and strategies of policy developers and stakeholders. The workshop concluded that understanding the impediments to implementation of EBM is imperative. Implementation of EBM is a process, and has institutional and legal implications. The workshop concluded that:

1. There is broad agreement of EBM concepts and best practices.
2. Successful implementation of EBM was 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.

Following this 2016 workshop, and within the broad EA2OHS effort, several task groups were formed to execute several tasks as part of an eight step process. All task groups for EA2OHS are exploring different facets of what it would take to enhance the uptake of knowledge for EBM and potential alignment of research priorities. One task group is considering mandates and governance. In this context, the mandates task group was specifically asked to characterize relevant mandates and governance structures; relate them to one another; compare across jurisdictions; and identify those features that facilitate or hinder the ecosystem approach. The task group met in the form of a four day workshop 13–16 March 2018, in London. It was comprised of a small, focused but interdisciplinary mix of legal, social, political, and natural scientists/scholars from across the three jurisdictions that signed the Galway Statement on Atlantic Ocean Cooperation.

The mandate task group workshop was asked to identify the major mandates that govern marine activities and the stressors, which can impact ocean health and condition. The overarching goal was to characterize, compare, and synthesize the mandates that govern marine activities and ocean stressors relative to facilitating EBM in the North Atlantic (national and international waters). The workshop was requested to identify impediments to the incorporation of science into the management process, largely based on a cross-comparison of jurisdictional applications of mandates.

The workshop was asked to deliver a meeting report, a plan to produce a peer reviewed paper containing a summary of findings and recommendations for advancing EBM (see Terms of reference and agenda Annexes 1 and 2). It will report back to EA2OHS, AORA, and national entities to advance EBM; primarily to identify and recognize synergies and opportunities among national and international jurisdictions and to open dialogues in home jurisdictions to explore mandate status relative to advancing EBM.

## 1.1 Why EBM?

There have been numerous efforts that document and debate the need for ecosystem-based management (EBM) of the ocean. EBM is emphasised in Canada in the Oceans Act, and numerous programs administered by Fisheries and Oceans Canada such as the Ecosystem Research Initiatives (Canada), by the National Ocean Policy (US), and in the EU by the Integrated Maritime Policy, Marine Strategy Framework Directive, and the Common Fisheries Policy. The salient point is that there are multiple uses of the ocean, marine ecosystems face multiple stressors, with multiple user-groups or stakeholders interested in the ocean, and covered by multiple mandates and jurisdictions to manage components of the ocean. These all often intersect in orthogonal means. The trade-offs within and across a growing number of ocean-use sectors and changing use patterns is primarily why an integrated, more systematic means of managing the ocean is needed (Smith et al., 2017). This is associated with the prioritisation of management objectives. Furthermore, many stressors have second or even third order effects, and although those stressors may be managed directly, they can have far-reaching consequences on other facets of ocean ecosystems and uses. Hence, the need to consider cumulative effects in a marine ecosystem.

EBM is a broad approach to ecosystem management that is predicated on using the natural ecosystem boundaries as a framework rather than being confined by political or administrative boundaries. By ecosystem, we mean beyond biological or ecological systems, necessarily including human systems as well. The critical feature of EBM is it acts as a systematic, holistic lens through which to approach ocean management.

EBM can increase certainty in and legitimacy of the decision making process. Good practice should result in more accessible, transparent, and interoperable data. Threats and opportunities can be explicitly identified. It provides a forum for alignment of management objectives with societal preferences and changing values. Whilst initial setup costs might be high, it is likely to bring about savings in future expenditure. These issues will be further explored in section 5 of this report.

EBM suggests institutions and organizations need to act differently, approaching ocean management in a comprehensive way, adding in new values and considerations that have traditionally not been incorporated in ocean management decision making. Into the future EBM will focus on an ecosystem basis -meaning a dynamic, interactive environment that is made up of human, biological, and ecological spheres.

## 1.2 Why talk about mandates in an EBM context?

The need for EBM necessitates a more comprehensive, systematic look at issues facing the management of ocean resources, goods, and services. Yet an impediment to the implementation of EBM has been recognized as the **perceived** lack of a clear, cross-cutting mandate to do EBM (Marshak et al. 2017). There is a lack of clarity in both the enabling authorities to conduct this more systematic EBM, and also in terms of the actual venues where such management decisions are made. Existing, single sector mandates have the ability to realize some facets of EBM (e.g. NMFS 2016), and some individual mandates have been interpreted as allowing for this comprehensive approach.

In order to manage anthropogenic activities through EBM, there is a hierarchy of legal instruments that range from the local, through national, regional to international (as an example see Boyes & Elliott (2014)). Similarly, and given the plethora of activities and sectors, there are many administrative bodies in all maritime states charged with managing the activities, thus producing a complex array (Boyes and Elliott 2015). It is constructive to consider what constitutes a mandate and document mandates that address

specific sectors/activities or pressures in order to address all ecosystem components or ocean uses, and collectively to describe the need for EBM. Whilst documentation of regulatory mandates has been done for some jurisdictions (see Boyes et al. 2016 for a UK example) a comparative characterization across North Atlantic jurisdictions has not been undertaken systematically.

A preliminary evaluation of governance coverage and mandates will help identify the research that is needed to support EBM. Furthermore, conducting such an exercise helps to identify important efficiencies across national and international obligations, characterizes critical juncture points, and determines how conflicting uses and trade-offs can be addressed.

EBM spreads its scope from local to international management challenges. In the context of AORA, we will focus our evaluation on international, regional, and national mandates and governance challenges.

### 1.3 The key question

Workshop participants formulated the following question:

Considering the common understanding of the need for EBM at the national and international level, and the lack of sector cohesion in its implementation, what is the current context of mandates for implementation of EBM within and across jurisdictions of the US, Canada, and the EU?



The majority of workshop participants.

### 1.4 Reading the report

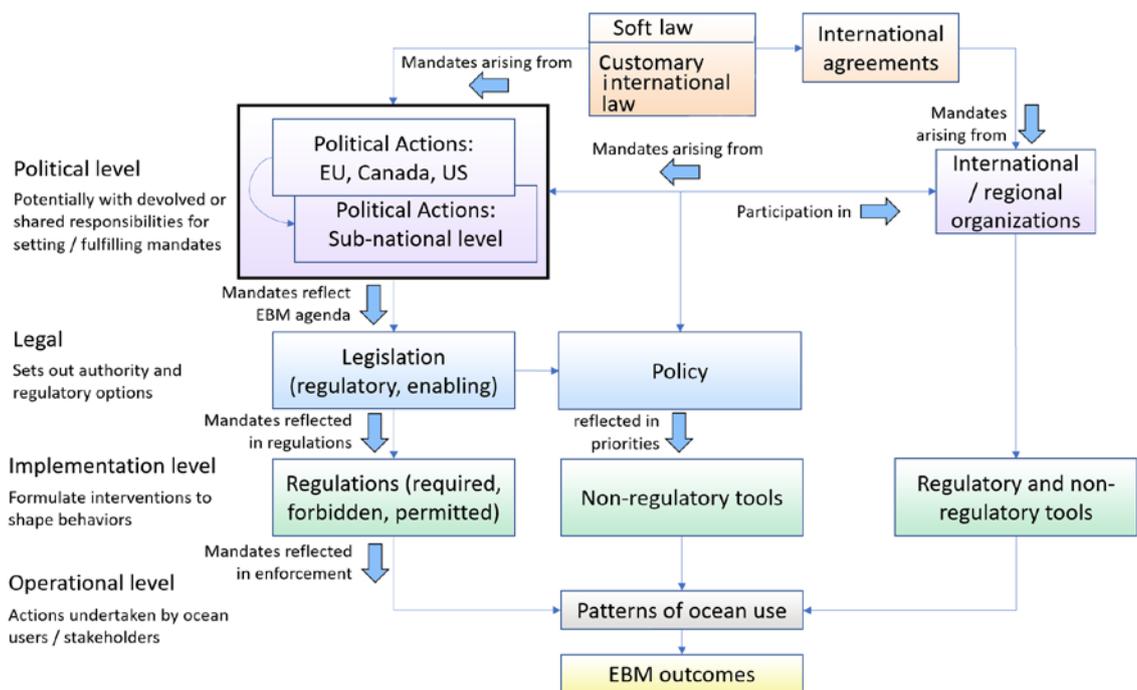
The report is structured along the following lines. The next chapter considers what constitutes a mandate, what do we mean by governance, and makes a distinction between legal enabling/regulating mandates and other policy mechanisms. This is followed by a chapter on the existing regulatory mandates, including an expert opinion on the implementation of EBM principles in the three jurisdictions and a preliminary

scan and comment on the regulatory mandates that cover elements of EBM (anthropogenic activities, pressures, issues of concern).

Chapters 4 and 5 explore the impediments to implementing EBM mandates and the potential merits of implementation. The report concludes with a summary section that highlights areas for further research and provides key recommendations.

## 2 What is a mandate in an ocean governance context?

EBM emphasizes the maintenance or enhancement of ecological structure and function, and the benefits that healthy oceans provide to society. It necessarily requires a degree of coordination across countries that share ecosystems, and among government agencies and departments that have varying responsibilities relating to ocean health and marine resource utilization. Understanding the potential for EBM to achieve ecological, social, and economic goals requires improved understanding of how governments structure and implement EBM. To organize our analysis, we propose a multi-level approach (Figure 3.1), reflecting political mandate, legislative structure, and non-regulatory implementing policy. We consider both the mandates themselves and the degree to which there is commitment to implement them (e.g., through the strength of discourse surrounding EBM, the discretionary scope of legislation or regulations, and the resources dedicated to achieving EBM goals).



**Figure 2.1** The conceptual multi-level approach used by the task group depicting political mandate, legislative structure, and non-regulatory implementing policy.

Political leadership is a necessary factor in the successful implementation of EBM given that it usually crosses political and administrative boundaries. Political leadership is often expressed through political mandate and may be reflected in a variety of ways. It can be formally expressed through legislative or programmatic action or more fluidly via informal means such as policy declarations (i.e., statements by Ministers or the annual budgeting process). In Europe, there is substantial political depth behind mandates for EBM as evidenced by European Parliament Motions (European Parliament, 2018). In Canada, there has been a long-standing commitment to EBM through the Oceans Act, and recent initiatives to expand the scope to marine conservation as well as biodiversity objectives. In the US, there are also broad mandates in place to facilitate EBM. Areas beyond national jurisdiction (ABNJ) also increasingly appear to be garnering a political mandate for EBM (European Parliament, 2018). The broad engagement

of groups potentially affected by ocean development or change (e.g., indigenous communities, resource users, coastal communities, etc.) may represent an influential source of political will to engage in EBM. The appropriate allocation of resources to enable the implementation of EBM is a critical indicator of the level of political support.

There have already been some analyses of legislation relevant to EBM (Boyes and Elliott 2014, Boyes et al. 2016, Bigali 2015, van Hoof 2015, WWF 2013, Foran et al. 2016, Parenteau et al. 2008) and EBM implementation (Arkema et al. 2006, Fluharty 2012; Leslie and McLeod 2007, NOC 2013, ORAP 2013, Tatenhove et al. 2014, Samhoury et al. 2014, Salomon & Dross 2013, Dell’Apa et al. 2015, Marshak et al. 2017, Link and Browman 2014, 2017), but relatively little on political and legal mandates for taking action to achieve EBM (but see Boyes and Elliot 2014, Boyes et al. 2016).

Legislation across jurisdictions (US, Canada, EU, and ABNJ) differs to some extent on how EBM is defined and the specific processes and standards that it involves. In some cases, other types of management strategies could include some of those typically associated with EBM or help achieve EBM goals. There are also differences regarding implementation and enforcement mechanisms across jurisdictions, as well as in the flexibility that authorized agencies and departments have to use specific types of rules or non-regulatory policy tools to achieve EBM goals.

In addition to legislation that largely focuses on formal rules and regulatory action to implement EBM, there are informal enabling or non-regulatory policy tools that can be used. These can take the form of incentives at the discretion of departments or enforcement agencies, capacity building, education, and awareness as examples of interventions that increase the likelihood of achieving EBM objectives. These types of tools can be used alone or in conjunction with formal rules to help move jurisdictions towards desired EBM outcomes, thus there are opportunities to strategically combine different types of interventions and investments to achieve synergies in protecting or re-generating benefits from healthy ocean ecosystems.

### **3 A preview of legal mandates in the AORA jurisdictions**

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#### **3.1 Are the principles of EBM implemented through mandates?**

Based on an adapted list of principles of Ecosystem Based Management from the Convention on Biological Diversity and FAO Ecosystem Approach to Fisheries principles, experts provided a yes/no/uncertain judgement of the current status of practical implementation of EBM in the AORA and ABNJ jurisdictions (see Table 3.1). Workshop participants felt that this list of principles reflected the broad elements of EBM, although with a bias toward biodiversity issues and natural resource exploitation. However, as a first exercise, the table provided a useful suite of principles by which to initially consider successful implementation. The evaluation of successful implementation of a principle, or not, was made through a process of expert opinion, rather than a more thorough review of implementation of enabling legislation in a given jurisdiction. The international (ABNJ) component was viewed as too wide-reaching with contrasting elements (e.g. seabed vs water column; treaty vs customary law) to give any meaningful indication that would be relevant in all cases. Overall, evaluations are opinions/generalizations, however, they provide an indication that the principles of EBM are recognized within all three jurisdictions, but that realization of implementation of all principles has not yet been achieved.

This kind of analysis could be better executed using formal expert judgement approaches, reviews, or interviews.

**Table 3.1 Expert opinion of realization (practical implementation) of principles of EBM in Canada, the European Union, the United States, and at the international (i.e. ABNJ) level.**

Principles of EBM (from CBD & FAO)	Canada	European Union	United States	International
The objectives of management of land, water and living resources are a matter of societal choices.	y	y	y	y
Management should be decentralized <sup>1</sup> to the lowest appropriate level	y	y	y	y
Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.	y	n	n	?
Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context.	y	y	y	?
Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in a social context.	n (emerging concept)	n	n (emerging concept)	?

<sup>1</sup> Unclear meaning of decentralized, could also be devolved or subsidiarity.

Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in a cultural context.	n (emerging concept)	n	n (emerging concept)	?
Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be an objective of the ecosystem approach.	y	y	y	y
Ecosystem must be managed within the limits of their functioning.	n	n	n	?
The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.	y	y	y	y
Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.	? (varies by mandate)			
Management must recognize that change is inevitable.	y	y	y	y
The ecosystem approach should seek the appropriate trade-off (balance) between,	n	n	n	n

and integration of, conservation and use of marine resources (e.g. biological diversity).					
The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.	y	n	? (varies by mandate/region)	? (varies by mandate/region)	
The ecosystem approach should involve all relevant sectors of society and scientific disciplines.	n	? (varies by region)	y	?	
Recognizes the interdependence between human wellbeing and ecosystem well-being (FAO).	y	y	y	?	
Ensure that an appropriate policy, legal and institutional framework is adopted to achieve the sustainable and integrated use of the resources (FAO).	y	y	y	?	
Is the institutional framework utilized?	y (varies)	n	n	?	
Reconciling objectives (prioritization and trade-offs)	y (varies by region)	n	y (varies by region)	?	

Recognizes the need to maintain the productivity of ecosystems for present and future generations (FAO).	y	y	n	?
Endeavour to establish and preserve equity in all its forms: intergenerational, intragenerational, cross-sectoral, cross-boundary and cross-cultural, with special attention given to rights of minorities (FAO).	n (with exception of current Reconciliation activities)	n	n	?

### 3.2 Mandates with respect to elements of EBM

Among the main types of mandates (Figure 2.1), legislative and regulatory aspects have received some attention and study in these jurisdictions (Bauer et al. 2015, Boyes and Elliott 2014, Boyes et al. 2016, Bigali 2015, van Hoof 2015, van Hoof et al. 2012, WWF 2013, Foran et al. 2016, Parenteau et al. 2008, O’Hagan 2013). Systematically evaluating mandate coverage relative to various ocean uses and stressors, as well as comparing across jurisdictions, has demonstrated value (e.g. AORA 2017, Boyes and Elliot 2014, etc.). A preliminary list of those mandates relative to ocean uses, goods, services, pressures, and stressors was compiled at prior AORA working group meetings (AORA 2017). An updated, list of legal mandates (enabling legislation) as related to the major ocean uses and stressors is provided in annex 4. We note that there are other types of mandates (e.g. executive regulations, directives, guidelines, policies etc.) that could also be considered and to a limited extent a few are; yet this list covers primarily enabling legislative mandates and although comprehensive among those, may not convey fully all the prescribed regulatory mandates in a jurisdiction. With this caveat, from the list of EBM elements (annex 4), we can glean four points.

First, there are notable commonalities across the jurisdictions. Irrespective of the detailed requirements of these authorizations or the efficacy of their actual implementation, most of the major ocean uses and pressures often associated with the ocean—e.g. water quality, fishing, shipping, offshore energy, mining, toxin and pollution mitigation, touristic use—have some form of enabling legislation coverage.

Second, following this level of commonality, the facets of ocean uses, goods and services, as well as various ocean stressors and pressures covered by mandates is rather comprehensive. Certainly there may be some gaps (noted below), but many aspects of ocean use and pressure indeed have some representation by enabling legislation.

Third, there are some gaps in mandate coverage for some ocean uses and pressures. For instance, some of the more recent technological developments seen in fields like marine biotechnology, marine derivatives and bioproducts, and marine bioprospecting do not have many, if any, clear legislative mandated coverage across these jurisdictions. This is linked to the management of genetic materials which is similarly limited in mandate coverage across jurisdictions, as is geothermal uses. Sea level rise is another important issue lacking a directly associated mandate. As is the need to directly address destructive jellyfish blooms. Additionally, some ocean uses or stressors are addressed in mandates in most jurisdictions save one or two. For example, biodiversity has direct mandates except in the United States, although that jurisdiction does have an endangered species act similar to all others. Another example is that ocean acidification, and considerations of heritage or special places are directly addressed, except in the EU.

Fourth, many of the gaps that do not have direct mandate authority through enabling legislation may in fact be covered by comprehensive, overarching laws or policies. All jurisdictions have some mandate to address cumulative impacts, and many of the sectoral-specific mandates have provisions to consider other factors. Additionally, all jurisdictions have a mandate, or at least non-legislative policy, to consider an integrative, systemic look at ocean-use. Again, this does not speak to the efficacy with which these overarching (i.e. an umbrella) mandates have been interpreted or implemented, but theoretically the ability to consider the majority of ocean uses and stressors exists.

These observations represent the directly observable and obvious facets of legal mandates that cover ocean uses and stressors. There are also three other, emergent considerations arising from the table.

One of these is that there are obvious instances where the objectives from these mandates within (and across) a jurisdiction are not aligned. As noted in the introduction, the concern of conflicting mandated objectives is one important reason we are attempting EBM. There are many instances where marine resource utilization and marine resource protection mandates have very different desired outcomes that are mutually exclusive (e.g. some fishing and biodiversity objectives, or port growth and tourism targets). For example, maintaining port growth and tourism often have conflicting objectives. As does maintaining fisheries catches relative to various conservation targets of some protected taxa. The need to prioritize objectives and address these trade-offs is strongly implied from a list of such mandates.

Another emergent feature from this table is the redundancies and ambiguities in coverage. It is unclear what effect that has in terms of authority to address ocean uses and stressors, but likely has important ramifications for the implementation of the mandates. Questions remain relating to the identity and functioning of the lead implementing organization, both within and across jurisdictions.

The final implied output from this table of legal mandates is that there are enough mandates to do EBM. Certainly, facets of EBM have been implemented within sectoral-specific applications of these mandates. Moreover, across them, especially using the provisos in the “umbrella mandates,” recognizes that EBM is legally allowable, and in fact likely advisable given the range of complexity among these mandates, ocean uses, ocean stressors, and jurisdictions.

### 3.3 Use of mandates in practice towards EBM

This raises the question: are there any mandates that clearly call for a systematic evaluation of ocean uses and pressures via EBM or similar approaches? The regulatory and policy mandates described in annex 4 reflect sufficient authority in all three jurisdictions (this may not reflect areas beyond national jurisdiction) to engage in effective EBM. A consensus has emerged that EBM is an appropriate and preferred approach to manage ocean areas. Language supporting an EBM approach has been incorporated into many legislative and policy instruments in all three jurisdictions.

Effectively implementing EBM in practice has been hindered by a lack of political will as well as institutional impediments within the three jurisdictions (*cf.* section 4). For example, in the United States, there is no comprehensive ocean legislation that mandates the application of EBM across ocean sectors. Recommendations by the National Commission on Ocean Policy created under the auspices of the Oceans Act of 2000 established a strong framework for the implementation of EBM in U.S federal waters. This was further codified by an executive order formalizing the National Ocean Policy (Executive Order 2010). However, few of these EBM-related recommendations have been put into practice by most federal agencies with ocean management regulatory authority. Instead, management of ocean activities continues through an assortment of different pieces of legislation, regulations and directives, depending on individual activities such as fisheries, hydrocarbon development, or habitat protection. This makes it exceedingly difficult to implement EBM effectively across sectors and agencies. Additionally, the broad power delegated to the executive branch to interpret and implement legislative and policy mandates can radically shift the emphasis and implementation of EBM depending on the political desires of each presidential administration.

Federalism also plays a role in complicating the implementation of EBM in U.S. ocean areas. Each state has effective authority in ocean areas adjacent to their coasts. Political influences and pressures relating to ocean activities in state waters vary greatly in the different regions of the nation and may diminish the political will to implement EBM approaches on a national scale.

Canada has long term commitment to EBM through its Oceans Act, a federal statute that establishes broad principles by which Canada will manage its ocean territories. The Act prescribes that an ecosystem approach be applied in the protection and preservation of the marine environment, and for the conservation and protection of fishery resources. Implementation of EBM has been largely conducted on a regional basis through integrated planning processes and has been supported by a number of initiatives such as the 2007 launch of the Ecosystem Research Initiatives. As with other jurisdictions there has been some overlap in the implementation of EBM with other tools such as marine spatial planning and/or coastal zone management. A significant barrier to the implementation of EBM remains the lack of coordinated effort in the management of ocean related activity among the federal departments, as well as with provincial and territorial governments.

The EU's Integrated Maritime Policy (IMP) provides an overarching framework for a "more coherent approach to maritime issues, with increased coordination between different policy areas"<sup>2</sup>. It addresses key aspects for a more holistic approach to maritime governance such as an agenda coordinating economic activities (Blue Growth Strategy), marine data and integrated surveillance, or sea basins strategies. However, as the umbrella instrument for overall coordination of maritime activities across different Directorate Generals and different coastal states, the IMP is weak, in legal and financial terms (lacking an adequate funding mechanism), compared with the sectoral policies which it is supposed to integrate. Salomon and Dross (2013) for instance criticise the lack of "objectives for European maritime policy that are valid for all sectors" (Salomon & Dross, 2013). Jones et al. (2016) find that Marine Spatial Planning (MSP), which is the key cross-sectoral tool to achieve integrated maritime policy, has so far not been used appropriately in the member states so that it has not achieved its main objective, the integration of objectives originating from different maritime sectors.

So far, the objective of establishing an integrated EU maritime policy has not been met in several respects. At the same time it must be acknowledged that achieving an integrated maritime policy across states and across departmental boundaries requires a high level of ambition.

The Marine Strategy Framework Directive (MSFD) provides the environmental pillar vis-à-vis sectoral EU maritime policies and is unique (in terms of EU marine legislation) in having an ecosystem-based approach. Under the MSFD, each member state has to develop a marine strategy in order to contribute to the achievement of Good Environmental Status by 2020 (GES; main goal for EU marine waters established through the MSFD; O'Hagan 2013). While developing such marine strategies, member states are required to cooperate, preferably through regional seas conventions (O'Hagan 2013).

As holds true for MSP, the MSFD is characterized by weak and uncoordinated implementation in the member states, and for instance creates asymmetries with fisheries legislation which is an exclusive competence of the EU (van Hoof and Tatenhove 2009; Tatenhove et al., 2014; van Hoof 2015).

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<sup>2</sup> [https://ec.europa.eu/maritimeaffairs/policy\\_en](https://ec.europa.eu/maritimeaffairs/policy_en)

Thus, there are clear authorities to execute EBM in all jurisdictions. These umbrella mandates exist, allow for and even call for EBM, recognizing the importance of considering an ecosystem approach. Yet in practice, they have seen limited implementation across all jurisdictions for a variety of reasons.

## 4 Impediments to implementing EBM mandates

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There are a number of potential impediments to the implementation of EBM in the North Atlantic. Considering them is imperative if EBM is to be successfully implemented. Identifying them also opens up opportunities to facilitate EBM implementation and catalyse innovative tools and approaches to support sustainable use of shared North Atlantic marine ecosystems.

### 4.1 Conflicting interpretations of laws and mandates

EBM may be impeded due to conflicting interpretations of laws or regulations. For example, the Endangered Species Act (ESA) in the United States has traditionally been interpreted to require that federal agencies ensure that their actions are not likely to jeopardize the continued existence of any listed species or adversely modify their critical habitat. This interpretation often places the sole emphasis on single species and prevents taking a broader more holistic and integrated EBM approach that focuses on broader ecosystem functions.

This traditional interpretation, which narrowly focuses on the health of one species, is increasingly being criticized in favour of broader EBM approaches to fulfil the mandates of the ESA. Under this newer interpretation, if the best scientific evidence shows an EBM approach would better protect and enhance the biological requirements of listed species, agencies should have the authority to employ that method of recovery. It should be noted that this interpretation has not been fully tested in the courts and it is still legally unclear whether EBM may be used as a recovery strategy under the ESA. Similar conflicts in both domestic and international mandates may inhibit the effective implementation of EBM. Analysis of these potential conflicts should take place and strategies to circumvent them investigated.

### 4.2 Administrative practices and routines

EBM involves coordinating and considering a broad range of interests in ocean management. One impediment to EBM implementation is that ecosystem boundaries are often incongruent with political, administrative, or legal boundaries. This implies that successful EBM implementation requires engagement across governance jurisdictions. However, there are often either few organizational structures that support this type of cooperative action within government or existing structures are not used. Conflicts can arise over jurisdictional authorities and competition between administrative units can act as barriers to the cooperative and coordinated effort necessitated by an EBM approach. There are rarely the institutional structures available to enable a more holistic management approach as required by EBM.

#### 4.2.1 Organization of government departments and agencies

EBM aspires to inform decision-making processes about trade-offs, synergies, and cumulative effects of different maritime uses and non-uses through a holistic perspective. Implementing EBM requires working across traditional boundaries and challenges existing Canadian, EU, and USA governmental structures, especially in the context of areas beyond national jurisdiction. There is the challenge of bringing together a number of departments to work together on an EBM approach. Departments may not only have competing agendas and mandates, but also different administrative cultures (e.g. different to other departments, finance departments may have a bias towards highly technical analyses based on quantified data, e.g. Howlett et al. 2014) or institutional norms. Moreover, there is a lack of mechanisms and institutions to support integrated

or coordinated approaches, such as budgetary or other incentives to do so. This requires policy makers to remove departmental blinders and engage in a more holistic approach.

For some departments, they may perceive the EBM approach as a threat to their departmental mandate; it may require cooperating with another department in an area traditionally under their mandate, in situations where the benefits of cooperation and outcomes of EBM processes may be uncertain. As an example, a department normally tasked with ocean protection may, under an EBM approach, be required to work collaboratively with a department that regulates a major ocean-use interest such as shipping. Hence, EBM requires significant coordination efforts by lead departments, within and across departments. Reservation against EBM may further be reinforced by an increased number of participants from other departments, increasing the transaction costs required for implementation. The development from the former European Commission's Directorate General (DG) for Fisheries, to a DG MARE with responsibilities for the EU's IMP and its common fisheries policy and DG ENV (environment) and DG MARE sharing the same commissioner can be considered as exemplary approaches to overcome these challenges.

Designing, implementing, and adapting EBM activities so as to meet societal ocean-related goals will take time. Within bureaucracies, potential impediments to EBM implementation can arise due to a variety of staffing issues. Managing EBM initiatives requires a relatively in-depth understanding of issues that cut across the natural and social sciences, as well as of the stakeholders and other departments engaged by EBM initiatives. In environments with high levels of (planned or unplanned) staff turnover, there can be challenges in maintaining the human capacity, institutional memory, and social networks needed to evaluate and manage EBM issues. Further, career incentives may influence individuals' enthusiasm for engaging in EBM initiatives. If EBM is perceived as being an area with limited potential for 'making a mark', it may be the case that individuals on a fast track to managerial positions could seek to avoid working in EBM. Conversely, if EBM was viewed as an area for policy innovation and developing valuable new skills and networks, departments involved in EBM could be viewed as attractive career-building stops.

EBM further requires increased external coordination from lead departments with sectoral representations as well as other actors (e.g. coastal communities). Such out-reach processes are not only determined by time and resource constraints, as well as strategic agendas of lead departments or agencies, but may run counter to departmental routines, depending on administrative cultures dominant in the three jurisdictions and across departments.

#### 4.2.2 Power dynamics

There is often an imbalance in resources, capacities, and spheres of influence between departments. As an example, central agency functions such as finance ministries have significant influence over the allocation of government resources but the actual administration of the EBM function may be occurring in a department such as Fisheries and Oceans that may not have specific resources allocated towards its implementation. It therefore necessitates that the implementing agency persuade the allocating agency to support an EBM approach in order to secure the resources for its implementation.

#### **The Case of the Salish Sea**

The Salish Sea in the Pacific North West is an example for the challenges EBM places on institutional structures and mandates. The Salish Sea is recognized as an ecosystem

based on its natural ecology, geography, and oceanography as well as the traditions of the Coast Salish people. The Salish Sea is transboundary, with its southern-most boundary in Washington State, USA and its northern-most boundary in the top end of Vancouver Island, British Columbia, Canada. The Salish Sea ecosystem is characterized by diverse sectoral and industrial activity including shipping, commercial and recreational fishing, and eco-tourism. The Salish Sea is within the traditional territory of over 70 First Nations and tribal groups who share a common Salish heritage as well as home to significant coastal communities such as Vancouver and Victoria. From a governance viewpoint, the result is complex where there are significant overlapping and often competing authorities including federal and international, state and provincial, municipal and regional, and multiple First Nations. Given the diverse activities underway in the Salish Sea, there are also multiple regulatory and agency activities that oversee marine transportation, fishing, and aquaculture, as examples. Bringing this complexity together to support an EBM process requires overcoming geographic boundaries, political boundaries, and administrative boundaries.

### 4.3 Capacities and operational challenges

#### 4.3.1 Imbalance across sectors

EBM is an approach to ocean management that is predicated on taking a whole-of-ecosystem viewpoint. Within an ecosystem, there are many diverse interests and activities that can vary in size and capacity to engage in the EBM process. For example, oil and gas companies have considerable resources to invest in the scientific research needed to support the decision-making process around EBM. Regulatory agencies and smaller industries may lack the resources and capacity to conduct the same level of scientific research and evidence production. In addition, EBM processes are often lengthy and require considerable commitment in terms of participation and engagement. Again, larger industries are often better placed to persist through the EBM process whereas small organizations or industries may not have the resources to dedicate to the EBM process on an ongoing basis thus limiting their ability to participate and be reflected in the outcomes of the EBM process. This challenge may represent an opportunity by allowing for better partnerships with well-resourced stakeholders or lead departments to ensure that less-resourced stakeholders are at “the table” for EBM discussions.

#### 4.3.2 Stakeholder involvement

Engagement, dialogue and co-creation of evidence and analyses with stakeholders is a key part of effective EBM. Implementation of EBM should always be sensitive to best practice for stakeholder engagement and interaction. Poor stakeholder engagement can be as destructive to the legitimacy of EBM processes and trust relationships as a total absence of stakeholder engagement. In Europe, Advisory Councils (regional stakeholder bodies set up under the Common Fisheries Policy) report that the work load has exponentially increased as more projects, institutions, and bodies call on their participation as formal stakeholders. This results in a dilution of their attention and resentment building towards events run with poor stakeholder engagement, and resulting in a reluctance to accept invitations to unknown new initiatives.

#### 4.3.3 Crises swamp longer-term priorities

EBM requires a long term and persistent commitment for its implementation. However, it is a common challenge that resources and the focus of decision makers can be diverted from the implementation of EBM due to more immediate and urgent issues

that can arise in the policy agenda. For operators of the EBM framework, a critical factor is to recognize the unpredictability of long term political support for their activities and to maintain agility towards identifying opportunities to leverage current events to support their longer-term goals. For example upcoming international conferences such as the G7 Conference result in multiple governments focusing on the specific agenda items that have been defined for that event. With oceans as one aspect of the agenda, EBM operators could use the opportunity to remind decision makers of the importance of their activity and how it benefits meeting both the immediate and longer-term goals. Recognizing the need to nimbly adapt EBM case studies, pilot projects, and specific applications to the “crisis du jour” is a challenge but also an opportunity to garner further support for EBM, particularly if it is viewed as solving problems.

#### 4.4 Maritime boundaries

Maritime boundaries may act as a constraint to effective EBM in cases where there is a difference in management approach, or a lack of cooperation, between neighbouring countries (or, more generally, between neighbouring jurisdictions). One context in which maritime boundaries may start to act as a constraint to effective EBM is Brexit, *i.e.* the United Kingdom’s (impending) departure from the European Union. The United Nations Convention on the Law of the Sea (UNCLOS), in Article 63(1), requires neighbouring countries to ‘seek ... to agree’ upon certain measures in relation to shared fish stocks, *i.e.* stocks that are shared between those countries’ exclusive economic zones. In principle, when the UK leaves the EU, many fish stocks will become shared between the UK and the EU and the Article 63(1) requirement will apply to the UK and the EU in respect of those stocks. Beyond the so-called ‘transition’ or ‘implementation’ period of Brexit, it remains to be seen whether or how that requirement will be implemented. Ultimately, and irrespective of Article 63(1), any failure by the UK and the EU to cooperate on the conservation and management of shared fish stocks may lead to challenges to effective EBM in the waters concerned.

#### 4.5 Conceptualisations of EBM are context-specific

When working across research disciplines and sectors there is a challenge of developing a shared understanding of concepts, language, and approaches (Pennington et al. 2013). When considering ocean-related EBM in different jurisdictions understanding specificities may add to these challenges as EBM is context specific.

##### 4.5.1 Differences in understanding of EBM across jurisdictions

Numerous efforts have been made to define and to characterize the key elements that define EBM. This is in part due to the complexity of the challenge of implementing EBM across multiple political boundaries, scientific uncertainties, and in part due to socio-ecological contextual differences in different countries and regions. Still, the implementation of EBM across all three jurisdictions and even within those jurisdictions can differ significantly. EBM is defined, instrumented, and operationalised through a variety of methods, tools, and indicators in order to make it operational. This lack of specificity around EBM can make it challenging to identify means to implement EBM processes, to work across different jurisdictions, and to evaluate outcomes given the diversity of activity involved.

EBM is a broader concept of ocean management but there are a number of similar concepts and policy tools that have been employed by jurisdictions to support ocean management including MSP, integrated marine planning, coastal zone management and integrated ecosystem assessments that share many of the same characteristics. Aspects

of EBM could currently be implemented in some areas but may not be labelled in that manner.

An example of this is the ambiguity and distinction between jurisdictions of MSP vis-à-vis EBM. EBM and MSP are often conflated, and this can lead to confusion of implementation of EBM. Both are important facets of wise stewardship of marine resources. Here we briefly note our perception of the differences between the two approaches to clarify the distinctions among them.

In some locations, MSP is understood as a framework tool that enables the implementation of EBM (for instance in a European context and specifically for the IMP). In other contexts, MSP is interpreted to be similar to EBM in its commitment to a comprehensive approach to marine planning that includes opportunities for considering multiple uses and conflicting values over ocean management.

EBM also requires additional knowledge on rates and processes. The depletion, productivity, and recovery of a component or set of components of the ecosystem. The added value of EBM is the holistic consideration of the ecosystem and the opportunities that can then arise.

**Table 3.2 Comparison of properties of EBM and MSP.**

<b>Both EBM and MSP</b>	<b>EBM</b>	<b>MSP</b>
Can be used as a guiding framework of integrated marine planning	EBM can be used a normative frame through which to design institutional structures	MSP is not useful to changing institutional structures, guiding more local decision making
Can operate at local level	EBM can be translated better to larger scale	MSP cannot scale up in the same manner
Involve extensive public participation	EBM to be fully implemented would require significant national and international institutional changes	Whereas MSP is more localized/regionalised tool that could implemented within existing structures

## 5 Business case for EBM

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EBM challenges conventional ways of ocean-related governance and management, and may even go beyond “environmental integration” challenges, as its basic notion is to not only integrate “the environment” into other sectors activities, but to take a systemic approach and use the capacities and potentials of an ecosystem as the basis for decision-making. To address the challenges EBM places on the variety of actors, common understanding of EBM itself, objectives, and benchmarks are required.

To what extent should we pursue EBM in the North Atlantic? We know that designing and implementing legislation and policy that leads to successful EBM outcomes will be costly; decision-makers therefore will ask about the costs of EBM relative to its benefits. Thus, reiterating the potential benefits of EBM seems warranted.

We suggest categories of costs and benefits to consider the economic merits for EBM. These include:

- considering and comparing the economic benefits (i.e., profits, resource rent capture, and spin-off benefits) of Business as Usual (BAU) scenarios relative to scenarios where EBM is successfully implemented;
- recognizing that private benefits are only one part of the overall benefits accruing to society, accounting for the full value of the environment, including those diverse benefits (e.g., human health, community well-being, technological innovation and spin-offs) that society obtains from healthy oceans and their use; and
- considering and comparing the transactions costs (i.e., the costs of coordination, negotiation, litigation, monitoring, and enforcement) of governance for BAU and EBM scenarios.

### 5.1 Private benefits from ocean resources and societal benefits from the ocean environment

The tools for calculating the economic benefits and costs to private sector organizations and individuals are well established. Other economic benefits to consider include potential spin-off effects (e.g., multiplier effects arising from firms’ purchases of supplies) and government tax revenues. These benefits and costs should be considered over relevant time periods for the implementation and evaluation of EBM initiatives.

#### 5.1.1 Ecosystem services

EBM recognizes the wide range of benefits that ecosystem goods and services derived from nature (Guerry et al. 2015) provide to humanity. Natural capital (the endowment or stocks of environmental and ecological goods in the oceans) supports human well-being in far more ways than simply providing economic profitability for firms and it underpins thriving societies in many ways. The idea of blue natural capital reflects a holistic perspective, protecting this stock of marine natural capital in a way that is consistent with the Agenda 2030, in particular United Nations Sustainable Development Goal (SDG) 14 (Visbeck et al. 2014), to which many countries are committed. This helps to align ‘blue economy’ activities (now particularly important in the EU) with EBM.

Economic activities that adversely affect the provision of other, broader ocean services valued by society thus impose costs on society. For example, an oil spill should not be viewed as a positive economic benefit because it generates employment for its clean-up. A full accounting system for natural capital considers industrial and extractive use

but also a full spectrum of recreational, supporting (e.g., the value of coastal nursery grounds), non-use (e.g., willingness to pay for preservation of marine habitats and biodiversity), and information (e.g., value derived from maintaining undisturbed reference sites for scientific research) values (Bateman et al. 2011).

Non-use values that citizens hold may be particularly important because there is strong evidence that individuals, even those who live far from the ocean, hold positive and significant values for marine and coastal habitats and species, and are willing to pay positive and significant amounts for efforts to protect them (e.g., Carson et al. 2003; Hein et al. 2006; Rudd 2009; Lew and Wallmo 2011). Those benefits – typically a reflection of citizens' diverse perceptions relating to non-consumptive and extrinsic value of ocean resources – can be substantial relative to private sector profits and may have the potential to tip the weighing of uses with regards to some types of extraction uses.

### 5.1.2 Accounting for diverse social values

Not all ocean benefits can practically be quantified in financial terms, so it is important to also consider other values and factors that influence society's willingness to engage and invest in EBM, and how social values evolve over time. For example, in Canada old growth forests were once valued exclusively as a source of lumber, whereas today they are celebrated as pristine environments and critical to the global environmental heritage. In a similar fashion, social values around ocean use have been changing, a product of increased awareness resulting from science and technology that have been exposing the level of degradation of the ocean environment and the consequences to the ecosystems including humans that are dependent on it (e.g., Gelcich et al. 2014). Recent heightened public discussions around ocean plastics is such an example (e.g., Pahl et al. 2017). To be successfully implemented, ocean management frameworks need to accommodate these changing social values.

Social values challenge different knowledge paradigms, indigenous in particular. Financial valuation of ecosystem service, might not practically be carried out (too expensive to justify). Selected valuation methodologies are based on preferences of citizens – as social values change, the financial value of ecosystem services change. A change in societal perceptions about ocean plastics is picked up theoretically and methodologically as the value of clean ocean goes up as awareness goes up. Financial values are not static.

EBM offers a mechanism through which to incorporate these changing values into an integrated decision-making framework. This goes back to problem structuring and influencing transaction costs as this is part of the negotiation and knowledge discovery that is part of EBM initiative design. It does so by integrating the societal, and cultural values into the framework along with the environmental, economic, and technological dimensions.

## 5.2 Transaction costs of governance

While the upfront investment required for EBM will be substantial (involving the integration of knowledge from the natural, social, and legal sciences), the costs of not implementing EBM also need to be considered. Two of the fundamental purposes of governance are to align the behaviour of societal actors (i.e., individuals, firms, organizations, etc.) with overall societal interests and to increase predictability with regards to the causal chain linking human behaviour to risk factors to adverse social outcomes.

From a transaction economics perspective (e.g., Williamson 2000), the effectiveness and efficiency of governance is a function of scale-matching. Specifically, the transaction

costs of governance (i.e., coordination, negotiation, monitoring, legal challenges, etc.) can be minimized by ensuring that the scope of governance is aligned with the geographic, political, and ecological scope of the challenges that are the foci of governance. In the case of EBM governance, a key point is that building governance structures and capacity for dealing with medium to long time horizons can be viewed as an investment to increase social, economic, and political predictability within an increasingly uncertain biophysical environment (i.e., due to increasing anthropocentric pressures, environmental change, etc.). Like any investment, there is a shorter-run investment that anticipates longer-run benefits will outweigh costs of investment.

While there are costs associated with further EBM implementation, there are also significant economic opportunities that could be expected from an improved EBM regime through, for instance, coastal ecosystem restoration, carbon mitigation, and adaptation through natural systems.

### 5.2.1 Relative merits of EBM and business as usual (BAU)

It is useful to highlight some assumptions regarding the anticipated costs and benefits of adopting an EBM governance strategy relative to a BAU strategy. We explore the assumptions around potential future costs and benefits of EBM. While, these may be justifiable based on theory, there is also a need for further clarity on the relative magnitude of the different cost components and their trajectories.

A key assumption is that, relative to EBM, BAU generates higher levels of private sector profit, spin-off effects, and government tax revenue in the short-run. The BAU path also has lower transaction costs of governance in the short-run.

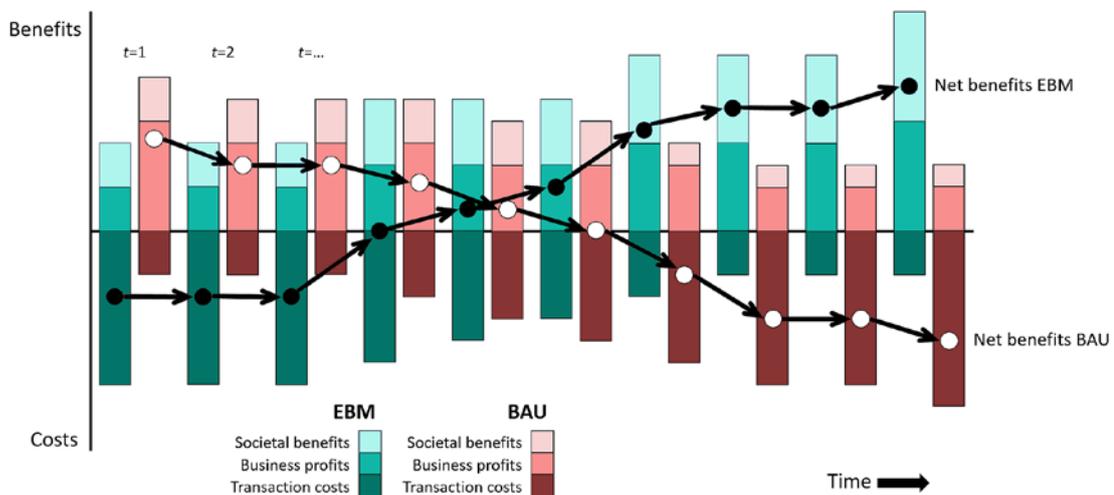


Figure 5.2.1. Assumption driven exploration of costs of EBM relative to business as usual.

The rationale for supporting the development of EBM-oriented ocean governance, however, revolves around a number of broader considerations:

- Economic profitability for the private sector (and spin-offs and tax revenues) will decline if they are over-exploited over time;
- Other non-market and social benefits important to society and derived from ecosystem services are inadequately accounted for under typical governance systems oriented towards BAU;

- Non-market and social benefits under BAU may decline over time due to changing public perceptions regarding ocean conditions (a result of economic value for ecosystem services being calculated based on personal preferences and trade-offs people are willing to accept between financial and environmental well-being – see Rudd, 2009 or Lew and Wallmo 2011);
- The transaction costs of ocean governance will increase over time under BAU given increasing levels of contestation over ocean resource use and conservation;
- EBM involves an investment in institutions for ocean governance, implying a higher cost in the short-run (e.g., negotiations, development of legislation, etc...) but a pay-off that reduces governance cost in the long-run (i.e., due to reduced levels of conflict over more sustainably used ocean resources);
- Investments in EBM serve to increase the predictability of ocean governance, thereby providing benefits to the private sector and that help protect profitability in the face of increasing environmental uncertainty (see below for additional detail);
- A more predictable social, economic, and political environment also influences planning horizons, allowing organizations and resource users to more effectively consider investments in sustainability that provide substantial, but relatively long-run, returns; and
- EBM has a relative advantage compared to BAU in coping with uncertainty due to the deliberative and participatory orientation of EBM.

To return to mandates, we believe that political will is necessary if EBM mandates are to be put forward and successfully implemented. Further, as the business case for EBM grows stronger we should expect to see increased levels of political support for EBM implementation efforts, a phenomenon which could in principle be measured. To draw an example from European renewable energy policy, policy researchers have developed an Index of Policy Activity, which is based on levels of government engagement in policy integration (e.g., through framework policies or ties with other instruments), the scope of the policy (i.e., does it deal with resource producers, users, or both?), policy objectives (in the renewables case, energy intensity versus absolute emissions reductions), budget (e.g., overall amount and relative share of government expenditures relative to tax revenues from a sector), implementation (procedures defined, authorities identified, sanctioning stringency), and monitoring intensity (Schaffin et al. 2015).

While there has yet to be this type of analysis for ocean governance, there has been strong support, particularly from Europe, for EBM over the past decade. The lack of successful implementation may stem from a lack of full political buy-in on the likely effectiveness of EBM. Strengthening the business case for EBM both in terms of quantifying the costs and benefits of EBM to business, government and society, and in terms of demonstrating the potential for achieving EBM objectives successfully both become potentially important in increasing momentum for the development and implementation of EBM in the North Atlantic.

### 5.2.2 Increasing predictability

EBM, as opposed to sectoral approaches, may increase the predictability of ocean decision-making by bringing all of those with permitting/regulatory authority together and streamlining the processes by which ocean regulatory decisions are produced.

When an integrated ecosystem approach is employed, stakeholders are not required to consult with various, multiple agencies and deal with a disparate number of administrative agendas and positions. Instead, stakeholders can be assured that there has been a coordinated effort by the agencies to address all of the potential ecosystem-based issues that may constrain the stakeholder from carrying out a particular type of ocean activity. If EBM is designed and implemented in an effective fashion, regulatory decisions will be more predictable over the long-term. Under a sectoral approach, administrative decisions are made by multiple agencies using different scientific data sets and administrative mandates. This often leads to unpredictable administrative outcomes.

EBM approaches will increase predictability as a result of improved coordination of processes and more compatible and accessible scientific data. Many in the ocean stakeholder community believe that lack of predictability in permitting and administrative decision-making is the primary impediment to successfully investing in ocean activities. (Stern et al 2009, Craig and Ruhl 2014). Unpredictable administrative outcomes is also a primary driver of litigation between stakeholders and governments. Moving away from sectoral approaches and toward more integrated EBM approaches will decrease the uncertainty and unpredictability that spurs legal disputes and litigation.

### **5.3 EBM facilitates other benefits**

Implementing EBM accrues other benefits. These need to be considered in the context of personal, corporate, and societal benefits. This often comes as a means to reconcile competing objectives.

#### **5.3.1 Prioritisation of objectives of maritime uses**

EBM processes facilitate the prioritisation of objectives linked to the various marine uses (e.g. shipping, oil and gas extraction, tourism, biotechnology, etc.). It may thus serve to increase planning security for maritime sectors in a medium to long-term perspective and likewise increase policy coherence and consistency. Prioritisation of objectives may further guide lower-level planning and increase effectiveness of tiering processes. As such EBM acknowledges the inter-connectedness and potential simultaneousness of maritime uses, while intending to reconcile and explicate the direct and indirect effects, positive and negative.

#### **5.3.2 Align societal objectives**

Policy makers must continually ensure that the outcomes of decision-making processes are in accord with the broader societal objectives and to address where possible, conflicts or tensions that may exist between those objectives. EBM has the capacity to bring into consideration those objectives and to reconcile them with decision making around ocean use within a defined ecosystem. An example would be to consider the impact of decision-making around ocean use within the context of the broader economic development framework such as promoting the use of alternative technologies to reduce environmental impacts but also to nurture emerging ocean industries.

#### **5.3.3 Forum and framework for broad objectives**

EBM is an integrated framework that supports the consideration and integration of broad objectives from a multiple of stakeholder perspectives. It is a forum through which diverse sectoral interests, differing government mandates, and public agendas can be articulated for the purpose of facilitating the reconciliation of them. It provides a platform through which these different perspectives can be considered in relation to each other and within the context of broader objectives that frame the key issues in the

ecosystem environment. Functionally, the EBM process can be used as a tool for problem structuring (Hoppe and Hisschemöller 2001), helping to better align scientific effort with policy and societal needs.

#### 5.4 Reframing EBM

One barrier to EBM is the perception that its purpose is to protect the marine environment and prevent stakeholders from engaging in ocean activities traditionally permitted by federal authorities. This is a generally unfounded concern, but this perception plays a significant role in opposition to EBM from stakeholder groups. To avoid this negative perception, it may be useful to reframe EBM to stress its capacity to aid ocean stakeholders in better assessing potential effects both in sectoral and cumulative contexts, **and to identify opportunities** that were missed via solely sectoral-based approaches. Because EBM provides data and information in a more systematic and integrated fashion, permitting and other regulatory mandates may take place with more efficiency and lower costs. By reframing and broadening the goals of EBM to include not just improving the health and stewardship of the oceans, but also streamlining and enhancing the effectiveness of the regulatory process and advancing business effectiveness and opportunities, stakeholders' perceptions may change and barriers to EBM reduced. Emphasizing enhanced growth for the blue economy is a subtle but important shift to contextualize EBM.

There is a substantial body of literature that identifies the determinants of human and organizational action. Key factors include core values for individuals and organizations, cognitive capacity, access to information, and behavioural and institutional constraints. People (and organizations) respond more strongly to increasing levels of perceived threats. Conversely, as perceived opportunities become more attractive, the more likely it is that actors respond to take advantage of them. This propensity to act can be influenced in the short-term (e.g., awareness building among stakeholders or policy-makers) and in the longer-term (e.g., by efforts to increase ocean literacy among members of the public, thereby increasing long-term opportunities for policy-makers to take decisions that improve ocean health).

If these challenges to EBM implementation exist in the North Atlantic, we can expect in less developed regions where capacity is lower, they may be even further vexed. The costs of inaction are just too high, even for countries that have high discount rates (i.e., foreshortened planning horizons) due to current uncertainties in the socio-ecological environment. The example of the North Atlantic could prove an interesting comparison.

## 6 Summary

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Whereas previous AORA discussions have focused on mandate challenges that may be inhibiting the implementation of the EBM, this mandates Task Group workshop led to the insight that while there were some legislative gaps in governance that contributed to the implementation challenges, it was the implementation structure of those mandates that was a significant locus for EBM challenges. This observation resulted from applying the policy-stages heuristic to the overall workshop discussion and demarcating those aspects that were specific to governance and those that related to implementation. In this analysis, it was concluded that there were sufficient legislative mandates to support the decision making to proceed with an EBM approach. Some of the gaps that remained included mechanisms to empower cross jurisdictional or inter-departmental decision making. The majority of identified challenges to the successful implementation of EBM were specific to the implementation process itself, such as overcoming political and administrative boundaries.

### 6.1 Key take-home messages

From a highly interdisciplinary perspective (legal scholars, economists, political and administrative scientists, and natural resource practitioners/scientists), it was noted that:

- Ocean governance today demands a systematic, holistic approach capable of integrating the multiple uses of the marine environment and social, political, ecological and economic values.
- EBM is recognized internationally and within most national policies as a primary means to meet the objectives of systematic ocean governance.
- EBM is predicated on an ecosystem approach that requires cooperation across administrative and political boundaries, and political leadership is an essential feature required to empower EBM.
- EBM draws on diverse knowledge paradigms to inform decision-making.
- There are sufficient mandates within existing legal and policy frameworks to support an EBM approach but some jurisdictions lack an overarching framework and other jurisdictions have a framework without the necessary authority or power to command compliance.
- The major impediments to EBM are not primarily in the lack of (clear) mandates, but rather in the implementation of them.
- Lack of implementation seems to be the major challenge everywhere. Key challenges to implementing EBM have been identified. Overcoming them is not infeasible, but starts with the acknowledgement that these challenges exist:
  - Conflicting interpretations of laws and mandates
  - Administrative practices and routines including organization and power dynamics across government departments and industrial sectors
  - Imbalance across sectors
  - Challenges of stakeholder involvement
  - Crises swamp longer-term priorities
  - Operating across maritime boundaries

- Conceptualizing EBM is context-specific
- The need to communicate the benefits and need for EBM remains, at multiple places of consideration with the business case for EBM being bolstered from an even broader perspective.
  - There are private benefits from ocean resources and societal benefits from the ocean environment from EBM across ecosystem services which account for diverse social values.
  - There are likely reduced transaction costs of governance from EBM compared to business as usual.
  - EBM will result in increased predictability in management and governance.
  - EBM allows for the prioritization of objectives of maritime uses and alignment with societal objectives.
  - Benefits will accrue from EBM with streamlining and enhancing the effectiveness of the regulatory process and advancing business effectiveness and opportunities.
  - EBM stresses its capacity to aid ocean stakeholders in better assessing potential effects both in sectoral and cumulative contexts, and to identify opportunities that were missed via solely sectoral-based approaches.
  - EBM provides data and information in a more systematic and integrated fashion; permitting and other regulatory mandates may take place with more efficiency and lower costs.

## 6.2 Priority research questions

There are very important gaps in our knowledge regarding how ocean governance helps to synergize or support EBM, and how specific mandates signal and shape political, policy, and implementation actions that affect EBM outcomes. This suggests some priorities for interdisciplinary or potentially transdisciplinary research to build understanding of how, when, and where EBM may work:

- Is there a need for an exhaustive and more comprehensive review of the gaps in current legislation, and certainly non-legislative mandates, across jurisdictions?
- Do we need a newer, stronger, overarching, framework policy for EBM in each of the jurisdictions?
- What is the cost effectiveness of different approaches? (stressors, re-generators have multiple effects and different costs)
- Does the business case for EBM truly outweigh BAU approaches?
- Are EBM elements that have been identified necessary or sufficient for achieving EBM outcomes / goals? (i.e, do we have to do EBM to get where we want?)
- In EBM, how are intervention options, implementation activities, and the achievement of EBM objectives related? This seeks to understand how layering (new policy approaches such as EBM laid down on top of an existing

foundation of regulations and policy) affects policy outcomes and transaction costs.

- To what extent do the single sector mandates in each jurisdiction potentially conflict with the effective implementation of EBM?
- Are frameworks available to synthesize knowledge from empirical sources with societal and community values and beliefs for trade-off analyses?
- How do international maritime boundaries and the international mandates associated with them affect EBM?
- What are the current conceptions and practices of EBM at various scales in the three jurisdictions? What geographic and political scales of EBM (eg. large marine ecosystem, national, regional, etc.) offer the best chances of success and why?
- How does EBM implementation compare across countries and potentially terrestrial approaches?
- What are good practices with view to EBM-oriented ocean governance?
- What could be innovative approaches and institutions for facilitating EBM?
- How does EBM relate to other ecosystem-related management approaches (e.g. MSP, ICZM)?
- What are the implications of the EBM approach for scientific research and the way science with view to ocean management is organised?

### 6.3 Key recommendations

- Facilitate further institutionalization of EBM;
  - Realignment of funding from research projects to base budget
  - Realignment of calls for research to be multi/inter-disciplinary
  - (Re) consider effectiveness and impact of over-arching integrative mandate(s)
- More effective use of existing mandates to implement EBM
- Consider innovative regulatory and non-regulatory tools to advance implementation of EBM
- Reframe EBM to emphasise benefits
  - Promote on-going awareness among relevant government institutions with respect to EBM
  - Build public support for EBM
- Keep EBM visible on the political agenda with emphasis of moving from “may” terminology to “shall”)
- Mitigate implementation barriers
  - Partly by identifying and acknowledging implementation challenges
  - Partly by continual reframing of EBM benefits to particular contexts

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## Annex 1 Terms of Reference

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### Workshop to Explore Mandates for the Ecosystem Approach

Dates: March 13-16, 2018

Venue: BMA House

British Medical Association, Tavistock Square, London, WC1H 9JP, UK

Overarching Goal: Characterize, compare, and synthesize the mandates that govern marine activities and ocean stressors relative to facilitating EBM in the North Atlantic.

#### Terms of Reference:

1. Review and familiarize with respect to terminology, major classes of stressors, uses, sectors, and pressures (c.f. AORA TG 1 and associated documents; sections 3 and 6 in AORA 2017).
2. Review existing compilations of mandates from prior, with regards to AORA and related efforts
  - a. particularly Table 4.2.1 from Reykjavik document (AORA 2017)
  - b. c.f. also, e.g., Bauer et al. 2015, Bigali 2015, Boyes and Elliot 2014, Boyes et al. 2016, Canada unpubl. doc., WWF 2013, Foran et al. 2016, Mundus & Gregório Pina Calado unpubl. data (to be provided at least 1 month prior to workshop)
3. Characterize main mandates relative to main stressors/pressures and/or uses/sectors for all AORA party jurisdictions (EU, USA, Canada).
  - a. Characterize and elucidate relationships among mandates within a jurisdiction  
(Each jurisdictional expert to provide draft to full Task Group at least 2 weeks (deadline 23 February) prior to workshop, a la Table 4.2.1)
  - b. Evaluate and discuss how well governance is executed/applied (in terms of following mandates, venues, violations, etc.)
  - c. Identify any gaps in mandate coverage
  - d. Identify what factors are facilitating or impeding EBM in a jurisdiction
4. Compare mandates across jurisdictions
  - a. Identify commonalities, gaps and distinctions for all main mandates
  - b. Synthesize What works well, what doesn't?
  - c. Identify common features that facilitate and impede implementation of EBM
5. Synthesize findings
  - a. Identify synergies and opportunities across mandates and jurisdictions

## Annex 2 Agenda

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### Day 1 - Tuesday 13 March 9:00 – 17:00

#### Morning 9:00-13:00

- Welcome, introductions and expectations (Mark)
- Galway Statement/AORA and approach of workshop (Jason)
- Atlantic Ocean Research Alliance Coordination and Support Action (Margaret)
- Review Terms of Reference and workshop aims and approach (Jason)

Health break 11:00-11:30

- Exploration of common understanding - glossary (Ellen)
- What do we mean by mandates? (Mark)
- Agreement of structure of report (Jason)

Lunch 13:00 – 14:00

- Review draft jurisdictional mandates documents that were submitted in advance (Jason; Revised table)
  - Identify commonalities, gaps, and distinctions for mandates
- Health Break 15:30-15:45)
- Review draft jurisdictional mandates documents that were submitted in advance (continued)

**Adjourn** 17:00

Dinner 17:45

### Day 2 - Wednesday 14 March 9:00 – 17:00

#### Morning 9:00-13:00

- Short review of day 1 discussions (Mark)
- Identify what factors are facilitating or impeding EBM in a jurisdiction (Mark; [Marshak et al.](#))

Health break 11:00-11:30

- Compare types of mandates across jurisdictions for EBM (Murray)
- Compare mandates in relation to governance venues (i.e. execution/application/implementation)

Lunch 13:00 – 14:00

#### Afternoon 14:00 – 17:00

- Social drivers of mandates (broader social/political/economic/cultural context for EBM; Mark)

Health Break 15:30-15:45

- Summing up and identify report assignments (Jason)

**Adjourn** 17:00

### Day 3 - Thursday 15 March 9:00 – 17:00

**Morning 9:00-13:00**

- Short review of day 2 discussions (Jason)
- Interactive report development (writing and conversation)

Health break 11:00-11:30

- Interactive report development (writing and conversation; continued)

Lunch 13:00 – 14:00

**Afternoon 14:00 – 17:00**

- Summarize best practice and lessons learnt for advancing EBM in a governance context (Mark)

Health Break 15:30-15:45

- Summarize best practice and lessons learnt for advancing EBM in a governance context (continued)

**Adjourn 17:00****Day 4 - Friday 16 March 9:00 – 13:00****Morning 9:00-13:00**

- Review the draft report and agree follow-up actions (Mark)
- Plans for broader dissemination (Key messages; peer-reviewed publication)
- Opportunities for future related work (AORA; ICES; MSEAS)

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In addition, Daniel Owen (daniel.owen@fennerschambers.com) attended the meeting during the afternoon of Day 2 as an observer.

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#### Annex 4 Legal mandates (enabling legislation) as related to the major ocean uses and stressors

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Cumulative Impacts	Marine Strategy Framework Directive, Environmental Impacts Assessment Directive, Strategic Environmental Assessment Directive	Canadian Environmental Assessment Act Oceans Act (in part)	National Environmental Policy Act (NEPA)	(several international conventions mention this) ESPOO Convention
Integrative, Systems Effects	Marine Strategy Framework Directive	Oceans Act	National Environmental Policy Act (NEPA), Fish and Wildlife Coordination Act (FWCA); Oceans Act (of 2000)	Sustainable Development Goals
Endangered/Protected Species	Birds & Habitat Directive CITES Regulations	Species at Risk Act (SARA) Marine Mammal Regulation, where relevant	Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), *Migratory Bird Treaty Act; Lacey Act	CITES, UNCBD, Bonn Convention, Berne Convention, OSPAR, HELCOM, UNEP-MAP, Bucharest Convention
Biodiversity	Birds & Habitats directives, Marine Strategy Framework Directive; EU Biodiversity Strategy	Canadian Biodiversity Strategy; Oceans Act		UNCBD, Bonn Conv., Berne Convention, Ramsar
Corals	Habitats Directives, Marine Strategy Framework Directive, CFP, EU Biodiversity Strategy	Oceans Act, Canada's Policy to Manage the Impacts of Fishing on Sensitive Benthic Areas	Coral Reef Conservation Act	UNCBD

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Invasive Species	Marine Strategy Framework Directive, Water Framework Directive, Environmental Liability Directive, EU Strategy on Invasive Alien species, and EU Regulation on Invasive Alien (non-native) species (1143/2014)	Fisheries Act, Aquatic Invasive Species Regulations	National Invasive Species Act, Aquatic Nuisance Species Program 16 USC 4722	Ballast water Convention
Gelatinous Blooms			Jellyfish Control Act	
Harmful Algal Blooms	Water Framework Directive	Department of the Environment Act; Great Lakes Water Quality Agreement	Harmful Algal Bloom and Hypoxia Research and Control Act	
Eutrophication	Water Framework Directive, Marine Strategy Framework Directive, Urban Waste Water Treatment Directive	Canadian Environmental Protection Act; Department of the Environment Act; Canadian Water Act; Fisheries Act; Arctic Waters Pollution Protection Act; Oceans Act – Marine environmental quality guidelines	Clean Water Act, NEPA, Water Pollution Prevention and Control Act (33 U.S.C. §1268)	
Toxic Chemicals	Marine Strategy Framework Directive, Water Framework Directive, REACH, Industrial Emissions Directive	Canadian Environmental Protection Act; Department of the Environment Act; Canadian Water Act; Fisheries Act; Arctic Waters Pollution Protection Act;	NEPA, CERCLA, Federal Insecticide, Fungicide, and Rodenticide Act, Water Pollution Prevention and Control Act	Montreal Protocol, CFC Agreement

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Water Quality	Water Framework Directive, Drinking Water Directive, Bathing Water Directive, Urban Wastewater Treatment Directive, Nitrates Directive	Department of the Environment Act; Oceans Act – Marine environmental quality guidelines	Clean Water Act, Water Pollution Prevention and Control Act	
Water Quantity	Water Framework Directive	Department of the Environment Act; Oceans Act – Marine environmental quality guidelines	Clean Water Act, Secure Water Act of 2009, National Integrated Drought Information System Act of 2006	
Water Cycle	Water Framework Directive	Department of the Environment Act; Oceans Act – Marine environmental quality guidelines	Clean Water Act	
Flooding	Floods Directive	Fisheries Act; Oceans Act; Public Safety Canada		
Erosion	Floods Directive, Recommendation on Integrated Coastal Zone Management	Fisheries Act; Oceans Act; Navigable Waters Protection Act; Canadian Environmental Protection Act	Coast and Geodetic Survey Act of 1947, Ocean and Coastal Mapping Integration Act	
Habitat	Habitats Directive including NATURA 2000	Oceans Act, Fisheries Act	MSA, ESA, Coastal Wetlands Planning, Protection, and Restoration Act; National Fishing Enhancement Act	UNCBD
Marine Debris	Marine Strategy Framework Directive, Waste Framework Directive; Port Reception	The Canada Shipping Act	Marine Debris Research Prevention and Reduction Act	Various under IMO

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Plastics	Facility Directive; The Packaging and Packaging Waste Directive  MSFD; Green paper on a European Strategy on Plastic Waste in the Environment; Strategy on Plastics in a Circular Economy; Waste Framework Directive; The Packaging and Packaging Waste Directive; Urban Waste Water Treatment Directive	Canadian Environmental Protection Act; Disposal at Sea Regulations	National Ocean Pollution and Planning Act 1978; Ocean Dumping Act; National Fishing Enhancement Act	IMO and its Conventions regulating commercial shipping; London Dumping Convention; MARPOL; London Convention
Ocean Dumping	Marine Strategy Framework Directive; Ship source Pollution Directive	Canadian Environmental Protection Act; Disposal at Sea Regulations	National Ocean Pollution and Planning Act 1978; Ocean Dumping Act; National Fishing Enhancement Act	IMO and its Conventions regulating commercial shipping; London Dumping Convention; MARPOL; London Convention
Archaeology Preserves & Artefacts	various regulations and standards; Council of Europe Conventions on archaeology & landscape	Parks Canada Agency Act	Abandoned Shipwreck Act; National Historic Preservation Act; Antiquities Act	UNESCO Protection of Underwater Cultural Heritage
Heritage and Special Places		Parks Canada Agency Act	Marine Protection, Research, and Sanctuaries Act (16 U.S.C. §1431; PL 106-513); Antiquities Act	UNESCO Protection of Underwater Cultural Heritage

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Marine Monuments	Council of Europe Conventions on archaeology & landscape	Parks Canada Agency Act	Monuments Act, Marine Protection, Research, and Sanctuaries Act (16 U.S.C. §1431; PL 106-513)	UNESCO Protection of Underwater Cultural Heritage; International Convention on Salvage
Industrial Capture Fisheries	EU CFP, 1995 Fish Stocks Agreement, Conventionsmany regulations	Oceans Act, National Defence Act, Fisheries Act	Magnuson-Stevens Fishery Conservation and Management Act (MSA)	FAO Code, UNCLOS, many tuna Treaties, non-Tuna RFMOs (NEAFC, NAFO in N Atlantic); London Fisheries Convention; ICES
Recreational Fishing	CFP	Oceans Act, Fisheries Act, Fishing and Recreational Harbour Act	Billfish Conservation Act (October 9, 2012), ATLANTIC STRIPED BASS CONSERVATION ACT, The Atlantic Coastal Fisheries Cooperative Management Act	
Aquaculture	CFP, Maritime Spatial Planning Directive	Oceans Act; Fisheries Act; Agriculture and Aquaculture Canada	National Aquaculture Act of 1980	
Seafood Processing		Seafood Processing Act; Fish Inspection Act	FDA Act	
Seafood safety	Basic Fish Regulations; Contaminantsin Food Regulations	Safe Food for Canadians Act; Canadian Food Inspection Agency; Health Canada	Federal Food, Drug, and Cosmetic Act	
IUU	EU Regulation to prevent, deter and eliminate illegal,	Oceans Act; Fisheries Act; Global Affairs (related to diplomatic efforts)	Lacey Act Amendments of 1981 (16 USC 3371-3378), High	

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
	unreported and unregulated fishing (IUU)		Seas Driftnet Fishing Moratorium Protection Act	
Oil & Gas Extraction	Maritime Spatial Planning Directive, Marine Strategy Framework Directive, Environmental Impacts Assessment Directive, Strategic Environmental Assessment Directive	National Energy Board Act, Canada Oil and Gas Operations Act, Canada Petroleum Resources Act, National Defence Act, Department of the Environment Act	Oil Pollution Act (OPA), CERCLA; Outer Continental Shelf Lands Act	UNCLOS; IMO; Regional Seas Conventions
Decommissioning of Offshore Structures (e.g. oil and gas, wind )	Environmental Impact Assessment Directive			Geneva Convention; UNCLOS; IMO; Regional Seas Conventions; London Dumping Convention
Liquefied Natural Gas	Maritime Spatial Planning Directive, Marine Strategy Framework Directive, Environmental Impacts Assessment Directive, Strategic Environmental Assessment Directive	National Energy Board Act, Canada Oil and Gas Operations Act, Canada Petroleum Resources Act, National Defence Act, Department of the Environment Act	Oil Pollution Act (OPA), CERCLA	
Renewables	Maritime Spatial Planning Directive, Marine Strategy Framework Directive, Environmental Impacts Assessment Directive, Strategic Environmental	Energy Efficiency Act; National Energy Board Act; Oceans Act; Canada Shipping Act; Fisheries Act; Migratory Bird Act; Species at Risk Act; Navigable Water Protection Act	Energy Policy Act of 2005 (provides authority to dept. Of interior (BOEM & BSEE) to regulate)	UN Framework Convention on Climate Change (CNFCCC), Kyoto Protocol, Paris Agreement

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
	Assessment Directive; Renewable Energy Directive			
Offshore wind	Maritime Spatial Planning Directive, Marine Strategy Framework Directive, Environmental Impacts Assessment Directive, Strategic Environmental Assessment Directive, Renewable Energy Directive	Energy Efficiency Act; National Energy Board Act; Oceans Act; Canada Shipping Act; Fisheries Act; Migratory Bird Act; Species at Risk Act; Navigable Water Protection Act	Energy Policy Act of 2005 (provides authority to dept. Of interior (BOEM & BSEE) to regulate)	UN Framework Convention on Climate Change (CNFCCC), Kyoto Protocol, Paris Agreement
Geothermal				
Mineral Extraction	Marine Strategy Framework Directive	Oceans Act; Canadian Environmental Protection Act; Canadian Shipping Act; Species at Risk Act; Fisheries Act	Outer Continental Shelf Lands Act; Deep Seabed Hard Minerals Resources Act	
Aggregates	Marine Strategy Framework Directive and other directives	Oceans Act; Canadian Environmental Protection Act; Canadian Shipping Act; Species at Risk Act; Fisheries Act	Outer Continental Shelf Lands Act	
Dredging	Other directives	Navigational Protection Act; Fisheries Act; Migratory Birds Act; Canadian Environmental Protection Act; Species at Risk Act; Oceans Act; Canadian Wildlife Act; Territorial Lands	Marine Protection, Research and Sanctuaries Act; Section 10 Rivers and Harbors Act	

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
		Act; Territorial Dredging Regulations		
Acoustic/Noise	Marine Strategy Framework Directive	Oceans Act, Oceans Protection Act; National Defense	National Environmental Policy Act (NEPA), Marine Mammal Protection Act (MMPA), ESA	
Current regulation	Marine Strategy Framework Directive	Canadian Hydrographic Service; Oceans Act		
Weather regulation		Weather Modification information Act; Canadian Environmental Protection Act; Meteorological Service, Environment and Climate Change Canada		
Climate Change	Clean Air policy	Department of the Environment Act; Oceans Act	Global Climate Protection Act of 1990, Global Change Research Act of 1990	UN Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, Paris Agreement
Thermal Conditions		Environment and Climate Change Canada		
Carbon chemistry/acidification		Fisheries and Oceans Canada Environment and Climate Change Canadian Environmental Protection Act	Federal Ocean Acidification Research and Monitoring Act (FOARAM Act)	
Sea Level		Monitoring – Environment and Climate Change Canada Impact on habitat and other – Fisheries		UN Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, Paris Agreement

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
		Act; Oceans Act Disaster Response – Public Safety Canada		
Coastal Development	Maritime Spatial Planning Directive; Integrated Maritime Policy (IMP); Recommendation on Integrated Coastal Zone Management	Oceans Protection Plan; Oceans Act; Fisheries Act	Coastal Zone Management Act (CZMA) of 1972 (as amended), *National Marine Sanctuaries Act; Coastal Barrier Resources Act	
Coastal Zone Management	Maritime Spatial Planning Directive	Oceans Act; Fisheries Act; Navigable Waters Protection Act	Coastal Zone Management Act (CZMA) of 1972 (as amended)	
Harbors and Ports	Maritime Spatial Planning Directive, Habitats and Birds Directives; Port Reception Facility Directive	Canada Marine Act; transport Canada; Canadian Port Authorities; Navigable Waters Protection Act Provinces and local communities responsible for non-federal ports and harbours	Rivers and Harbors Act , Port and Tanker Safety Act 1978, Coastal Zone Management Act (CZMA) of 1972 (as amended), Coast and Geodetic Survey Act of 1947, Ocean and Coastal Mapping Integration Act; Jones Act; Rivers and Harbors Act; Deepwater Port Act	
Coastal Community Dynamics	Maritime Spatial Planning Directive	Oceans Protection Plan; Oceans Act; Fisheries Act; Indigenous and Northern Affairs Canada	Coastal Zone Management Act (CZMA) of 1972 (as amended)	
Community Well-being	CFP, Integrated Maritime Policy (IMP)	Oceans Protection Act	Coastal Zone Management Act (CZMA) of 1972 (as amended)	

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Recreation	Maritime Spatial Planning Directive, Integrated Maritime Policy	Coastal fisheries Protection Act; Marine Mammal Regulation; Fishing and Recreational Harbour Act; Commercial activities under provincial jurisdiction		
Tourism	Integrated Maritime Policy (IMP)	Coastal fisheries Protection Act; Marine Mammal Regulation; Fishing and Recreational Harbour Act; Commercial activities under provincial jurisdiction		
EcoTourism	EU Agenda for a sustainable and competitive European tourism; Integrated Maritime Policy (IMP)	Coastal fisheries Protection Act; Marine Mammal Regulation; Fishing and Recreational Harbour Act; Commercial activities under provincial jurisdiction		
Beaches/Bathing	Bathing Water Directive; Water Framework Directive	Fisheries Act; Provincial/local regulation; Parks Canada, where located in a national park	CZMA, National Coastal Monitoring Act	
Recreational Boating		Canada Shipping Act	USCG Act	
Maritime Safety	The European Union Maritime Security Strategy (EUMSS), Enhancing Port Security Directive	Canadian Transportation Accident Investigation and Safety Board Act, Oceans Act, Oceans		IMO and its Conventions regulating commercial shipping, MARPOL

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
		Protection Act, Canada Shipping Act, Labour Code		
Maritime Piracy	Recommendation on measures for self-protection and the pre-vention of piracy and armed robbery against ships (2010/159/EU)	Criminal code of Canada		
Human Trafficking	EU Directive on preventing and combating trafficking in human beings	Criminal code of Canada		UN Convention against Transnational Organized Crime: two related protocols: UN Protocol to Prevent, Suppress, and Punish Trafficking in Persons, Especially Women & Children, and the UN Protocol against the smuggling of Migrants by land, sea, and air
Contraband transport		Criminal code of Canada		
Shipping	Air pollutants from maritime transport (Directive 2012/33/EU)	Coasting Trade Act, Provisions of the Customs and Excise Offshore Application Act, Customs Act, Customs Tariff, Pilotage Act, Oceans Act, Oceans Protection Act, Canada Shipping Act , Navigable Waters Protection Act; Canada Labour Code; Pilotage Act; Navig	Port and Tanker Safety Act 1978; Act to Prevent Pollution from Ships of 1980; Intervention on the High Seas Act	IMO and its Conventions regulating commercial shipping, MARPOL

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Transport		Canadian Transportation Act, Canadian Transportation Accident Investigation and Safety Board Act, Oceans Act, Oceans Protection Act, Canada Shipping Act, Navigable Waters Protection Act; Transportation of Dangerous Goods Act	Port and Tanker Safety Act 1979; Act to Prevent Pollution from ships of 1980; Intervention on the High Seas Act	IMO and its Conventions regulating commercial shipping
Shipbuilding and Repair		National Shipbuilding Strategy (Public Works) Shipbuilding practices governed by provincial law where docks located	Jones Act	
Genetic materials		Fisheries Act; Canadian Environmental Protection Act		UNCBD and implementing protocols
Marine Biotechnology	ERA-MarineBiotech (FP7 ERA-NET funding)	Fisheries Act; Canadian Environmental Protection Act		
Marine Derivatives and bioproducts		Fisheries Act; Canadian Environmental Protection Act		
Marine bioprospecting		Fisheries Act; Canadian Environmental Protection Act		
Telecommunication and power cables		Telecommunications Act Navigable Waters Protection Act		UNCLOS
Military Uses		National Defence Act		
R&D		Oceans Act; Industry Canada; National Research Canada	multiple	

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Education		Fisheries and Oceans Canada (lead for overall ocean awareness and education) Environment and Climate Change Canada (ocean health) Global Affairs (international commitments related to ocean use and management)		
Arctic	Integrated EU policy for the Arctic	Oceans Protection Plan Oceans Act; Fisheries Act; Arctic Waters Pollution Prevention Plan Canada Shipping Act (and other transport related authrotites) Acts/regulations of the Territorial Governments		Arctic treaty
Antarctic		Antarctic Environmental Protection Act		Antarctic treaty
MPAs	Marine Strategy Framework Directive, Habitats and Birds Directives	National Marine Conservation Areas Act (Hertiage Canada)* Oceans Act (Fisheries and Oceans Canada)* Canada Wildlife Act (Environment and Climate Change Canada)* *three departmetns have authority to create marine areas for conservation and protection Spec	Marine Protection Research and Sanctuaries Act	UNCBD, RSC

Ocean Uses/Stressors/Ecosystem Goods & Services	European Union	Canada	United States	International/Treaty
Human Health		Health Canada	Oceans and Human Health Act	
Spill response				

## Annex 5. Background and Overview of the Atlantic Ocean Research Alliance

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The Atlantic Ocean Research Alliance (AORA) between Canada, the EU and the US was launched by the signatories of the Galway Statement on Atlantic Ocean Cooperation in May 2013. The AORA intend to advance the shared vision of an Atlantic Ocean that is healthy, resilient, safe, productive, understood and treasured so as to promote the well-being, prosperity and security of the present and future generations.

The AORA intend to advance this agenda:

- by taking stock of and utilising existing bilateral science and technology cooperation and multilateral cooperation frameworks including those related to ocean observation, and ocean literacy initiatives;
- recommending priorities for future cooperation and, where possible,
- coordinating the planning and programming of relevant activities in these areas including promoting researcher mobility.

To date the AORA have identified four priority cooperation areas (in no particular order below) and set-up an AORA Working Group on each of these:

- Ecosystem Approach to Ocean Health & Stressors
- Seabed Mapping
- Aquaculture
- Ocean Literacy

The Trilateral Galway Statement Implementation Committee oversees the implementation of this historic Atlantic Ocean Cooperation and the AORA Working Groups.

The above Committee is made up of three (3) Co-Chairs from the bodies mandated by each jurisdiction to implement the Galway Statement. The 3 Co-Chairs are Trevor Swerdfager, Senior Assistant Deputy Minister, Fisheries and Oceans Canada, John Bell Director Bioeconomy, European Commission DG Research & Innovation, and Craig McLean, Assistant Administrator, Oceanic and Atmospheric Research, US National Oceanic and Atmospheric Administration (NOAA).

The AORA-CSA is one of the vehicles through which the AORA works to implement the Canada –EU-US Galway Statement on Atlantic Ocean Cooperation. The AORA-CSA supports the AORA by organising meetings, workshops and events as well as catalysing opportunities as part of that taking stock and moving forward together with the Atlantic Ocean Cooperation. The AORA-CSA has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement no. 652677.

This meeting/workshop is sponsored by the Atlantic Ocean Research Alliance, and is organised by [Work Package 4 of the AORA-CSA](#), this work package is led by Mark Dickey-Collas (ICES). The AORA-CSA has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement no. 652677.